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Exploring New Horizons in Business and Management

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FOREWORD

The Annual Conference of the EuroMed Research Business Institute aims to provide a unique international forum for the exchange of cutting-edge information. This is achieved through multidisciplinary presentations that focus on examining and building new theories and business models for success through management innovation.

The conference has established itself as one of the major conferences of its kind in the EuroMed region. This is evident in terms of its size, the quality of its content, and the standing of its attendees. Many of the papers presented significantly contribute to the business knowledge base.

The conference attracts hundreds of leading scholars from top universities, as well as principal executives and politicians from around the world.

This year, the conference attracted over 200 people from more than 30 different countries. Academics, practitioners, researchers, and doctoral students from around the world submitted original papers for conference presentations and publication in this Book of Proceedings. All papers and abstracts underwent a double-blind review process. The result of these efforts produced empirical, conceptual, and methodological papers and abstracts involving all functional areas of business.

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Many individuals and organizations played crucial roles in the successful outcome of the 18th Annual Conference of the EuroMed Research Business Institute. We extend special thanks to the Conference Chairs, Prof. Raquel Meneses and Prof. Nuno Moutinho, and the organizing committee from the University of Porto, Porto, Portugal.

A successful conference of this magnitude would not be possible without the professional work and special cooperation of the Track Chairs and Reviewers. Their efforts in reviewing and commenting on the numerous papers submitted to this conference were invaluable. Special thanks also go to the Session Chairs and Paper Discussants, whose interventions and discussions significantly contributed to the success of the conference.

Last but not least, we acknowledge all those who submitted and presented their work at the conference. Their valuable and cutting-edge research has greatly contributed to the continued success of the conference.

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SITUATIONAL ANALYSIS APPROACH: IDENTIFIED TWO KEY IMPEDIMENTS OF YOUTH ENTREPRENEURSHIP GROWTH IN PORTUGAL

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ABSTRACT

The main objective of this study is to identify the key pediments to youth entrepreneurship growth in Portugal. At this moment, the number of youth groups (age 20-45) is more than half of the total population (10.53 million). Since 2021, the government has allocated a huge budget and implemented various plans to provide many supportive programs for the youth group. The reason behind such an initiative is to reduce vulnerable youth groups, increase an entrepreneurial mindset, and obtain sustainable economic growth. In 2023, the unemployment rate was 6.5% higher than that in the previous year. After interviewing using open and closed-ended questions, 71% of respondents did not agree that national spending helps to increase youth entrepreneurship ability and mindset. In contrast, 89% of respondents agree that personal development through understanding economic terminology and national economic conditions will boost the number of youth entrepreneurs and the entrepreneurial mindset. A total of 141 youth participated in this study. Among them, 53% lived in Porto and Lisbon (47%), where 45% were selected randomly and snowballing methods were used to meet the remaining 55%. Face-to-face interviews (1 to 1) were conducted with 35% physically and 10% virtually. The remaining 55% were interviewed after the entrepreneurship-related workshops (35%), training courses (15%), and job fair events (5%). Further studies are required to be conducted on when and how to let the youth groups understand the economic condition and the economic terminology in Portugal.

Keywords: Government Budgets, Youth Groups, Unemployment, Youth Entrepreneurship Growth, & Entrepreneurial Mindset.

INTRODUCTION

Since 2021, the Portuguese government has implemented numerous programs aimed at increasing the progressive development of youth participation in terms of education, employment, ease of life,

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entrepreneurship, and entrepreneurial mindsets (Freires et al., 2025, IAPMEI Report, 2024, and Porfirio *et al*., 2023). Although the government of Portugal allocated various funds to increase economic activity, the unemployment rate rose to 6.5% in 2023. This is the main reason for conducting this research on the youth groups in Portugal. This study aims to discover whether any key impediments are hindering the growth of entrepreneurs or the entrepreneurial mindset among youth groups (Ibrahim and Adeniyi, 2024, and Magala and Mwesigwa, 2024). To finalize the logical and justified outcome, this study used situational analysis to determine the impact factors of youth entrepreneurship (Assimos and Pinto, 2022, and Zhao *et al*., 2021). So, the study was designed to look for the answers to what the impactful outcomes are after implementing various programs by the authority, and if the outcome is not impactful, then what are the key impediments to the growth of youth entrepreneurs or the entrepreneurial mindset?

Why Lisbon and Porto?

In 2023, the total population was recorded as 10.31 million (see table 1), and approximately 60% of the population lives there. Moreover, the unemployment rate was relatively higher in these two regions (Lisbon 7.1% and Porto 7%). Lisbon is the capital (the second largest population lives there) and is considered the best place for youth groups to engage in all types of entrepreneurial activities (Nuno and Hugo, 2022, and Litzky *et al*., 2020). Porto is situated in the northern part of the country and has the highest population. Both cities have reputed educational institutions, corporations and industries. Both places are crowded with tourists and host many national and international events periodically. Therefore, this study was conducted in these two regions.

No	Region	Total No. of Populations	%	Employment Rate (%)		Unemployment Rate (%)	Research Target zone
				All	Youth		
1	Porto	3,640,294	35.28	54.3	30.3	7	1
2	Algarve	478,618	4.64	56.6	28.6	5.6	
3	Centre	2,246,956	21.77	53.3	28.2	5.2	
4	Lisbon	2,921,564	28.31	57.3	25.6	7.1	2
5	Alentejo	537,556	5.21	52.5	26.9	6.1	
6	Azores	240,125	2.33	55.2	30.5	6.5	
7	Madeira	254,070	2.46	54.6	26.5	6	
Total		10,319,183	100				

Table 1. Population and youth groups based on the Region in Portugal

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Literature Review

Key initiatives taken by the Portugal government for youth groups

The Portuguese government has taken initiatives in line with the EU Youth Strategy (EUYS) framework for EU cooperation to enhance youth engagement (Freires *et al*., 2025). In May 2024, the government announced a new plan called "You Have a Future in Portugal". This packaged plan included housing, health, tax breaks, sports, entrepreneurship programs, and more. The authority recently highlighted that the policy is not favorable to youth and causes the destruction of youth's growth in line with the national economy (Rodrigues *et al*., 2024). For this reason, the government has started to push its efforts to engage the youth entrepreneurship mindset through various events. One of the programs is called 'StartUp Portugal', which aims to boost the entrepreneurial spirit in Lisbon (European Commission Report, 2023).

In addition, three entities (ANJE-National Association of Young Entrepreneurs, PEEP-Platform for Entrepreneurship Education in Portugal, and Junior Achievement Portugal Foundation) work alongside the government. The PEEP also organized a program called Youth Start-Entrepreneurial Challenges, involving the Ministry of Education. This program was funded with two million euros for three years. In the form of non-formal and informal learning mechanisms, PEEP also organized a youth program for Green Entrepreneurship and Employability (JEVE) (European Commission – Youth Wiki, 2024). The target group was set for the age between 18-30 years old – to enhance the skills, knowledge, and development of an entrepreneurial attitude towards the green economy.

No.	Particulars	2021	2022	2023
1	Employment rate (15-64 Yrs.)	69.6	71.4	72.4
2	Employment rate (15-24 Yrs.)	23	25.4	28.1
3	Unemployment rate	6.7	6.1	6.5
4	Job Vacancy Rate	1	1.5	1.4
5	Gross Avg. Income (monthly, Euro)	1,740	1,839	1,976
6	Net Avg. Income (monthly, Euro)	1,250	1,317	1,412
7	Remote works (sometimes)	11.3	10.7	10
8	Remote works (usually)	14.4	8	7.7

Table 2. Conditions of youth groups in Portugal

After supporting all the above initiatives, this study looks for the real scenarios of youth groups in Portugal. According to the EURES report published online on February 24, 2025, 10.6 million people lived in Portugal on the 1st of January 1, 2024. The GDP per capita increased by 18% (2018 – 2022). There were 5.4 million people active in the labor market in 2023, with an employment rate of 72.4%

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(see Table 2). The main concern indicated by this study is that the differences between the three years do not show significant changes. Eventually, it is the same flow, even though there were many initiatives taken by the government between 2021 and 2024. The unemployment rate was 6.7%, which was higher than that in 2022. It seems to be challenging, though it shows 6.1% (reduced by the 3rd quarter of 2024). In addition, the job vacancy rate decreased by 0.1 % in 2023, but the average income per person increased to 1,976 euros. Therefore, there must be something unbalancing the situation that hinders the growth of entrepreneurs and the entrepreneurial mindset.

Evidence from a previous study conducted in Portugal

The Flash Eurobarometer 513 report on social entrepreneurship and youth section highlighted some key sections, as shown in table 3. An online survey was conducted in Portugal with 1,002 young people between 15 and between15-30 years old. Many are classified as NEETs (not in employment, education, or training) and are found to be vulnerable while answering the questions (Banha *et al*., 2022).

Q. No.	Particulars	Section 1	Section 2	Section 3	Section 4	Section 5
2	What young people look for in a potential employer	Very Important	Fairly Important	N. V. Important	N. important at all	Don't know
		34%	51%	11%	2%	1%
3	Preference for employed vs self-employment	Self - employed	An employee	Don't know		
		57%	35%	8%		
5	Familiarity with entrepreneurship	Great deal	A Fair amount	Not V. Much	Not at all	Don't Know
		28%	47%	20%	3%	2%
7	Interested to have their own business	Very Int.	F. Int.	Not V. Int.	T. Not Int.	Don't Know
		19%	34%	39%	5%	4%
8	Drivers of youth entrepreneurship	Be a boss	Freedom	Opportunity		
		37%	29%	27%		
11	Youth's goals when setting up a business	Follow interest	P. Impact on world	Innovative Ideas	Become. Wealthy	
		45%	29%	29%	28%	
15	Support needed to start a business	B. plan	Coach / Mentoring	Edu. & Training		
		25%	23%	23%		
16	Support by the EU – EU Effort for starting a business	A great deal	Some Effort	N. V. Much	No. Effort	Don't Know
		16%	29%	36%	13%	6%

Table 3. Breakdown of Eurobarometer findings for the social entrepreneurship report

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Within eight questions, answering question number 2 shows that the majority (34% and 51%) are seeking jobs where the potential employer is important. Of the respondents, 57% prefer to be self-employed rather than an employee (Q. No. 3). This means that they have a high interest in becoming an entrepreneur (Q. No. 7). For question 5, the majority (28% and 47%) agreed that knowledge of entrepreneurship is essential. The main reason for becoming an entrepreneur is to be a boss and have freedom (the majority agrees on that). The above explanation indicates some important aspects of the youth entrepreneurial mindset, such as knowledge, being a boss, freedom, and little support.

In addition, according to the EU report (March 2023) on social entrepreneurship and youth, 46% of youth (15-30 years old) in the EU wanted to start their businesses. Some of the barriers for youth entrepreneurs are a lack of capital or resources, financial risks, insufficient knowledge, and entrepreneurship skills (Handavati *et al*., 2020). This study will find the correlation between the above issues and the outcome of this study. Furthermore, to justify the capacity, capability, or interest in entrepreneurship or entrepreneurial mindset, the study started with the demographic details of the respondents.

Demographic information vs the youth's mindset

Personal information always carries the structure of a person's mindset because it provides the crucial context and background that shape an individual's perspectives, attitudes, and values (Marx, 2024 and Mitan *et al*., 2024). A brief discussion is presented in table 4. Considering these personal factors delivers comprehensive, meaningful information for understanding an individual's mindset and helps to assess the provision of effective support (Alodwan *et al*., 2024).

No.	Particulars	Details	Linked to the mindset
1	Demographic factors	Age, gender, ethnicity, and cultural background	Significantly influence how people think and approach situations
2	Educational background	Level and type of education	Impact knowledge, critical thinking skills, and problem-solving approaches
3	Socioeconomic status	Income level and social class	Affect experiences, opportunities, and worldviews
4	Life experiences	Personal history	Significant events and challenges, shapes mindset and resilience
5	Family background	Upbringing and family dynamics	Play a role in forming beliefs, values, and attitudes
6	Geographical location	Where someone lives	Influences their exposure to different ideas and opportunities
7	Occupation	Career choices and work experiences	Contribute to skill development and professional mindset
8	Health status	Physical and mental health	Conditions can impact cognitive processes and overall outlook
9	Interests and	Personal pursuits	Provide insight into motivation, passion, and

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	hobbies		areas of focus
10	Social networks	Relationships and social connections	Influence perspectives and access to information

Table 4. Key areas of personal information for estimating a mindset

Demographic factors (1) are directly linked to how people think and deal with their situations. In addition, their educational background (2) helps them deal with critical issues. Therefore, highly educated personnel can make better decisions. Effective decision-making also requires social and financial status (3), life experiences (4), family background (5), geographical locations (6), work experiences (7), health conditions (before and now) (8), lifestyle or personal development (9), and social networks (10). Therefore, the youth who gains more numbers within these 10 sections is considered to be in a better condition than others. In addition, many organizations (including government agencies, NGOs, national authorities, educational institutions, financial institutions, industry players, and others) are interested in understanding the mindset of an individual (K and Ma, 2024).

For instance, to determine the quality of a youth who is currently working or who is going to be hired, the HR manager emphasizes 10 key sections (as mentioned above). Some research has discovered that in a small or medium-sized business, having 5-8% of employees (at least) with quality helps the organization to grow fast (Overwien *et al*., 2024). Therefore, collecting relevant personal information to estimate the impact factor can contribute to a better understanding and extraction of a person's potential quality (Setiawan *et al*., 2022).

Impact factors: demographic information vs youth entrepreneurship mindset

Identifying the entrepreneurial mindset of a person through their demographic information (age, gender, education, family financial condition, etc.) can be linked to various influential factors (Wenjun and Panikarova, 2023, and Chatterjee *et al*., 2022). Many studies have explored and found that entrepreneurial ability and mindset stem from individuals' experiences of financial distress. To avoid such bad experiences, they set ambitions and acquire skills (Zelekha and Kave, 2022). In addition, financial distress (poverty issues) tends to force individuals to be more aggressive in their creative mindset for doing something.

Many successful entrepreneurs started their businesses with empty hands due to their past conditions. They forced themselves to change. It changes the mindset and creates a strong connection between poverty-related challenges and entrepreneurial success (Tam *et al*., 2024). Based on the above explanation, this study will look for key impediments through situational analysis for four key impact

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factors: respondents' backgrounds (a), studying and need for financial support (b), their present situation (employed, unemployed, and years of experience) (c), and future expectations (d).

Therefore, this section estimates two impact factors: background and financial needs or support. This is because these factors remain lifelong (past, present, and future) but change over time (according to needs or situational demands). The next section discusses in detail how the study was designed to collect information from youth groups based in Lisbon and Porto.

RESEARCH METHODOLOGIES

This study employs situational analysis to extract the impact factors on youth group entrepreneurship growth. In a generic view, situational analysis refers to a process of collecting and analyzing information to understand the environment, circumstances, and things around the targeted issues (Grzanka, 2020). In a deepening sense, it extracts key factors affecting decisions or choices based on the surrounding situations. Therefore, the analysis covers the types and magnitude of the problems and identifies possible causes (challengeable, critical, complex, and untraceable) (Zhang and Acs, 2018). The results of this study provide comprehensive, relevant, and meaningful information.

Reasons for conducting the situational analysis

This study seeks to identify the direct and indirect relationships, links, or connections between an educated student and an entrepreneurial mindset. There is no way to make a direct connection or a bold statement as a conclusion on an individual without justifying certain measures (Assimos and Pinto, 2022). Therefore, situational analysis is the best choice.

No.	Steps	Particulars	Specific	Processing Flow
1	Defined Purpose	Investigate - how to boost entrepreneurial mindset	Target Group: Youth (20 – 45 years old)	Collected Key Identifiers from the Portugal and EU reports
2	Finding Tracks	Study on what Influenced a person to become an Entrepreneur	Studied other research to find - What areas are still untouched?	Literature review & analysed reports from the national and international seminars
3	Data from the national reports	Study on what kind of strategy were prepared by the national authority for the youth group in Portugal	Searched comprehensive important areas that might be justified to conduct this study	Research on the National Youth Development Programs (Plans, Budget, and other Reports)
4	Conducted Interviews: Physically and Virtually	Interview youth groups (firstly randomly selected then use snowball method to get others) in two cities (Porto & Lisbon)	Focused groups were Current Students, Graduated (employed & unemployed), Industry Professionals, and Entrepreneurs	Randomly selected from workshops, coffee shops, restaurants, shopping malls, universities, popular locations and use snowball methods to find professionals & entrepreneurs

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5	Question design	Total 101 Questions: 60% Open ended & 40% Close ended questions	Applied Search & Share Info techniques: Applied Influential communication method to connect with them	Explained to them the objectives of the research and then engaged for long intellectual conversation
6	Data Analysis	Divided 141 participants answers into four groups Using the Ms Excel to store data and analyse data	Divided all participant into 4 different groups based on the position, status and current conditions	Select Group 1: 35, & Group 2: 35 first then use snowball method to find Group 3: 33, & Group 4: 38 participants

Table 5. Steps taken to implement the situational analysis approach

Here, the measures refer to the logical boundaries where the estimation or judgmental consent is defined according to the surrounding atmosphere or environment. Therefore, situational analysis can be a perfect solution. Situational analysis practices cover broader complex areas to narrow down to identify precisely the identification of impact factors, variables, or issues. To do this, the study considered the following steps, as shown in table 5.

Research design: the reason for segregating respondents into four different groups

The study divided all the respondents (141) into four groups, where the first two groups were selected to clarify the situation and extract the real causes, and the last two groups were selected to justify the extracted causes and suggest solutions through these groups (see table 6). In group one, the respondents consisted of undergraduate (still studying), graduate, and postgraduate students. The second group consists of entrepreneurs, employees, and unemployed individuals. The third group consists of experts from different industries, such as financial institutions, educational institutions, NGOs, and the government. agencies, manufacturing companies and trading companies. The fourth group consists of professionals, such as; freelance consultants, professors, associate professors, assistant professors, PhD students (currently studying), and commercial lawyers.

No. of Groups	Key Stakeholders	Why	No. of Populations Selected	No. of Respondents	Total in a group
Group 1	Undergraduate	Understanding the situation, clarification, find the real causes	20	20	35
	Graduated		10	10	
	Post-Grade		5	5	
Group 2	Entrepreneurs		5	5	35
	Employees		10	10	
	Unemployed		20	20	
Group 3	Financial Institutions	Justifying the extracted	7	7	33
	Educational Institutions		7	7	

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	NGO, Govt. Agencies	causes and suggested solutions through this group	7	5	
	Manufacturing Companies		7	7	
	Trading Companies		7	7	
Group 4	Freelance Consultant		7	5	38
	Professors		7	7	
	Assoc. Prof.		7	7	
	Asst. Prof.		7	7	
	Ph.D Students		7	7	
	Commercial Lawyers		7	5	
Total			147	141	141

Table 6. Segregation of four groups of respondents

To justify the situational analysis, the study looked for demographic information (age, sex, and nationality) (A), other personal information - scholastic background (B), personal health (physical and mental) (C, D), lifestyle (E), criminal records (F), contribution record (G), ambition (H), personal income status (I), and knowledge of personal development (J).

Structure of the question

The structure of the questions was designed with 101 questions that were asked with closed-ended (40%) and open-ended questions (60%). Within these separated sections, each section had ten relevant questions. Most of the questions were interrelated, with 40% of them being multiple-choice questions and 60% taking notes (use code) based on their answers. Among them, 70% of the answers seemed to be very similar, and the study was interpreted through keywords.

Meet respondents: strangers to strangers through the snowball method

The study was conducted in the city of Porto on Sunday, 3rd November, 2024, with a group of five undergraduate students at the Starbucks coffee shop. From that group, the snowball method was implemented to collect the contact information of others (Gierczyk *et al*., 2024). In addition, some groups agreed to and attended interviews through workshops, events, and training courses. On 7th November, the study conducted interviews in Lisbon with a group of students, entrepreneurs, and unemployed graduates meeting at Starbucks coffee shops, McDonald's, offices and universities. Of the respondents, 65% were met physically, and 35% were met online. They were busy and had scheduled different dates.

Data assessments: segregation and analysis

All the collected answers (raw data) were recorded in Excel sheets and segregated into different

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sections based on groups one to four. The questions and answers were placed in separate Excel files and then summarized to interpret key points based on similar answers. On another page, it is divided into situational analysis factors and calculates the percentage of agreement, support, and answers with similar points of view. All analyses are presented as percentages.

Furthermore, to identify the key impediments to entrepreneurship growth, a set of questions was designed to ask them directly, and the majority answered more or less similar points of view. Finally, the study discovered two key impediments, which are discussed in the next section.

FINDINGS

The discussion of findings in this section follows a structured process. It begins with a situational analysis of the present situation (c), which is justified by two key impact factors: background information (a.i) and financial support (a.ii) (see figure 1). These two factors influence a person's education (b.i) and lifestyle (b.ii), driven by financial support from family (b.iii) or self-needs (b.iv) originating from the past (b), all with the goal of achieving their future plan (g). This timeline explains how past situations lead to present conditions, including current self-achievement (c.i), health condition (c.ii), and income status (c.iii). Favorable or unfavorable self-conditions can result in frustration or hopelessness (c.iv), as well as good or bad financial conditions (c.v).

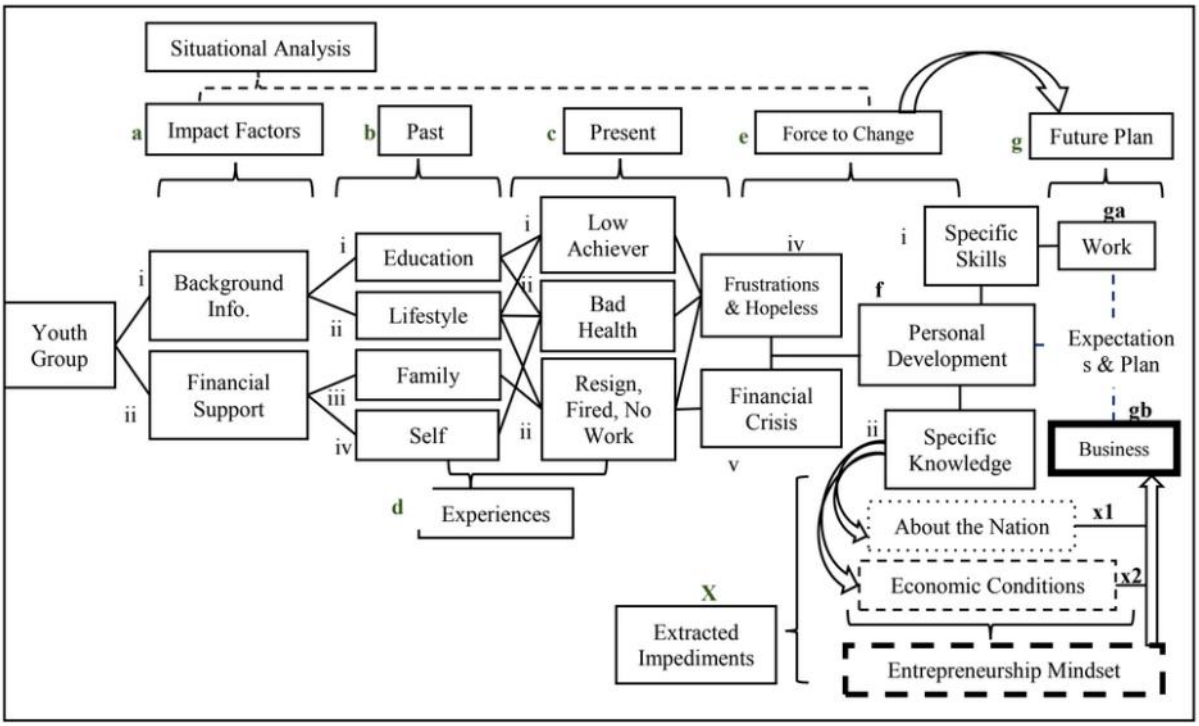


Figure 1. Structure of Situational Analysis to extract two impediments for youth entrepreneurship growth

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The situation described above suggests that individuals' good or bad experiences (d) may prompt them to move forward by mitigating issues and embracing change (e) for personal development (f). This development can occur through acquiring specific skills (f.i) or knowledge (f.ii). Acquiring specific skills will enable them to get a job (g.a). The study, however, faced challenges in obtaining responses, as most individuals were unwilling to engage in business (g.b), primarily due to a lack of specific knowledge (f.ii). As a result, the study identified two key impediments to entrepreneurial ability or mindset: a lack of knowledge regarding economic terminology and national economic conditions. The following section will describe the research findings in detail.

Evaluation of respondents through personal information - education and lifestyle

Seven questions were designed to extract information on age, gender, nationality, social status, work experience, relationship with family, and family economic conditions. The general demographic breakdown of the respondents showed that 45% were male, 50% were female, and 5% identified as other. Regarding age, 49% were 20-24 years old, 40% were 25-29 years old, 7% were 30-35 years old, 3% were 36-40 years old, and 1% were 41-45 years old. In terms of social status, 45% of respondents were single, 35% were in relationships, and 9% were married, with 1% identifying as divorced, widowed, separated, or other. Additionally, 10% of them declared they were living alone (see table 7).

No	Location (%)	Gender	Age (Yrs, %)	Personal status (%)	Relationship with family (%)	Financial Needs	Work Experiences (Yrs, %)	Business Experiences (%)	(e) Force to change (%)
i	Lisbon: 45	Male: 45	20-24: 49	Single: 45	Wonderful: 20	No	< 1: 45	< 1: 4	Agreed: 75
ii	Porto: 55	Female: 50	25-29: 40	Relationship: 35	Average: 60	Yes	1-2: 35	1-2: 5	Not sure: 15
iii		Others: 5	30-35: 7	Married: 9	Bad: 5	Yes	2-3: 5	2-3: 1	Denied: 10
iv			36-40: 3	Others: 1	Very bad: 10	Yes	3-4: 3		
v			41-45: 1		No relation: 5	Yes	> 4: 2		

Table 7. Brief analysis of findings for understanding the youth's present situation

The survey also explored respondents' relationships with family members. A significant 20% reported wonderful relationships, while 60% described their relationships as average to good. Conversely, 5% indicated an average to bad relationship, 10% reported very weak and vulnerable ties, and another 5% had no relationship or bitter relationships with their parents, siblings, and other relatives. In terms of work or business experience, 45% of respondents had less than one year of experience. Those with 1-2 years accounted for 40%, 2-3 years for 10%, 3-4 years for 3%, and 2% had more than four years of experience. Finally, regarding family financial status, the survey revealed that 10% of respondents

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came from upper-class families, 30% from upper-middle-class, 45% from middle-class, and 10% from lower-middle-class backgrounds. 5% of respondents identified as being from poor families.

In brief, the respondents primarily hailed from Porto (55%) and Lisbon (45%), with the vast majority (89%) falling within the 20-29 age range. The gender distribution was nearly balanced between male and female, and 90% were Portuguese. Regarding social status, 45% were single and 35% were in a relationship. In terms of experience, 45% had less than a year of work or business experience, while 40% had 1-2 years. Family relationships were generally positive, with 60% reporting average to good relationships. Financially, 75% of respondents came from upper-middle or middle-class families. This demographic overview provides the foundation for identifying the impact factors influencing their decisions to pursue business or work.

Impact factors: study and financial Support

The survey aimed to determine the extent to which respondents were studying without financial difficulties. The outcomes revealed varying patterns across four groups: in the first group, 60% were solely studying, 31% were studying and working, and 8% were studying and engaged in business; the second group showed 57% only studying and 43% studying and working; in the third group, 51% were only studying during their university life, 42% were studying and working, and 6% were studying and doing business; finally, the fourth group had 42% studying, 52% studying and working, and 5.3% studying and doing business. Overall, across all four groups, 74 respondents (52.48%) were focused solely on their studies without needing to consider financial support, 60 respondents (42.55%) were balancing studying with work, and 7 respondents (4.96%) were combining their studies with entrepreneurial activities.

The study also explored respondents' financial independence, specifically whether they relied on family or personal income. In the first group, 22 respondents (62.85%) were dependent on family income, while 13 (37.14%) had their own income. The second group showed similar figures, with 22 respondents (62.85%) relying on family income and 13 (37.14%) on their own. However, a shift was observed in the third group, where 11 respondents (33.33%) depended on family income, and a larger proportion, 22 (66.66%), relied on their own income. The fourth group continued this trend, with 13 respondents (34.21%) dependent on family income and 25 (65.78%) fully self-sufficient. Overall, across all four groups, 68 respondents (48.22%) were completely dependent on family income, while 73 (51.77%) relied on their own income.

Justifying present situation: employed, unemployed, and years of experience

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The survey aimed to understand the respondents' current professional situation, including their employment status and any frustration stemming from low achievement, poor health, or years of experience. Among the 141 respondents, the majority were unemployed (72, or 51.1%) during the interview period, with 41 (29.1%) employed and 28 (19.9%) engaged in business. Within the unemployed group, 9 (12.5%) had resigned, 8 (11.1%) were fired, 33 (45.8%) were still seeking jobs or business opportunities, and 22 (30.55%) expressed hopelessness due to frustration. For those working, 10 (24.39%) were part-time with no employer commitment, while 31 (75%) worked full-time. In the business sector, 13 (46.4%) were in partnerships, and 15 (53.5%) owned their businesses. Regarding work experience as an employee, 56 (39.71%) had experience, with 13 having less than a year, 19 with 1-2 years, and 24 with 2-3 years. Among entrepreneurs, 29 (20.56%) had business experience: 7 with less than a year, 12 with 1-2 years, and 10 with 2-3 years. Notably, 56 (39.71%) respondents had no prior work or business experience. After identifying these scenarios, the study then focused on understanding their future plans, specifically whether they intended to work or pursue business.

Identified two impediments to youth entrepreneurship growth

After recording the initial responses, two additional sections were created to delve deeper into the respondents' understanding of their country's economy. This included 17 multiple-choice questions and 3 open-ended questions on national knowledge, where 78% of respondents agreed that a lack of understanding about the national economy and its development plans hinders the youth entrepreneurial mindset. The final section, comprising 11 multiple-choice questions on economic terms, found that 86% of respondents agreed that insufficient knowledge of economic terms and the nation's economic condition impedes the development of an entrepreneurial mindset among young people. Interestingly, 71% of respondents disagreed that national spending helps increase a youth's entrepreneurial mindset or ability to be an entrepreneur.

CONCLUSION

The primary objective of this study was to identify the key impediments to the growth of entrepreneurial ability or mindset in Portugal. To achieve this, the study extracted impact factors by analyzing respondents' past and present situations, creating a structured research flow to clearly illustrate the key impediments and how they were identified (see Figure 1). Data was collected through questionnaires and interviews, with a strong emphasis on each person's current situation, recognizing that present circumstances often stem from past conditions. Specifically, we focused on two crucial past factors: education (reflecting an individual's quality and values) and financial needs (encompassing difficulties, stress, struggles, or frustration).

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During the interviews, most respondents expressed reluctance to engage in business, citing increased competition and risk; they felt unable to cope with market demands, lacking clarity on where or how to begin. Furthermore, respondents struggled to comprehend Portugal's current economic climate and economic terminology, highlighting a critical need to educate them on the economy's current state (whether favorable or unfavorable) and to clarify essential economic terms, empowering them to assess their potential as entrepreneurs. While this study was conducted in Portugal and identified these two key impediments, similar challenges may exist in other nations. The increasing complexity of global economies, coupled with citizens' limited understanding of economic conditions, is a growing concern, and governments often don't do enough to inform young people about economic realities and their potential role within the economy. The study faced limitations due to time constraints, respondents' unwillingness to participate, and difficulties in convincing other young people to contribute; therefore, it is strongly recommended to conduct further research on when (age and institution) and how (scholastic system or others) to let the youth groups understand the economic condition and the economic terminology in Portugal.

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DOES THE ESG PERFORMANCE AFFECT THE PORTFOLIO STRATEGY?

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ABSTRACT

The paper attempts to answer the following question: can the pursuit of certain ESG performance standards influence the portfolio strategy choices of corporate headquarters in the same way as typical business logic?

In the paper, through the analysis of the Sustainability reporting of major tobacco companies, the "relationship" between the type of ESG performance that the main standard setters and rating agencies recommend, and the investment choices made by companies is studied.

To achieve this objective, after constructing the conceptual framework, case studies were analyzed. Subject of the analysis were the five major companies belonging to the tobacco industry.

The result was that senior management's desire to achieve certain levels of ESG performance influenced the portfolio strategy choices of corporate headquarters. To provide a managerial tool with which to identify the positioning of a business with respect to sustainability issues, the paper proposes a matrix to formalize what can be called ESG logic.

By reading the text, managers can draw useful indications on how best to approach the creation of an ESG strategy, through investment/disinvestment choices from a business or through sustainability-oriented business model innovation processes. In this way, they will have a broader and more structured view on where to focus their attention, to make investments in sustainability a source of lasting competitive advantage.

Keywords: Corporate Social Responsibility, CSR, Environmental Social Governance, ESG, Portfolio Strategy, Corporate Strategy, ESG Performance, Sustainability, Tobacco Industry, Case Study.

INTRODUCTION

Environmental, Social, and Governance (ESG) criteria have experienced a rapid ascent over the last decade. From a niche concept, they have become a topical subject, both in university classrooms and in the board meetings of Corporate Headquarters. This paper seeks to answer the following question: Can the pursuit of specific ESG performance standards influence the portfolio strategy choices of Corporate Headquarters to the same extent as typical business logics? Through the

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analysis of the *Sustainability Reporting* of major tobacco industry companies, the paper investigates the "relationship" between the type of ESG performance that leading standard setters and rating agencies recommend pursuing and the investment choices adopted by companies.

Numerous companies have begun to implement ESG strategies today; investors have started to include the so-called ESG criteria among the tools used to filter capital allocation choices; rating agencies have found themselves needing to integrate new products into their offerings, capable of generating an ESG performance score for the examined companies; new standards have become necessary to support companies in the transition towards a new form of reporting, no longer merely focused on economic-financial reporting, but capable of incorporating the sustainability performance of companies as well; finally, regulatory bodies, driven by the urgencies of climate change and the major social issues of our century, are developing new and detailed regulations aimed at making compliance with ESG standards a new business practice.

The sudden explosion of the ESG phenomenon has led to the emergence of a multitude of institutional and private actors attempting to support companies in adopting these new reporting and evaluation tools. The confusion generated (Cheng, 2023) has led many academics to focus their efforts on understanding the reasons for the frequent misalignment in the communication methods of ESG performance suggested by major standard setters and, consequently, in the evaluations produced by rating agencies, which are often very distant from each other for the same company. This is because, despite the proliferation of sustainability studies, relatively little is known about how companies incorporate sustainability aspects into corporate strategy (Clementino and Perkins, 2021).

To achieve the paper's objective, both the existing standard system for measuring ESG performance and the rating system proposed by major agencies were first analyzed, through which investors gain access to evaluations of the performance level achieved by various companies on ESG issues. This study served to build the conceptual framework through which case studies were analyzed. The five major companies belonging to the tobacco industry were chosen for analysis. The tobacco sector is of significant interest as it is undergoing a profound transformation, witnessing a drastic shift from the business of combustible products to that of so-called smoke-free products, which lack the harmful health effects caused by tobacco combustion. Furthermore, it was deemed useful to apply the analysis to a specific sector, as results vary depending on the sector in which companies operate and from company to company, given a marked heterogeneity both in the non-financial reporting communicated by companies and in the judgment criteria of rating agencies. Finally, the five analyzed companies cover a wide geographical spectrum, thus allowing for a comprehensive analysis that also considers different sensitivities to ESG issues and reporting

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in various countries. Based on the analyses conducted, it can be affirmed that achieving ESG performance influences portfolio strategy choices and that corporate strategy choices, which to varying degrees have involved all companies in the analyzed sample, are conditioned precisely by what will be defined as ESG logic.

LITERATURE REVIEW

This work is situated within the stream of studies addressing the integration of Corporate Social Responsibility (CSR) activities into Corporate Strategy (CS), in line with the work presented by Collis et al. (2012). This paper provides a useful analytical tool as it allows for the schematization of the five evolutionary stages that CSR can assume within multibusiness companies based on the orientation imposed by the Corporate Headquarter.

The paper by Ioannou and Serafeim (2021) that investigates the topic of ESG policies as a value creation tool is useful. In particular, the authors believe that ESG practices are characterized by a high degree of innovation, to ward off imitative behavior by competitors, as often happens for those initiatives undertaken mainly for regulatory purposes, so that these practices are converted into greater capacity for the company to generate a competitive advantage. Indeed, "[only] the adoption of unique actions is significantly and positively associated with multiple measures of performance" (Ioannou and Serafeim, 2021, p. 1). The paper by Kandpal (2024) is useful as it highlights how, with the advancement of the 21st century, the traditional objectives of businesses, primarily focused on profit maximization, are being re-evaluated. The emerging consensus recognizes the need for companies to play a constructive role in addressing some of the urgent challenges facing society and the environment. This shift is encapsulated in the concepts of CSR and ESG. Born from philanthropic initiatives, CSR now includes a vast spectrum of ethical practices, from labor to environmental considerations. ESG, with its quantifiable parameters, offers an empirical approach to evaluating a company's performance in these areas. Although distinct, CSR and ESG are interconnected, presenting qualitative intentions and quantitative measurements. While the rise of ESG reporting marks a turning point towards transparency, challenges such as lack of standardization and greenwashing persist. Looking ahead, regulatory obligations, technological integration, and changing stakeholder expectations, particularly from younger generations, will shape the future of CSR and ESG. Companies have now emerged as responsible global entities, linking success to planetary and social well-being.

Sun (2024) directly addresses the integration of ESG into corporate strategy and its impact, albeit with a focus on green innovation and digital transformation rather than direct portfolio strategy.

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However, it offers valuable insights to reinforce the idea that ESG is a concept that could influence the implementation of corporate strategies and increase corporate value.

In general, companies communicate sustainability through a combination of tools and channels, to reach a wider audience and ensure greater transparency and accountability regarding their sustainable activities. For this work, the focus will be on the "Sustainability Report", as it is, as stated, the formal document through which companies communicate their ESG performance. Since it is not standardized, it is interesting to compare the evolution over time of this document between companies in the same sector or between companies in different sectors. It is useful to refer to the contribution made by Stroehle and Murthy (2019) who collected what emerged during the OIR, to illustrate the most widespread non-financial accounting and sustainability reporting frameworks existing today.

With reference to the disclosure instruments available to companies, it is observed that in practice there are two broad categories of sustainability reporting: i) *Sustainability Report*: an annual report addressed to investors and external stakeholders of the company; ii) *Integrated Reporting*: a report addressed to all categories of stakeholders and to management itself, as it highlights the existing interdependencies between different forms of capital (financial and non-financial) in the value creation process.

The understanding of these interdependencies is presented as necessary to guide corporate strategy and create a culture of integrated thinking.

Regardless of the type of report the company deems most appropriate to use, decisions about the content to be given to the report are crucial, both from a structural point of view (How to organize the information?) and a substantive one (What to communicate? Which metrics to adopt?). For this purpose, there is a wide variety of frameworks and standards that have arisen with the aim of addressing only one or both dimensions. Among these, the works of Elidrisy (2024) and Diwan (2024) are particularly noteworthy. The latter, in particular, highlights how sustainability reporting is the new language of corporate communication with stakeholders, within frameworks such as GRI, TCFD, and CDP. Companies' non-financial performance is increasingly becoming a critical criterion for evaluating overall corporate performance. The study highlights: i) trending research areas, such as corporate governance, ESG reporting, the role of stakeholders, etc.; ii) the need for research focused on CDP, GRI, TCFD frameworks and more empirical studies on ESG parameters related to operational performance; iii) finally, the predominance of sustainability as a key differentiator and a disruptive tool in the business world.

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METHODOLOGY

In line with Eisenhardt (1989), the approach used in this work to answer the research questions is that of case studies, which is very useful for qualitatively investigating the relationship between the portfolio strategy choices of multibusiness companies and their ESG performance. Operationally, three steps were followed:

1. analysis of the type of performance that ESG standard setters recommend measuring and reporting to stakeholders through their frameworks;
2. study of the sustainability reporting of the examined companies, with a specific focus on the reported practices and their strategic motivations, as well as the evolution of the reporting over time;
3. comparison of the case studies.

Through this analysis process, it was possible to highlight the link between the ESG performance required by the main actors in the ESG landscape (standard setters and rating agencies) and the performance reported and implemented by companies.

As mentioned, the companies operating in the tobacco sector were chosen for analysis, due to the interesting transformation it is undergoing. This phenomenon lends itself well, in fact, to illustrating how the growing relevance attributed to socio-environmental issues (public health in this specific case) can influence the investment choices of companies in the sector. More specifically, the sample of companies whose ESG performance and related reporting method are evaluated are: 1) Philip Morris International; 2) Altria Group; 3) British American Tobacco; 4) Imperial Brands; 5) Japan Tobacco.

Taken together, these companies constitute a form of oligopoly, as they hold a market share of approximately 50% of the tobacco market (Statista: Tobacco Products Report, 2020, p. 29), as well as 90% of the realistically analyzable share; it must be considered, in fact, that 44% of the total tobacco market is represented by the Chinese market, a monopoly controlled by the China National Tobacco Corporation (CNTC), a state-owned company that encompasses a series of tobacco growers and local cigarette manufacturers under its umbrella. This results in the impossibility of having access to any sustainability disclosure. Contextually, the different regulatory sensitivity to sustainability issues, existing across various geographical regions, has made it even more necessary to choose a sample of companies capable of covering a wide territorial spectrum.

The analysis material is therefore composed of: a) the ESG reporting frameworks on which tobacco companies declare to base their reporting; b) the sustainability disclosure published by the analyzed companies.

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For the former, the relevant metrics and recommendations were analyzed, with a particular focus on those related to the social dimension. As for sustainability disclosure, its temporal evolution was studied for each case study, both from a formal point of view – through an analysis of the reporting models adopted and the structure attributed to them – and from a substantive point of view, through a qualitative study of the evolution of the communicated corporate strategy. For each company and for each temporal analysis period (the years considered vary depending on the company and the broadest time span ranges from 2009 to 2022), the following were reported:

a) the title of the disclosure document;

b) the number of pages;

c) the standard setters used;

d) the ratings and recognitions cited;

e) the disclosure topics;

f) the quantitative metrics measuring ESG performance.

Finally, where present, the current criteria for measuring sustainability performance regarding product safety were highlighted, as this dimension was deemed to have the greatest impact on capital allocation choices among different businesses.

At this point, it is important to emphasize that the purpose of the paper is not to understand if and how ESG performance is influenced by the frameworks and rating systems used (a topic extensively covered by existing literature), but, more specifically, if and how the willingness to achieve certain levels of ESG performance influences portfolio strategy choices (a topic still little addressed by academia). For these reasons, the two steps illustrated above will be approached in such a way as to highlight, for each of the two dimensions of analysis – ESG standards and corporate disclosure – only those aspects that are believed to be related to the portfolio choice of tobacco companies to disinvest from the traditional cigarette business and at the same time allocate greater resources to the business of so-called smoke-free products. Therefore, this paper does not report all the metrics that standard setters suggest tobacco companies adopt, such as CO2 emissions or water consumption; this is because they relate to choices that are essentially activities that have no impact on portfolio strategy, limiting themselves to having effects on business operations rather than on CS. Based on these dimensions, a comparison was finally conducted between the companies in the sample in order to identify common patterns and demonstrate how different sensitivities to the issue of ESG performance, reflected in sustainability disclosure, have different impacts on the portfolio strategy choices of multibusiness companies.

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PRESENTATION AND DISCUSSION OF RESULTS

In the first step of the analysis, we sought to answer the question: What performance do standard setters suggest be reported by companies operating in the tobacco sector? To answer this question, the disclosure systems proposed by the standard setters referenced by companies operating in the tobacco sector were examined. For each, the type of information suggested to companies in the sector, which may have had an impact on the portfolio strategy choices of those adopting such standards, was highlighted. The Tobacco Standard developed by SASB consists of two thematic areas – Public Health and Marketing practices – and a section on Activity Metrics. Within the Public Health theme, the suggested disclosure criteria are:

- Gross revenue and (2) revenue net of excise taxes from (a) non-tobacco nicotine products and (b) heated tobacco products;
- Discussion on the process to assess risks and opportunities associated with "tobacco harm reduction" products.

Within the Activity Metrics section, SASB recommends reporting:

- Combustible tobacco product sales volume: (1) cigarette, (2) cigar, and (3) other smoked tobacco products;
- Non-combustible product sales volume: (1) traditional smokeless tobacco, (2) non-tobacco nicotine products, (3) heated tobacco products, and (4) nicotine replacement therapy products.

In the second step of the case study analysis, the aim was to answer the question: What do tobacco companies report in their sustainability reports? The answer to this question is predominantly contained within the sustainability disclosure instruments used by companies: sustainability report, integrated report, annual report. The paper illustrates the temporal analysis of the sustainability reporting of the companies in the identified sample, aimed at understanding when the process of measuring and reporting on ESG issues began, how this process evolved and enriched over time, and which frameworks and ratings each adopted. However, before proceeding with the longitudinal analysis of the socio-environmental disclosure of the companies in question, it was deemed useful to illustrate the evolution of their respective business portfolios, to identify the link with the transformation of sustainability disclosure described below. In particular, the approach used by each company to penetrate the new-generation product business based on the chosen segments – heated tobacco products, e-vapor, oral tobacco products – as well as the consequent contribution to revenues from the two businesses: traditional cigarettes and smoke-free products, was examined in depth.

Considering the analysis conducted on the ESG reporting frameworks that companies declared to base their reporting on and on the sustainability disclosure published by them, it was possible to

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make an overall and comparative interpretation of the various observed cases. The portfolio choices previously described have inevitably had, over time, an effect on the composition of these companies' revenue mix. Depending on the timeliness of entry into the smoke-free product business and the investments made in the development of the new category of next-generation products, the effects on the business model of the analyzed companies have not been uniform.

A leadership position clearly emerges from PMI, which extensively covers the heat-not-burn product segment. Similarly, BAT has also managed over time to gain a competitive advantage in the e-vapor category, although it remains a valid competitor in the heated tobacco products segment as well. AG's approach is slightly less differentiated, as despite showing strong interest in the new generation product business from the outset, it directly presides only over the oral tobacco products category, since its presence in the other two segments is guaranteed on the one hand through a strategic participation in JUUL, and on the other hand through commercial agreements with PMI. IB, on the other hand, operates at a different level, having only recently begun a business transformation journey towards new-generation products, predominantly oriented towards the heated tobacco products category. Finally, it would be indeed speculative to express a complete judgment on JT's choices, as, although it adopted an original strategy with the launch of the so-called T-Vapor products, it lacks adequate disclosure on the contribution that the various businesses in the tobacco sector have on corporate revenues.

In drawing the conclusions of the descriptive analysis of the disclosure and the strategic sustainability choices adopted by the companies under examination, a final issue can be discussed: the tendency of some companies to communicate their sustainability strategy prematurely before achieving the desired results, compared to the approach of other companies, which decide to communicate their strategy and related results only after having achieved them. Examples of the first case include companies like PMI and BAT, which were the first to enter the heated tobacco products and e-vapor businesses, respectively, accompanying these choices with a broader strategy that nevertheless progressively enriched itself in subsequent years. There are, however, differences between PMI and BAT: the former declared the vision of achieving a "smoke-free world" since its first sustainability report in 2015, while in the case of BAT a significant change in strategy and sustainability reporting occurred with the appointment of the new CEO in 2019. AG's communication approach, however, was significantly different: while remaining in line with new market trends in the USA, it only much later (in 2019) communicated a strategy explicitly aimed at favouring the transition towards the new-generation product business, summarized by the expression "moving beyond smoking." Finally, it is possible to further distinguish the cases of JT and IB which, although they became active at different times in entering the smoke-free product

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business, have not yet associated these choices with a broader strategy explicitly aimed at sustainability.

Regarding the aspect of integrating ESG issues into CS, the analysis conducted highlights a different degree of integration that is reflected in corporate *disclosure* (Fig. 1).



Company	Titolo Report	N. Pagine	Standard	Awards & Rating	Disclosure topic
	Integrated Report	254	UNGC Principles SDGs, GRI, SASB, TCFD, CDP, WEF, IIRC	**ESG rating:** S&P, Sustainalytics, MSCI, CDP, Bloomberg, Tobacco Transformation Index, ISS-oekom, State Street R-Factor	**Product Impact:** - Purposefully phase out cigarettes - Maximize benefits of smoke-free products - Seek net positive impact in wellness and healthcare - Reduce post-consumer waste **Operational Impact**
Altria	Corporate Responsibility Progress Report (diviso in sei fascicoli) + datatable	184 (Totali)	GRI, SASB, TCFD	**Awards:** Great Place To Work, National Business Inclusion Consortium, CPA-Zicklin Index, Points of Light, Human Rights Campaign,Forbes Green Growth 50, Best Workplaces in Manuf. & Production, **ESG rating:** CDP Global	Protect Environment, Responsibility through Value Chain, Reduce Harm of Tobacco Products, Prevent Underage Use, Support People & Communities, Engage & Lead Responsibly
	ESG report, Combined performance & ESG Summary, + ESG reporting criteria + Focus Reports + datatable	126 - 390	GRI, SASB, WEF, SDGs, UNGPRF, TCFD	**Awards:** Gold Class Sustianability award, Global Top Employer, FT diversity Leaders, FT climate leader **ESG rating:** DJSI, MSCI, CDP, Sustainalytics, Vigeo Eiris, ISS	Health impact, environmental / social / governance disclosure
	Annual Report, Sustainability Performance Summary	13	GRI, SASB, SDGs, TCFD	**ESG rating:** MSCI, Sustainalytics Vigeo Eiris, CDP	Environment, Health and Safety, Diversity, Farmer Livelihoods & Welfare
	Integrated Report	129	GRI G4 reporting, SDGs, IIRC	**Awards:** GES certificate, White 500, FTSE Blossom Japan, SBT **ESG rating:** DJSI, S&P / JPX Carbon Efficient Index, CDP	Products & services, people, supply chains, regulatory environment & illegal trade

Figure 1. *Example of sustainability disclosure as of 2021 (product safety)*

Firstly, it is indeed possible to distinguish companies like PMI and JT that have recently embarked on the path of *Integrated Reporting*, from those, like BAT and AG, that continue to use the *Sustainability Report model*, or even companies like Imperial Brands, which use the *Annual Report* to communicate their CSR initiatives. Another distinguishing element is the adoption of a quantitative metrics system aimed at measuring ESG performance: AG and BAT publish a *datatable* accessible through their corporate website, just as detailed is the performance measurement system developed by PMI; JT and IB do not belong to this category, as they adopt a predominantly qualitative communication style on sustainability. In this regard, it is possible to further investigate the topic of ESG performance measurement, emphasizing that each company develops its own metrics system in coherence with the type of structure it intends to give to its reporting, from which a certain heterogeneity in the criteria used and the way they are presented derives; an example of this is the fact that PMI and BAT communicate specific KPIs to measure business transformation towards a business model increasingly oriented towards new-generation products, while Altria Group has not yet foreseen criteria for doing so. Finally, a further element of heterogeneity is represented by the communication regarding the recognitions and rankings achieved with various ESG rating agencies, with MSCI, DJSI, and CPD being among the most cited. On the other hand, the adopted reporting frameworks and consequently the discussed disclosure topics constitute a factor of homogeneity, although presented with different structures and levels of depth. Among the most recurring, standards developed by GRI, SASB, and alignment with

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SDGs undoubtedly emerge. The different combination of these factors is what allows for expressing a different judgment on the level of sustainability performance of the examined companies and the level of maturity achieved. Furthermore, the existence of common behaviors regarding sustainability disclosure (standards, ratings, topics covered, etc.) and investment/disinvestment choices demonstrates a relationship between the willingness to pursue certain levels of ESG performance and portfolio strategy. At the same time, the existing dissimilarity among the smoke-free product businesses managed by the five analyzed companies allows for the use of Campbell's matrix (2014) as a synthesis tool to evaluate the corporate strategy of the different companies, considering the social and environmental sustainability perspective. Within it, the smoke-free product businesses of the individual companies were placed, to understand their relative contribution to ESG performance.

Entering the merits of the matrix, it is first necessary to define which stakeholders are considered when evaluating the degree of preference for the business under analysis, and the relative weight attributed to each of them. In the case of companies operating in the tobacco sector, the common priority stakeholders can be grouped into the following categories:

- Regulatory bodies and Public Health: include government authorities, health organizations, the scientific community, and all those who protect public health;
- Consumers and Civil Society: include adult smokers and users of nicotine products, as well as local communities, NGOs, etc.;
- Financial Community: composed of shareholders, potential investors, banks, insurance companies, rating agencies, etc.

Based on what has been described about the tobacco sector and in virtue of what emerged from the case study analysis, it can be affirmed that the level of *stakeholder preference* dictated by the expectations of these three categories of stakeholders is quite high towards the new generation products business. Although a definitive regulatory framework is not yet in place, what is certain is the growing attempt by public health authorities to discourage the consumption of traditional cigarettes, and the progressive conviction that switching to *risk-reduced products* is the best way to achieve this long-term objective. Therefore, although regulation has often been described as a significant obstacle to the spread of the new business, it is at the same time possible to believe that developments by the scientific community have significantly improved its degree of acceptance. Consumers are the main driver that has led to the expansion of this new category of products, as increasing attention to health and well-being has led to a decline in traditional cigarettes and the search for less harmful forms of consumption. This also results in greater interest from investors in verifying companies' ability to intercept these new trends, as sustainable core business innovation

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is fundamental to their very survival, as certified by the increasing weight attributed to ESG rating scores.

Given the high *stakeholder preference*, the business's positioning with respect to the *ESG logic* will be within the right quadrant of the matrix, with the specific placement varying depending on the business model's ability to leverage sustainability as a source of competitive advantage. To measure this dimension, it has been suggested to evaluate the degree of innovation of the adopted business model. PMI's case once again represents a *best practice* in this regard. The innovation of the business model, from 2015 to today, manifests in four dimensions along the value chain: *sourcing, operations, commercialization, consumers & revenues*. The first saw a drastic shift from a predominantly agricultural supply chain to a more diversified one, also including the supply of electronic devices, marked by a reduction in tobacco cultivation contracts, from approximately 350,000 to 250,000, against an increase in investments in the supply chain dedicated to *smoke-free products*, amounting to 35% of the total expenditure. A similar change in direction occurred with reference to operations: in 2015, 2/48 factories were dedicated to the production of new generation products, compared to 8/38 today, just as the percentage of R&D expenditure invested in the development of the new business increased from 70% to 99%. On the commercial front too, the impact on the business model dictated by PMI's new strategy is substantial: it shifts from a purely B2B model to a *consumer-centric one* for the sale of new products, with a significant increase in served markets, which become 71 compared to 7 in 2015. This also leads to a rebalancing of revenue streams, increasingly conditioned by the sale of products associated with the new business, quantifiable at 29% of total revenues compared to 0.2% in the past.

BAT's declared *business model innovation* is also very ambitious; with the launch of the Project Quantum program, it expects to save £1.5 billion annually by creating operational efficiencies by the end of 2022, intended to be invested in the development of new digital skills and to improve future sustainability performance. In 2021, BAT illustrated its new business model focused on nine steps aimed at achieving £5 billion in revenue from new generation products, based on current growth estimates showing over 70% growth in customer numbers from 2019 to date. This is based on a value chain that has seen a significant increase in investments in scientific research to reduce the health impact caused by the business. This is accompanied by a shift in the supply of materials necessary to produce new product categories, with over 30,000 contracts signed for the procurement of logistics, marketing, and IT services.

AG's positioning is slightly lower, partly due to limited disclosure on its business model. What emerges from corporate reporting is a strong orientation towards a more environmentally sustainable supply chain, as evidenced by its adherence to the "Sustainable tobacco program".

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Furthermore, AG has demonstrated a marked effort in managing relationships with the scientific community and in dealing with authorities, having had 15 interactions in 2020-21 with the Federal Drug Administration.

In the lower quadrant are the remaining two companies: JT and IB. The former records a series of impacts related to its value chain, dictated by the transition to a business model focused on risk-reduced products, analyzable along five functional areas: *R&D, Procurement, Manufacturing, Marketing, Distribution/Sales*. With 5 research centres dedicated to product development, the R&D function is increasingly focused on launching new platforms, through a new operational approach concerning the organization of working groups, which are shifting from "*site-based teams*" to "*outcome-based global teams*". The procurement function has also undergone significant changes, due to its adaptation to a new strategy focused on greater resilience in the event of disruptions related to the new generation product business. With 6/39 production facilities dedicated to *smoke-free cigarette production*, the *Kaizen approach* represents the substantial novelty of the business model regarding production. Important changes in organizational culture are also recorded with reference to the marketing area, with the development of new skills in the field of business analytics and B2C, aimed at creating a *consumer-centric approach* throughout the organization. Finally, JT states that it is also updating its commercial skills, seeking new markets to launch new generation products. Lastly, IB does not dedicate particular space to disclosure on its business model, limiting itself to stating that operations related to the new business have been unified under the same leadership to implement an agile and entrepreneurial model that allows it to close the gap with the competition.

CONCLUSIONS AND IMPLICATIONS

To help fill the identified gap in the literature and given the growing relevance attributed to corporate ESG performance, both by major governmental and financial institutions and by customers and other categories of stakeholders, this work aimed to investigate if and how companies' willingness to achieve certain ESG performance standards impacts their portfolio strategy choices. In this perspective, this work can contribute to the scientific debate that has developed around the integration of sustainability policies, precisely represented by the aforementioned ESG policies, within corporate strategy. Indeed, it aligns with the path traced by Campbell et al. (2014) — according to which corporate strategy choices are made taking into account four logics: business logic, added value logic, capital markets logic, governance and compliance logic — and by Corbetta and Morosetti (2018), who developed an effective tool for evaluating corporate strategy itself, called the "*valuation diamond*". Among the five evaluative

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elements used by this model, the criterion of "social and environmental sustainability" is specifically included. The latter aims to explicitly consider, in the corporate strategy analysis process, the impacts that the strategic decisions of multibusiness companies have on their reference socio-economic context.

In summary, it can be affirmed that the case studies conducted in this work confirm an increasingly evident trend, both in business practice and in academia: the need to primarily consider the perspective of sustainability in evaluating corporate and business strategy choices. Consumers demand it, through purchasing choices increasingly guided by socio-environmental sustainability factors; investors demand it, allocating their capital based on parameters that integrate ESG criteria in portfolio construction; finally, regulatory bodies also demand it, often making sustainability one of the cornerstones of their political agendas. It is therefore time for companies to take sustainability performance issues seriously, definitively abandoning those greenwashing attitudes that have often generated severe criticism of the entire ESG system. Companies are now called to filter every strategic and/or operational choice through the lens of sustainability.

This work confirms the need for companies to integrate sustainability into strategic and operational choices. It aims to provide a concrete managerial tool for analyzing portfolio strategy choices. Companies are encouraged to undertake purpose-driven growth paths towards sustainable business models, capable of generating benefits for both shareholders and consumers and society at large.

Regarding future research, it would be interesting to delve deeper into the long-term impact of "*ESG logic*" on companies' actual financial performance, going beyond the analysis of portfolio choices alone. Furthermore, a comparative study between industrial sectors other than tobacco could reveal further patterns and nuances in the adoption and communication of ESG strategies. Finally, a more detailed analysis of the specific quantitative metrics adopted by companies (even beyond product safety) and their correlation with declared sustainability objectives could offer new perspectives for measuring and evaluating ESG performance.

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HUMAN FACTORS AFFECTING AI ADOPTION IN SUPPLY CHAIN

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ABSTRACT

Artificial Intelligence (AI) is widely recognized as the top strategic technology for organizations, with unmatched potential to transform supply chains through enhanced efficiency, visibility, and resilience. Yet despite heavy investment in AI-driven digital transformation, many companies fall short of realizing its promised value. Why does this gap persist? This study reveals that the answer lies not in the technology itself, but in the human dynamics surrounding its adoption—dynamics that are often underestimated.

This research explores the psychological and organizational barriers that determine whether AI initiatives succeed or fail, by using a leading Consumer Packaged Goods company as a case study. While establishing robust data and technological infrastructure is essential, it is not sufficient. At the heart of successful AI adoption lies effective change management—anchored in clear, user-specific value communication, early stakeholder engagement, and a continuous feedback loop that fosters co-creation.

A core finding of this study is the powerful role of Fear —fear of job loss, loss of job identity, failure, transparency, and control. In parallel, the study highlights Trust as a crucial enabler—trust in leadership, in systems, and in organizational safety nets when risks are taken.

This research introduces a new conceptual framework that integrates these human factors, offering practical strategies and a roadmap for future inquiry. By placing people—not just technology—at the center of AI adoption, it provides critical insights for leaders aiming to unlock the full potential of AI in supply chain management.

Keywords: *Artificial Intelligence, Digital Transformation, Technology Adoption, Supply Chain, Human Factors, Fear, Trust, Leadership.*

INTRODUCTION

Artificial Intelligence (AI) has emerged as a transformative force in the supply chain, offering unprecedented opportunities for resilience, sustainability, and agility (Knut et al., 2021). Despite its

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potential, the successful adoption of AI in supply chain management remains a significant challenge (WEF, 2024). This study aims to bridge this gap by exploring the critical human factors that influence the adoption of AI technologies within the Consumer-Packaged Goods (CPG) industry, a sector historically slower in digital transformation compared to others (Brea et al., 2019). Understanding these human elements is crucial for companies aiming to accelerate their digital transformation journeys and fully leverage the value of AI.

Artificial Intelligence (AI) is ranked as the number one strategic technology for organisations (Gartner, 2021), with one of the highest potentials for value generation is Supply Chain, where there is an expectation that AI will create value for US $1.2- 2 trillion (Bughin et al., 2017). AI is expected to be one of the biggest determinants for future competitiveness (WEF, 2025) and 92% of organisations expect to increase their investment in AI over the coming three years (Mayer et al, 2025). AI has the potential to become a game changer for reshaping Supply Chains for resilience, sustainability, and agility (Knut et al., 2021) and numerous applications have been identified throughout the Supply Chain (Knut et al., 2021, Nozari et al., 2022, Yang et al., 2021). However, despite these promising prospects, the adoption efforts have been disappointing (Fountaine et al., 2018; WEF, 2024) and only less than 26% of companies have succeeded in their digital transformation efforts (Boutetière et al., 2018). Why such a gap between Expectations and Reality? Cutting-edge AI technology is not enough while the human aspects such as culture, structure, and ways of working play a critical role (Fountaine et al., 2018; Stocker et al., 2020) and are often underestimated (Stocker et al., 2020).

Despite growing interest, there is very little research on the specific adoption drivers of AI-based technologies (Pumplun et al., 2019; Trenerry, 2021). Moreover, recent studies on digital transformation have prioritised business and strategic levels with limited integration of employee-related factors which drive the success or failure of AI technologies (Trenerry, 2021). In fact, it can be recognized a gap in the literature in terms of understanding of the critical factors specific to AI-based technologies introduction (Pumplun et al., 2019) with a focus on human factors (Trenerry, 2021). Therefore, the aim of this research is to understand the perspective of Supply Chain Subject Matter Experts (SMEs) concerning the critical human factors affecting the adoption of AI technologies within a large organization within the Consumer-Packaged Goods (CPG) industry. This study is expected to inform Supply Chain decision-makers who are planning to accelerate the digital transformation journey. This is particularly relevant for the CPG industry, that compared to other sectors have lagged behind in AI adoption (Brea et al., 2019) and are at the bottom of the AI maturity ranking (Bughin et al., 2017). Additionally, it might contribute to the academic research by developing a more comprehensive theoretical framework which puts emphasis on the human elements of AI adoption. The remainder of

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this paper is structured as follows: the next section will outline the relevant literature, followed by a proposed conceptual framework and research methodology. Finally, the emerging themes identified through this study will be discussed, leading to practical recommendations and a proposal for a novel conceptual framework.

LITERATURE REVIEW

The literature used for this research has been searched mainly in Google Scholar and ProQuest with a year of publishing not older than 2016, except for the seminal articles on Technology adoption. The literature research strategy followed a three-step approach. First, it researched theories on Technology Adoption as AI belongs to the wider realm of Technology. Secondly it looked with more specificity into AI Adoption literature including AI readiness, Digital transformation, Industry 4.0. Third, the research focused on the human determinants at organizational and individual level driving the adoption. Organizations are increasingly investing in AI (WEF, 2025, Bughin et al., 2017). Research over the past decades has proposed several Technology Acceptance models to explain the adoption of technology systems (Lai, 2019; Saghafian et al. 2021; Hamm & Klesel, 2019; Trenerry et al., 2021; Roberts et al., 2021; Dutta & Borah, 2022 and Lai, 2017). Limited research has explored in more specificity the adoption of AI-based technology. In this context, the Technological-Organisational-Environmental (TOE) framework has been widely used (Hamm & Klesel, 2021; Arnold et al., 2018). The current body of research on Technology and AI adoption put in evidence some highly recurring factors influencing the adoption which can be classified in environmental-related factors, organizational-related factors, technological-related factors and individual-related factors.

Within environmental-related factors, there was broad consensus among scholars in highlighting competitive pressure and government regulations as key drivers for organizations to adopt AI. Competitive pressure refers to the threat of losing competitive advantage. AI has strong potential for businesses to increase efficiency, reduce cost, increase net revenue (AlSheibani et al., 2020) and at Supply Chain level to create smart factories, more efficient, with better decision-making, higher agility to respond to customer needs (Kamble et al., 2020). This element creates pressure for organizations to adopt AI technologies to stay competitive in the marketplace (Hamm & Klesel, 2021; Arnold et al., 2018; Pumplun et al., 2019; Nguyen, 2022; Schaefer et al., 2021). Government regulations have also been widely considered a key factor influencing AI adoption as it can facilitate or create challenges in the adoption such as data privacy regulations (AlSheibani et al., 2020; Pumplun et al., 2019).

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Technological-related factors widely addressed include Compatibility, Relative advantage and Data. Compatibility refers to the available IT infrastructure and capability to meet the actual business needs and emerge as critical driver for adoption (AlSheibani et al., 2020; Pumplun et al., 2019; Hamm & Klesel, 2021; Demlehner and Laumer, 2020). Relative advantage considers the degree to which AI technologies are delivering higher benefits than conventional technologies and emerged as a very important factor driving AI adoption (AlSheibani, 2018; Hamm and Klesel, 2021; Schaefer, 2021). Data emerged as prerequisite for the successful adoption of AI (Pumplun et al., 2019; Denholm et al., 2021; Kruse, 2019; Hamm & Klesel, 2021; Schmidt, et al. 2020). While data quality is a clear prerequisite for any new technology, what specific to AI data is the 3 Vs: (1) Volume of data required to train AI system, (2) Velocity referred to the frequency of data to be collected and refreshed, and (3) Variety of data, meaning broad spectrum of data which increases ability for AI systems to make accurate predictions.

Organizational-related factors most commonly cited as playing a role in AI adoption were Top Management support and Culture. Top Management support referred as significant driving force facilitating AI adoption by setting strategy, allocating resources both human and capital resources, ensuring the proper capability building (Hamm & Klesel, 2020; AlSheibani et al., 2010; Pumplun et al., 2019; Arnold et al., 2018; Stocker et al., 2020). Culture, referred as innovative culture or growth culture, open culture, collaborative culture, is widely argue among scholars to be a strong force in driving AI adoption (Fountaine et al., 2019; Stocker et al., 2020; Pumplun et al., 2019; Mikalef & Gupta, 2021; Lee et al., 2019).

Among Individual-related factors, trust emerged consistently among scholars as an essential factor which can represent a major barrier to AI adoption (Vera et al.,2022); Pumplun et al., 2019; Rossi, 2018; Nasirian et al., 2017; Hamm & Klesel, 2021; Manning et al., 2022). Trust was a broad concept driven by lack of transparency in the rationale behind algorithm's decision-making process, by risk of bias being amplified coming from inaccurate dataset, accountability of the final decisions, ethical concerns (on how data is used, prepared, data privacy) and Cyber security. Other individual factors at a more psychological level influencing technology adoption included Personality factors, Attitude Factors, Motivation Factors, Cognitive Factors and Social factors (Roberts et al., 2021).

Overall, numerous studies have explored the factors driving technology adoption in the workplace. However, it can be recognized a gap in the literature in terms of a deeper understanding of the factors specific to AI technology introduction (Pumplun et al., 2019) with a focus on human factors (Trenerry, 2021). This lacuna in the literature leads to the motivation for this study. The objective of this study is

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to provide a deeper understanding of the underlying human-related factors specific to the AI technology within the Supply Chain organisation of a large Consumer Packaged Goods (CPG) company through a case study approach.

CONCEPTUAL FRAMEWORK

To explore SMEs' perceptions of the human factors impacting AI use within the Supply Chain department, it was found useful to explore the phenomenon drawing on the theoretical frameworks developed by Pumplun et al. (2019), Trenerry et al. (2021) and the one from Roberts et al. (2021). At broader level, Pumplun et al. (2019) have widened the TOE framework widely recognized as a valuable model for analyzing technology adoption (Arnold et al., 2018; Lai, 2017; Narula, 2020; AlSheibani et al., 2020), considering the specific requirements of AI technologies. Going deeper into understanding the human factors that influence AI adoption at a firm level, the model from Trennery et al. (2021) offers a multi-level framework that integrates employee-related factors and suggests three levels of influencing factors: individual level, group level and organizational level. As the objective of this study is to explore the human factors influencing AI adoption and knowing that psychological barriers including employee attitude and resistance could have a critical role, it was found valuable to draw on the model from Roberts et al. (2021) who delved into the psychological factors that impact technology adoption, namely personality, attitudes, motivation, social, cognitive, and organizational factors.

RESEARCH PHILOSOPHY, STRATEGY AND METHODOLOGY

The aim of the study informed the choice of the research strategy. The choice of a qualitative research design through a case study as research methodology and the use of interviews as key research instrument aligned to the epistemological postmodern conception of knowledge produced as socially constructed (Brinkman & Kvale, 2018). The choice of a single-case study was driven by the need for in-depth analysis and understanding of the phenomenon and urge for interpretation (Yin, 2018). The unit of analysis was a large organization operating within the CPG sector, in particular its Supply Chain organization. The study used different sources of evidence, namely twenty-three in-depth interviews and other sources of evidence: documentation, archival records, physical artefacts. These different data sources enabled to gain insights from a multidimensional perspective with the aim to increase the robustness of the research (Yin, 2019). This approach was commonly used in technology adoption research (Halkias & Neubert, 2020). The participants to the interviews were selected through purposive sampling to collect rich data from different perspectives (Yin, 2018). Inclusion criteria

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included (a) direct experience in AI technology within the Supply Chain (b) being either employees or third-party consultants. The interview guideline used in this study was strongly inspired by the empirical research performed by Roberts et al. (2021) who explored the psychological factors influencing technology adoption. Aim was to achieve data saturation, defined as when gathering fresh data does not spark any new insights (Charmaz, 2006). The overarching RQ of this study was: What are SMEs' perceptions of critical factors influencing AI adoption in Supply Chain Management (SCM), with a focus on human factors? The subsequent questions:

1) What are the main challenges to AI adoption in SCM?

2) What are the facilitating factors to AI adoption in SCM?

To answer the RQs, the data analysis followed a logical sequence. It started first with a separate analysis of each individual piece of evidence with a first cycle inductive mixed coding (Saldaña, 2016), then it followed a comparison to identify differences and similarities, and finally a theoretical and literal replication using pattern-matching approach was used.

FINDINGS

Through the triangulation of the findings, literature review, and conceptual framework, several main themes have emerged to answer the overarching RQ: What are SMEs' perceptions of critical factors influencing the success of AI-based technologies used in SCM, with a focus on human factors? For this section the SMEs of the interviews are referred to as "P" followed by a number while for the Other sources of evidence, it was used the letter "E" followed by a number.

Main challenges to AI adoption

Technology and Data

This research has emphasized that technology and data were basic roadblocks to AI adoption. Bugs in the system, lack of flexibility to adapt to local needs, absence of troubleshooting support, missing user-friendliness were some of the reasons unveiled behind the pure technology challenges (P2, P17, P6). Linked to technology, it emerged the key role of data in the broader sense. Data was consistently recognized as a major challenge across all use cases, in particular data availability, data accuracy, data access, frequency of data refresh, data connectivity, and data standardization were some of the barriers highlighted (P2, P7, P9).

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People

Key themes emerging were people Expertise that can get in the way (P7), lack of Skills (P3, P20) and Mindset challenges (P23, P7, P10). Overall majority of experts recognized that there was a bias towards thinking that the younger generation would be more open to digital adoption, however, they admitted that it was not a matter of Age but of Experience getting in the way. People who have been doing the same job for thirty years were 'just less open to change' (P7). Moreover, resistance to adoption had to do with people Mindset, attitude to try new things (P7, P10, P19, P20, P2). Mindset has been identified as a factor impacting technology adoption (Aldahdouh et al., 2019, Heim et al., 2022). What also it was highlighted was the fact that digital adoption relied on people Skills (P6, P18, P20). It was also highlighted the criticality of having people with both system, technology knowledge as well as business process knowledge (P9) critical to make the technology not only work but maximize the value to the user. Several authors have emphasized the importance of empowering Supply Chain workers and managers and ensuring they have the right skills to work effectively with machines (Fountaine et al., 2019; Trunk et al., 2020; Colson, 2019; Cremer & Kasparov, 2021; Jarrahi, 2020).

Fear and Trust

At a deeper individual level, this study brought to surface the notion that Fear, and Trust have a focal role in AI technology acceptance. Fear took different shapes and forms at different levels of the organization. First, Fear of job loss emerged as a topic "Fear of not being necessary anymore" (P21). Another manifestation of Fear was fear of loss of job identity. P23 referred to the shift of the role of the technician in the plant moving from "being the hero who comes in when there is a break down... to being someone who strategically prevents the break-down "(P23). Fear of failure manifested at leadership level as "Fear of feeling incompetent, not being equipped to lead the change" (P23) and at lower levels in the organization, as "worry of not being equipped, lack of support" (P1). Moreover, Fear of transparency was widely emerging as digital tools brought visibility and people felt they were controlled. It became very visible if someone made a mistake (P22). Linked to the notion of Fear, the concept of Trust has surfaced. Lack of Trust was reported as a challenge to AI adoption. It displayed skepticism in adopting the technology due to lack of understanding of how the 'black box' was generating its output (P15). Literature has reported different causes of why Trust is a challenge for AI adoption such as the lack of transparency in how the system is generating its outcomes (Singh et al., 2019; Rossi, 2018), ethical concerns due to potential bias in data and algorithms, and risk of cognitive bias (Hudson, 2017).

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Stakeholders Alignment

Stakeholder Alignment has emerged as one of the challenges in AI adoption, which required time, effort and energy but it was so critical for advancing the initiatives (P1, P4, P5, P6, P13, P14, P24, P15, P21).

Facilitating factors to AI adoption

Competitive pressure

This case study has confirmed the notion of competitive pressure as a trigger for AI adoption. One manufacturing cluster lead clearly emphasized that 'not engaging in AI, means risk of losing competitive advantage and remaining behind from all points of view, not only for efficiency but also out of the talent market (P22).

Value

The study acknowledged that Value could manifest itself in different ways such as Efficiency, Visibility, Simplified Ways of Working. Efficiency gains clearly emerged as major driver for AI adoption. SMEs referenced to the use of AI technologies for optimization of logistics and manufacturing network (P13), waste reduction (P9), loss eradication (P4). Additionally, digital technology was seen as enabler for simplification of the ways of working such as in the manufacturing paperless initiative (P9). Increased Visibility was not a value on its own but was ultimately linked to efficiencies benefits (P13,P18). Opposite was also true. Lack of perceived Value led to failure in adoption, because as P1 mentioned 'operators did not appreciate the added value of the technology' and 'people felt that it was something done to them rather than for them'.

Change management practices

Change management practices were strongly highlighted as an enabler for digital adoption. As best practice, this study supported the instrumental role of the change agents, the early engagement of the users and the continuous feedback loop from the users, which created a virtual loop and co-creation spirit, and the tailored communication which put emphasis on the value for each of the targeted user. The experts gave some hints on the personality traits of the change people i.e., 'change advocates', 'digital enthusiastic', 'people who create the bridge between the old world and the new world'(P7), 'people who understand the technology, they believe in the technology, they are trusted people within

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their community and can influence others'(P3). In the study from McKinsey (2021), it was attributed as the key reason for the low rate of AI adoption in CPG to the underinvestment in change management.

Factors both challenging as well as facilitating AI adoption

Leadership

On one side, the facilitating role of Leadership took different forms. Experts highlighted the leadership role in setting the strategy and clear direction and create excitement, in showing enthusiasm and a sense of belief (P1, P8, P23, P13, P2, P10, E13). This was visible in the town halls by spotlighting the digital initiatives, making them a priority for the plant, and celebrating success stories. On the other side, Leadership has been seen as a challenge in allocating dedicated resources (e.g., P3, P15, P16, P18) and allowing time for learning curve. Several experts highlighted the leadership expectation that the moment the technology gets introduced, it would immediately work perfectly. This challenge was so strongly felt that one expert urged for a leadership Mindset shift and need to allow a learning curve and grant a 'license to fail' (P15). Top management support is widely recognized in the literature as critical to overcome internal resistance and positively influence AI adoption (Yang et al., 2019, Yang et al., 2021, Pumplun et al., 2019; Narula et al, 2020; Saucedo et al, 2018; Arnold et al., 2018, Alsheibani et al, 2018; Alsheibani et al., 2020; Demlehner & Laumer, 2020; Enholm et al., 2021).

Social Influence

Social Influence has been reported in the literature as having an influence on technology adoption (Stocker et al., 2020; Trenery et al., 2021). However, this research has put in evidence two facets of Social pressure. The facilitating role in AI adoption of Social Influence got manifested into the change agents (e.g. P2, P17, P18, P20) acting as a role model for the others. On the other side, Social Influence was detrimental to adoption, when it created group pressure, a sense of shame due to the transparency that the digital technology brought. This was the case during the implementation of manufacturing visualization tools, as "visibility of the data was a barrier to adoption as people in plants with lower performance were not that happy to show their data" (P17, P20, P22).

Human-Machine interaction

The SMEs across all use cases of the Supply Chain highlighted the role of AI as either a Human Support or a Human Replacement. In this case study, the Human Replacement role was limited to the Manufacturing space, automation and introduction of Cobots, which were replacing the most

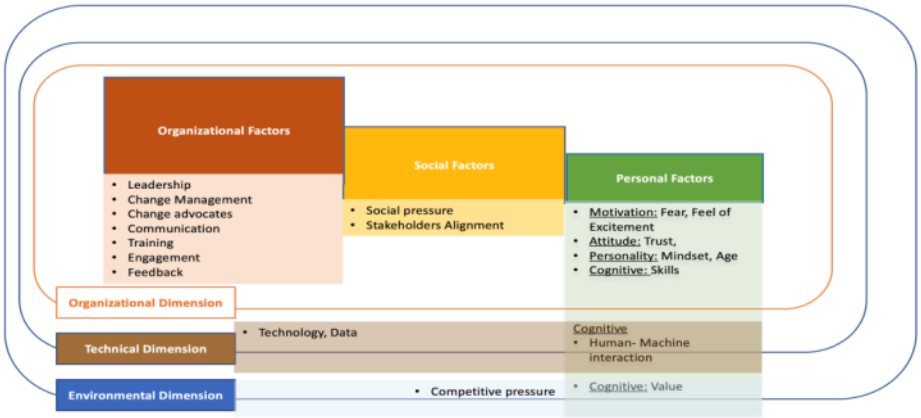
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repetitive and simple activities on the production line. This Human Replacement role of AI was linked to challenges to adoption due to Fear of job loss (P3, P9, P5). Within Human Support, it emerged that there was a first level of Human-Machine interaction as a work support, where technology provided new, better, real-time data such as real-time performance data (P21, P18) and there was a more advanced role of the machines as decision support where the technology directly provided recommendations to humans on proposed course of actions where technology was able to provide forecast numbers or recommendations (P15, P19). As Human Support, what all experts have emphasized was the synergistic relation between human and machines. This relation was made evident in the critical role of humans to make a judgement on the final outcome (P15,P19) or human scrutinity of the data accuracy (P1, P3, P13, P21). The concept of Human-Machine complementarity has been heavily represented in the literature. Jarrahi (2020) supports the vision of Human-AI symbiosis. Trunk et al. (2020) and Gartner (2021) refers to AI technology as Human Augmentation. Cremer & Kasparov (2021) refer to Augmented Intelligence.

DISCUSSION

New proposed Theoretical Framework

Bringing the findings together and linking the emerging themes to the theoretical framework dimensions, a new proposed framework is proposed, Figure 1 which answers the RQs.



Picture 1. *Framework for AI use within Supply Chain. Note. Source: Author*

At macro-level the factors influencing AI adoption can be seen through three dimensions of Technical, Organization and Environmental. Within the organization dimensions, the influencing factors can be classified among three pillars: Organization, Group and Individual, as inspired by Trenerry et al. (2021) and within the Individual dimension the elements influencing the adoption can be clustered

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into Motivation, Attitude, Personality and Cognitive Factors as inspired by Roberts et al. (2021). The findings from this research validate the new proposed framework, spotlighting the human factors that most affect AI adoption.

At the Environmental level, an emerging driver for adoption was competitive pressure highlighted by the SMEs and confirmed by the literature (AlShebani et al., 2020, Pumplun et al., 2019). What competitive pressure translated at individual level is the notion of perceived Value. This research highlighted the criticality of perceived Value to drive AI adoption, mentioned unanimously by all experts and it materialized in increased Efficiency, Simplified ways of working, higher Visibility. Within the Technical dimension, pure technical challenges created a major resistance to the adoption. Additionally, the role of Data was underestimated and represented unexpected issues. What technology translated at the individual level as a cognitive factor was the Human-machine interaction. Within the Organizational dimension, it can be identified three Levels: Organization, Group and Individual level. In the Organizational level it is highlighted the role of Leadership, Change Management practices which included Communication, Change advocates, Training, Feedback, and Early Engagement. The Group level includes Social Pressure and Stakeholders Alignment. The Individual pillar included several themes, namely Personality factors: Mindset; Motivational Factors: Fear; Attitude Factors: Trust; Cognitive Factors: Skills. Lastly, the framework shows that all these dimensions were interconnected, in particular Individual level intersects the Environmental dimension with the notion of Value, and it overlapped the Technological dimension with the notion of Human-Machine interaction.

CONCLUSION

Contributions, Limitations of the study & Future research avenues

This study has contributed to close the gap in the literature in terms of understanding the critical factors specific to AI technology introduction (Pumplun et al., 2019) with a focus on human factors (Trenerry, 2021) by (1) revealing and confirming a set of human factors that facilitate AI adoption: Value, Change Management practices including Change Advocates, Communication, Early Engagement, Feedback, Training as well as (2) revealing blocking factors: Technology and Data, Stakeholder Alignment, Fear, Trust, people Mindset and Skills, (3) highlighting that Leadership and Social Pressure might have both a facilitating and blocking role on adoption. Lastly, this work offers a new holistic conceptual framework, which can guide practitioners in the acceleration and success of AI initiatives. However, this study comes with some limitations which derive from the research

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methodology. As it is a single case study within a large CPG organization, it might be that these findings are not applicable to other organizations or other industries. Hence, further research could seek to validate the model in other settings, industry and quantitatively test the model developed by building the key factors into a predictive model.

Conclusions & Recommendations

Based on the key findings from this research and taking into account the limitations of this study, few powerful recommendations can be given. First, getting the technology right is foundational. Leaders in organizations who aim for a successful AI adoption, need to focus on getting the technology right by dedicating resources and not underestimating the time required to get data requirements in order. Not getting this step right would be detrimental to adoption.

However, getting the technology and data right is not enough. People were at the core of a successful AI adoption. Hence, change management practices should be prioritized. What the research has brought to the surface clearly is that what drives people is Value and Value can be perceived differently. Hence, the change management efforts should be tailored to communicate the benefits not in general terms but in greater specificity. As best practices for change management practices, this study supports the instrumental role of the change advocates, the early engagement and the continuous feedback loop from the users, which creates a virtual loop and co-creation spirit. Second, this study brought the notion of Fear as a key force driving resistance to change. On one side, Fear can be considered as a basic emotion, normal in any change, however, AI brings some specificities, such as Fear of Job Loss and /or Job identity, Fear of Failure, Fear of Transparency, Fear of being controlled. Therefore, it is recommended early on to step back and map the fears of the users and define an action plan on how to address those. Third, findings from this research urge for a Shift in Leadership style to address Fear of Transparency by creating a safe environment while empowering people by dispersing decision-making. But how do organization enable this leadership behavioral shift? It could be enabled by changing the context and departing from traditional hierarchical structures, promoting flatter management models. This empowerment is linked to Trust. On one hand, leaders must Trust people to whom they have delegated their decision-making and at the same time people must Trust that if they run into trouble, they will not be on the chopping block, if something goes wrong.

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DIGITAL TRANSFORMATION: A LEADERSHIP PARADIGM SHIFT

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ABSTRACT

In a world of rapid technological change, artificial intelligence and digital innovation are no longer optional—they are essential for organisations to thrive in volatile markets. Yet, despite significant investment, many digital transformations fall short. Why? This paper explores how leadership behaviours can make or break digital transformation efforts. Using a case study in a Consumer-Packaged Goods (CPG) company, it reveals how leadership traits influence the adoption and success of digital technologies. While AI literature is growing, little research exists on how leadership drives transformation and how leaders must evolve to guide their organisations through change. This study proposes a new leadership framework centred on emotional connection. At the core is the leaders' ability to Emotionally connect, with aim to remove Fear and building Trust. This is enabled through key leadership behaviours: Engage early and effectively, Empower decision- making and Enable people thanks to resource allocation and capability building. Ultimately, this research reframes digital transformation: from a technology-first agenda to a leadership-driven shift, placing people—and their emotions—at the heart of successful change.

Key words: Digital Transformation, Transparency, Trust, Empowerment, Leadership, Fear, Decision-Making, Human-Machine, Artificial Intelligence

INTRODUCTION

This paper aims to explore the leadership behaviours that enable or hinder the adoption of digital technologies in Consumer-Packaged Goods (CPG) organizations, with the goal of identifying those that best support a successful digital transformation. Through a case study approach, it provides insights into how leadership traits and actions shape strategic direction, technology adoption, and implementation success.

The wave of technological advancement and the rapid rise of artificial intelligence (AI) are transforming how organizations create and capture value. Digital transformation has become a key determinant of future competitiveness (WEF, 2025), with digital investments steadily increasing

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(Mayer et al., 2025). An estimated ninety percent of organizations are now undergoing some form of digital transformation (Lamarre et al., 2022), and AI investments are soaring (EY, 2024).

However, digital transformation is not solely a technological shift—it is equally a leadership challenge (Georgakis et al., 2022; Li & Shao, 2023). In the CPG sector, digital technologies are expected to be a game-changer for both top- and bottom-line performance, with potential to generate up to five percent of industry revenue (Chui et al., 2018). Despite this promise, many organizations struggle to realize tangible value from digital and AI initiatives. A recent survey revealed that only 26% of companies report seeing real value from AI adoption (De Bellefonds et al., 2024). This disconnect between high expectations and limited returns raises critical questions about leadership capabilities in a digital age. As digital technologies redefine how organizations operate, leaders must evolve in their competencies and behaviours to guide transformation (Chui et al., 2021; Watson et al., 2021).

While leadership is widely recognized as a key enabler of successful transformation (Bevilacqua et al., 2025; Gupta et al., 2023, Fernandez-Vidal et al., 2022;), there is still insufficient research on how specific leadership behaviours influence digital adoption (Watson et al., 2021, Sriharan et al., 2024). This study addresses that gap by examining the leadership shifts required to thrive in the digital era and proposing a novel leadership framework based on findings within a CPG organization. By doing so, it contributes to both academic research and practical guidance on leading digital transformation in complex, rapidly evolving business environments.

LITERATURE REVIEW

The literature research strategy explored the realm of research on technology adoption, including AI adoption and digital adoption, and second, it investigated the literature stream of digital leadership, through Google Scholar.

Definitions

Digital transformation can be defined as the rewiring of an organization, with the goal of building a competitive advantage by continuously deploying technology at scale (Lamarre et al., 2024). However, digital transformation is not limited to the implementation of more and better technologies in a rapidly changing digital world, but it includes efforts to align company culture, people, structure and tasks (Kamalaldin et al., 2020). Among all digital technologies in the suite of options for leaders to apply, a special note should be given to AI. AI is claimed to be a game-changer for organization with promise to revolutionise the way organisations run their business thanks to its ability to process vast amount of data and engage in decision-making (Lamarre et al., 2024). Despite there is not a

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unanimous definition of AI, for the purpose of this study, AI is defined as a computer with human-like capabilities, enabling it to perform tasks that conventionally require human intelligence (Makarius et al. 2020; Mikalef and Gupta 2021).

Leadership theories

Leadership has long been a central theme in social science research, dating back to the early 1930s. With the rapid pace of technological advancements and accelerating organizational change, leadership is increasingly recognized as a decisive factor in navigating digital transformation (Aziz et al., 2024). A growing body of literature explores how leadership influences company strategies and performance and how senior managers' leadership traits shape strategic decision-making (Bevilacqua et al., 2025). However, the digital age presents new leadership challenges, particularly in managing AI integration, data-driven environments, and organizational agility (Mohammadi et al., 2024). Among recent trends, Artificial Intelligence (AI) has significantly redefined leadership by introducing complexity into both operational processes and decision-making structures (Aziz et al., 2024). Unlike traditional contexts, AI implementation often requires leaders to adopt more collaborative and emotionally intelligent approaches (Cortellazzo,2019). Research shows that strong leadership support is vital for successful digital deployment at scale (Choi et al., 2017).

One useful framework is Pendleton's Primary Colours Leadership Model (2012), which conceptualizes leadership as the interplay of three core domains: strategic (blue), operational (red), and interpersonal (green). Effective leaders must balance all three, either within themselves or through complementary team members (Pendleton et al., 2012). In digital environments, this model is especially valuable, as the strategic domain supports vision and digital roadmapping, the operational domain reinforces efficient AI-enabled systems, and the interpersonal domain fosters trust, inclusion, and team cohesion. Distributed leadership is encouraged, recognizing that no single leader can master all domains—especially under conditions of digital complexity.

In recent years, contemporary leadership theories have expanded to address the unique demands of the digital era—particularly Agile, Digital, Collaborative, and Transformational leadership styles. Each emphasizes specific digital leadership behaviours. First, Agile leadership promotes adaptability, empowerment, and responsiveness in changing conditions. It emphasizes team autonomy, reorganizing internal resources, and leveraging rapid feedback loops (Porfirio et al., 2021; Fernandez-Vidal et al., 2022). This aligns with Pendleton's Interpersonal sphere by promoting accountability and open dialogue. Second, Collaborative leadership complements Agile approaches by fostering inclusion, co-creation, and horizontal communication. It encourages shared ownership and strong

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interpersonal ties across groups (Jimmy, 2025; Sharma et al., 2024).Third, the concept of Digital leadership has emerged as a distinct model, blending strategic vision with digital fluency, and the ability to manage AI-driven processes. It promotes transformation through real-time decision-making, and data-enabled foresight (Westermann et al., 2014) Additionally, Muller (2020) underlines that digital leadership implementation engages real-time decision-making and real-time feedback processing power.Araujo et al. (2021) define digital leadership as enabling innovation, articulating vision, and aligning vertical and horizontal coordination—linking to the strategic and operational spheres of Pendleton's model. Lastly, the notion of Transformational leadership continues to be relevant in digital contexts, particularly for managing organizational culture change. Transformational leaders inspire through vision, motivation, and intellectual stimulation—creating alignment and engagement around long-term innovation goals (Aziz et al., 2024; Bevilacqua et al., 2025). This directly links to the strategic sphere in Pendleton's model.

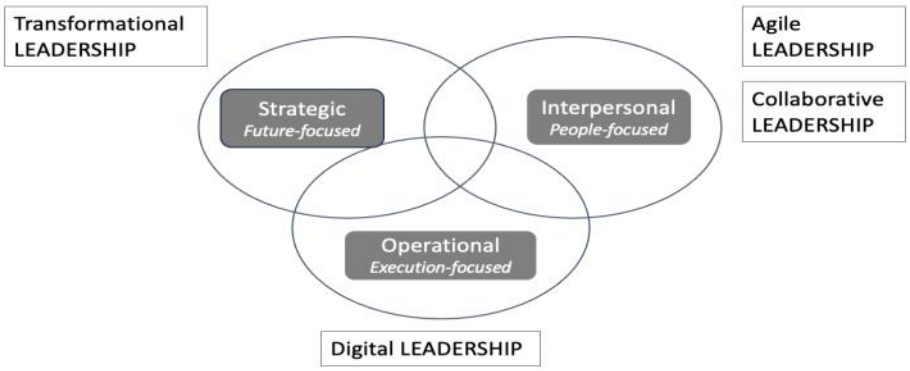
Leadership Theory	Key Characteristics	Strengths in Digital Context	Key References	Link to Pendleton domain
Primary Colours of Leadership	Balance of three domains: strategic (blue): setting direction, operational (red): delivering results, interpersonal (green): building trust	Encourages holistic leadership; promotes distributed capabilities essential for digital transformation; balances execution, vision, and emotional connection for resilient digital adoption	Pendleton et al. (2012)	
Agile Leadership	Empowerment, adaptability, responsiveness, shared responsibility, team enablement	Supports rapid adaptation to digital change; empowers autonomous teams; enables fast decision-making and iterative innovation	Greineder & Leicht (2020); PorfÃrio et al. (2021); Fernandez-Vidal et al. (2022)	Interpersonal
Collaborative Leadership	Inclusion, co-creation, horizontal communication, shared decision-making, trust-based relationships	Breaks silos; promotes innovation through collective intelligence; facilitates cross-functional collaboration crucial for digital transformation	Jimmy (2025); Sharma et al. (2024)	Interpersonal
Digital Leadership	Strategic vision, digital literacy, data fluency, emotional intelligence, real-time decision-making	Aligns technology with strategy; drives large-scale digital initiatives; integrates AI and analytics; builds a digitally capable and emotionally intelligent organization	Westerman et al. (2014); Araujo et al. (2021); Cortellazzo et al. (2019); Muller (2020)	Operational
Transformational Leadership	Visionary influence, cultural change, motivation, intellectual stimulation, emotional engagement	Inspires organizational renewal; fosters a culture open to innovation and learning; mobilizes people to embrace change	Aziz et al. (2024); Bevilacqua et al. (2025) (Gachugu, E. ,2023).	Strategic

Table 1- *Literature review relevant to Leadership for Digital Transformation*

Taken together, these theories map well to Pendleton's three leadership domains and they offer a conceptual framework for understanding the mindsets and behaviours essential for leading in a

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digitally transforming world (Picture below).



Picture 1- *Conceptual framework for Leadership for Digital Transformation (adapted from Pendleton, D., 2012)*

METHODOLOGY

This research method uses a qualitative research design that aims to deeply understand the leadership behaviours which foster or hinder a successful digital transformation. The research is characterized by its inductive approach, indicating that it does not depend on preexisting theories or concepts. Qualitative research was chosen because this approach allows researchers to explore individual views, experiences, and perceptions regarding digital leadership offering greater flexibility of a complex research topic, and seeks interpretation of the phenomenon (Yin, 2018). Inclusion criteria included (a) employees and leaders within large CPG organisation, who have direct experience in the use or implementation of AI-based technologies in the organization (b) being either employees of the CPG organization or third-party consultants. The data collection technique in this study uses fifteen semi-structured interviews that allow flexibility in exploring relevant issues during the interview. To ensure the validity of the data, a triangulation process was applied, where researchers compare interview results with secondary data, such as Documentation, Archival records, Physical artefacts, and Observations, which the author has directly experienced. These different data sources enabled to gain insights from a multidimensional perspective with the aim to increase the robustness of the research (Yin, 2019). Aim was to achieve data saturation, defined as when gathering fresh data does not spark any new insights (Charmaz, 2006). Thematic data analysis followed a logical sequence, based on Yin 's five phases to enable inductive, emerging and interpretative findings addressing the Research Questions (RQs). These five phases of analysis comprised a non-linear cycle: (1) compiling the data (2) disassembling data (3) reassembling data (4) interpreting data (5) concluding (Yin, 2018).

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Leadership theories have evolved significantly, adapting to the complexities of the digital era. While traditional theories provide foundational insights, modern frameworks such as Agile, Digital, Transformational leadership aim to address the specific challenges posed by technology adoption. Despite these advancements, gaps remain in understanding the specific leadership behaviors that foster AI transformation (Sriharan et al., 2024, Watson et al., 2021). Understanding leadership behavior is crucial for organizations considering AI because effective leadership shapes the strategic direction, adoption, and successful implementation of digital technologies (Sriharan et al., 2024). To address this research gap this study aims to address two primary RQs: (1) What leadership behaviours facilitate digital transformation? and (2) What leadership behaviours hinder digital transformation?

FINDINGS

In answering to the RQs several themes have emerged through triangulations of the interview data, literature review and secondary data. For this section the interviewees are referred as "E" while all other pieces of supporting evidence with "SE".

What leadership behaviours have facilitated digital transformation?

Several elements emerged in terms of role of Leadership in having facilitated the adoption of these technologies such as leadership role in setting the direction, create sense of urgency, define clear priorities, communicate and engage people, celebrate milestones along the way (e.g. E1, E2, E3, E6, E7, P8, E10, E12, E13, E15, E17, E19, SE5). Direct observations within leadership meetings confirm the importance of these topics (SE2, SE9, SE10, SE11).

Set strategy & Create sense of urgency

Several experts highlighted the role of leadership in setting the strategy. E8 talked about "leadership setting clear direction on the way forward". E2 reinforced that "Leaders were crystal clear about the direction. This approach gave confidence to people that this was the right thing to do". E3 highlighted the importance of communicating clearly the 'why' the organisation wants to implement these technologies. Additionally, E1 explicated how the leadership team in the pilot had created a sense of urgency and this helped remove barriers.

Make it a priority

It emerged the crucial role of leadership in making the digital projects a priority. E7 said that "if leadership did not put it as priority, there would just be no headspace for the plants to drive the digital pilots". E6 added that "the leadership team was getting regular updates and digital was also on

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the agenda of the senior leadership meeting". E12 recalled "I personally perceived the importance and focus that the leadership was giving to this project. We were having almost daily follow-ups."

Communicate

It was underlined the role of Leadership in communicating and creating excitement and sense of pride and support. E8 highlighted the "enthusiasm from the leadership team during the physical meetings". E2 firmly stated "without leadership support in the plant, it will not happen". E6 recognized the role of the leadership in being not only present in the meetings but being really engaged, asking right questions, showing the importance of the program not with words but with facts and behaviour".

Celebrate

Linked to the leadership support role, it emerged the concept of recognition and celebration (E1, E17, E19). E1 highlighted that "it was really really important to celebrate all kinds of little successes, It was important to celebrate to make sure people really understand how leadership values what they are doing".

To sum up the facilitating Leadership behaviours included, first, setting the direction, create the vision and why we are entering this journey, second communicate and create sense of pride and excitement and third, when it comes to execution, ensure clarity in prioritisation and celebrate milestones along the way.

What leadership behaviours have hindered digital transformation?

From this study few areas where Leadership has hindered the adoption of digital transformation were allocating resources and build right capabilities (E17, E2, E16, E18), create stakeholders alignment (E2, E5, E6, E15, E21, SE1, SE4), manage Fear (E15,20,E21,E1,E7,E23) and create Trust and empower decision-making (E15, E16,E20,E24).

Allocate Resources & Build right capabilities

Most of the participants highlighted the need of dedicated resources and challenge in getting leaders understand that this was required even for a pilot (E17, E2). E16 also highlighted the need of resources with the right skills. She pointed out that it was not only about technical skills, automation, digital skills but about the process and business understanding. On the opposite spectrum, one expert took pride in the fact that after her appointment as dedicated program lead, the number of plants onboarded in the digital program moved in 6 months from 6 to 40 plants (E13).

Create Stakeholders Alignment

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Communication and Stakeholder alignment has emerged as one of the leadership challenges (E2, E5, E6, E15, E21, SE1, SE4). For example, in the demand forecasting project through machine learning, many participants highlighted that the project started as a technology project but in reality, it was a cross functional business project. E15 added "...to understand if our promotions have been effective, the machine has to create a business number, not a Supply Chain number". She added that "this project is not only about technology per se.... it drives a new process, a new way of working for the business". The key challenge of stakeholders alignment emerged in the other use cases and experts engaged in the initiatives expressed with frustration because of the time, energy, effort spent in alignment and communication to different levels and across regions (E5, E6, E2, SE1, SE4).

Manage Fears

Most of participants have highlighted the role of leadership in manging fear from employees. Fear manifested in different forms, such as fear of failure, fear of job loss, fear of transparency. Fear of Failure referred to leadership not allowing time to make the tool work. E20, who has experienced digital adoption in the manufacturing industry, talked about lack of "license to fail". He recalled that when the on-line sensors got installed, the values detected were much worse than before and this created lots of questioning from management. E21 openly talked about "Leadership has to give time for learning". E20 clearly elaborated this challenge by saying that "there should be the need for a safe agreement between the plant and expectations from leaders, an understanding that the plant will go through a learning curve". Similarly, E15 when talking about Demand Forecasting project said that "the tool, AI-powered, requires time to learn to become reliable. This is how this new technology works". E7 urged for a leadership mindset change, by saying "Leadership needs to be OK that when you turn on, it's gonna have errors". E1 and E7 talked about Fear of Failure, of not being equipped and having the right support. E23 gave the perspective that the different types of fear are perceived differently at different levels of the organisation, for example "at plant leadership level you need people able to lead the change. For plant leadership, the fear is of not being equipped to lead this change, fear of feeling incompetent".

Another component of fear is linked to Fear of job loss. In fact, within manufacturing space, introduction of Cobots and digital automation, create fear job loss as mentioned by E3 and E9, and somehow not new as automation projects has always caused headcount (E9).

Fear of Transparency is also a very strong emerging theme. E17 referred to transparency that the tool brings can also create fear, fer of competition of feeling ashamed as your performance results are on a

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dashboard visible to everyone". E23 added that "people feel they are controlled. As a matter of fact, these digital tools bring visibility. People are scared of being punished for their mistakes".

Create Trust and Empower decision-making

One leadership challenge mentioned strongly by several participant was the need for leaders to create Trust and show themselves that they trusted the technology. One expert mentioned that from his experience "the first key challenge of digital is that you need a leadership that believes in it and shows trust in it" (E15). E15 called out that "there is an imminent group of sponsors who are true believers, and they deliver the right messages and support within the organisation but we still have significant amount of sceptics". Other experts attributed the reluctancy to digital adoption to the fact that "People don't understand this black-box, so they push back, they challenge the tool" (SE1, E16). E24 supported this concern by saying, "I think it is being afraid of the change and being dependent on a tool they do not understand". Taken to the next level, other participants urged for a leadership Mindset shift, alluding to the fact that digital drives of big change in the ways of working, forcing people to do things differently and enabling people to take real-time decision but this requires leaders to trust their people in making these decisions (E20, SE1, SE4).

To summarise, findings from this search, have confirmed that Leadership is an instrumental determinant in leading and determining the speed and scale of digital transformation and the study brings up the leadership behaviors that have accelerated and those that have slowed down the digital transformation. On one side, the facilitating factors included leadership in first, setting the strategy and create the sense of urgency (E8,E2,E3,E1), second, communicating and engaging people early in the process, showing enthusiasm and a sense of belief (E2,E8,E6), third, making these initiatives a priority (E6,E7, E12), and lastly, celebrating success stories (E1,E17,E19). Literature on digital Technology adoption has explicitly recognized the Leadership role as significant driving force facilitating AI adoption by setting strategy, engage in communication and change management practices, (Hamm & Klesel, 2021; AlSheibani et al., 2020; Arnold et al., 2018). Dedication and engagement of the top-level management is thus suggested to be a strong contributor in leading digital transformations (Enholm et al., 2021).

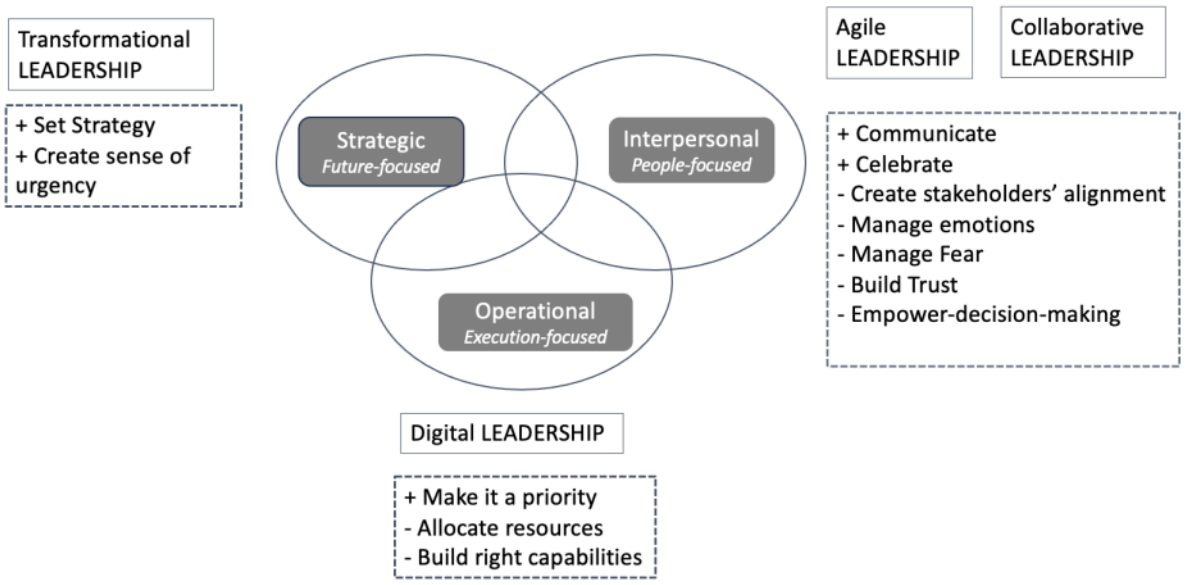
On the opposite side, Leadership behaviours that have slowed down the adoption included the challenge in first, allocating dedicated resource with the right capabilities (E2,E16,E17,E18), second, seek stakeholder alignment (E15,E5, E6, SE1,SE4), third, manage Fear (e.g.E20, E21, E17, E23) which takes the shape of fear of failure, fear of transparency, fear of not being equipped, on top of job loss and lastly, create Trust and empower decision-making (E15, E16,E20,E24,SE1,SE4). Literature has

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widely confirmed the role of Top management as critical to overcome internal resistance and positively influence AI adoption (Yang et al., 2021; Narula et al, 2020, Arnold et al., 2018, Alsheibani et al., 2021), including allocating resources effectively both human and capital resources, ensuring the proper capability building (Fernandez-Vidal et al., 2022, AlSheibani et al., 2021; Pumplun et al., 2019). Prior research from Bevilacqua et al. (2025) has highlighted the critical leadership role in the AI era in communicating helping navigating complex, digitally enabled environments where hierarchical barriers are minimized and ability to foster a shared digital culture (Fernandez-Vidal et al., 2022). Additionally, Cortellazzo et al. (2019) has reinforced the role of leaders in establishing connections with wide array of stakeholders and facilitating cooperation within intricated corporate setting.

DISCUSSION

By linking the findings to the literature review and the conceptual framework from Pendleton, it becomes evident that the leadership behaviors with the greatest impact on digital transformations are predominantly rooted in the interpersonal domain. While setting the overall strategy remains a critical leadership function, resource allocation, prioritization, and capability building are central to the operational domain. However, this research underscores that the most influential leadership behaviors lie in the interpersonal sphere. The findings emphasize the vital role of leadership in managing emotions, aligning stakeholders, and most importantly, fostering trust by reducing fear. Trust, in turn, is a key enabler of empowered decision-making.



***Picture 2**- Findings linked to conceptual framework*

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New conceptual framework

The insights from this research supported by the literature review can be summarised in a new leadership model, named by the authors as "4Es Leadership framework" (Picture 3). This framework magnifies the leadership interpersonal domain putting emphasis on the critical leadership behaviours that can more effectively drive Digital transformation. Overall, this study reveals the crucial role of two emotions Fear and Trust playing a critical role, hence the necessity for leaders in the digital age to Emotionally connect with the aim to remove Fear and build Trust. It deepens the concept of Agile Leadership into Emotional and social agility, which have been widely recognised in the literature as key attributes for managers to lead digital efforts (Bevilacqua et al.,2025, Porfirio et al., 2021, Fernandez-Vidal et al., 2022), drawing on Goleman's concept of emotional intelligence (Goleman, 2006), defined as the ability to understand how everyone's emotional sphere can influence thinking and behaviours. How this can be done? Leaders could enable the shift through three behavioural shifts.

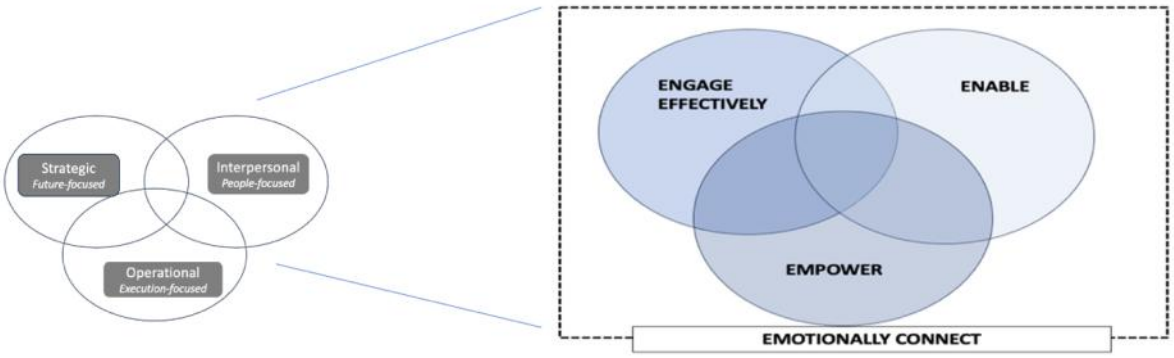
First behavioural shift is for leaders to Engage people early and effectively. This does not only create co-ownership and a co-creation spirit but addresses the Fear. Prior research from Bevilacqua et al. (2025) has highlighted the importance of leadership in the AI era to go beyond traditional models of top-down communication. Additionally, the concept of reverse transparency (Gierlich et al. ,2020) is very relevant for engagement, as people ultimately need to appreciate that they are back in control as they can shape the design of technology and influence its output and put it at their own service. Additionally, if people feel the technology depends on them, rather than the other way around, they will feel more value and in control (Calitz et al., 2017). When employees realize how dependable the technology is on them, Trust will increase.

Second behavioural shift is to Empower people by giving people the autonomy to take decisions. Transparency emerged as a double-edge sword, on one side it brings Fear on the other side it enables Trust and shift in Decision-Making. As a matter of fact, these digital tools brought visibility and with this visibility it became immediately visible who has made a mistake, and this can be scary for people. On the other side, Transparency could be used to empower employees to take decisions thanks to real-time data visibility. Digital technologies enable decision at a lower level of the organization, real-time data accessible to people on the front line create a shift in the decision-making to people who are closer to the decision point (Fountaine et al., 2018). Dispersing operation decision-making becomes the enabler for an organisation to respond more rapidly to disruptions and volatility of the environment but anticipate and predict (Bevilacqua et al., 2025). This is a profound shift because leaders need to abandon the command-and-control style with micromanagement and firefighting style. Best practices

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show how democratization can bring about quicker and better distributed decisions, making companies more agile and responsive to market changes and opportunities (DiFiore, 2018; Greineder and Leicht, 2020). Prior research from Bevilacqua et al. (2025) has highlighted that leadership in the AI era must go beyond traditional models of top-down communication while instead, leaders must navigate complex, digitally enabled environments where hierarchical barriers are minimized, which is essential for achieving sustainable competitive advantage (Fernandez-Vidal et al., 2022). Leaders need to loosen their reins and Trust their people. Trust is a two-way street. On one hand, leaders must Trust people to whom they have delegated their decision-making and at the same time people must Trust that if they run into trouble, they will not be punished. Hence, leadership ability to create a psychological safe environment becomes paramount where leader acts as coach. Creating a psychological safe environment where people can learn without Fear of being punished becomes a key enabler for digital technology adoption (Edmonson, 2018). However, Trust people is not enough. People need to be equipped to make good decisions.

Hence, third behavioral shift is for leaders to Enable employees by providing resources and build capability-building so people can appropriately use the information they get to make the right decisions. The study has confirmed the importance of equipping people with the right capabilities, and it has also highlighted the criticality of having people with both system, technology knowledge as well as business process knowledge, critical to make the technology not only work but maximize its value generation. Data access is key, but it is not enough. Employees also need to be given the skills to use and interpret data and tools (Fountaine et al., 2019; Trunk et al., 2020; Colson, 2019; Cremer & Kasparov, 2021; Jarrahi, 2020).



Picture 3. *Leadership in the Digital Age – 4Es Framework Source: Authors*

CONCLUSION

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Contributions, Limitations & Future research avenues

This research contributes to both academia and practitioners world in several ways. First, it confirms the critical role of Leadership in defining the speed and scale of the digital transformation within organisation. Second, it highlights critical behaviours that can either accelerate or slow down the transformation journey. Third, as Fear and Trust emerge as basic emotions that are key to unlock, the study highlights leaders' social and emotional intelligence as critical leadership skills in the Digital era, for leaders to manage Fear and build Trust. Lastly, this case study offers a new leadership framework "*4 Es Leadership framework*", which can guide practitioners in accelerating the value creation from their digital efforts and be a basis for academia for further research on the topic. However, this research comes with several limitations linked to its methodology and sampling strategy. Future research could validate the Leadership model empirically in other industry settings. Additionally, it could deeper investigate the correlation between Trust and Fear and leadership behaviour, something not widely addressed in the literature.

Conclusions & Implications

Given the relevance of Fear and Trust, emerging as critical emotions affecting the people during the Digital transformation journey, this research has spotlighted the instrumental leadership ability into the interpersonal domain, in particular to Emotionally connect. How can leaders do that? This study offers from a practical point of view three behavioural shifts meant to accelerate and unlock the benefits of the digital at its fullest. Leaders should Engage early and effectively with employee and more holistically with stakeholders internally and externally, Empower people shifting the balance of decision-making and create an environment of learning, and lastly Enable people allocating resources and building capability. Overall, this study envisages a reframing of Digital Transformation from the traditional view of a Technology transformation to a Leadership transformation which puts people and their emotions at the centre.

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SEGMENTING SLOVAK CONSUMERS BY ENVIRONMENTAL BEHAVIOUR IN THE CLOTHING INDUSTRY: A CLUSTER ANALYSIS APPROACH

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ABSTRACT

Market segmentation enables companies to more effectively focus their marketing activities on customers who are most likely to purchase a specific product or service. This also applies to green markets. Customers interested in sustainable products and services are not a homogeneous group. Multiple segmentation approaches are needed to identify differences in their characteristics. Each of these studies resulted in some segmentation of the environmental market. In Slovakia, several authors have used segmentation, e.g., Roper ASW, but their segmentation is absent. This paper focuses on segmenting Slovak consumers by their environmental behaviour. Furthermore, we have examined the research on one specific industry - the clothing industry, which has been one of the most polluting industries in recent years. The study identified three Slovak consumer segments: Sincerely Disengaged (28.8%), Sustainability-Oriented (36.6%), and Undecided Contributors (34.6%). While no entirely "green" segment emerged, there is potential to influence undecided consumers through targeted marketing and education. Additionally, younger and more educated consumers tend to exhibit higher environmental awareness, suggesting opportunities for businesses to develop sustainability-focused strategies tailored to their needs. Despite growing environmental concerns, many consumers hesitate to actively engage in sustainable consumption.

Keywords: Segmentation. Consumer behaviour. Environmental cluster analysis. Sustainable clothing industry

INTRODUCTION

Market segmentation is a strategic approach that divides large consumer markets into smaller segments, each with unique behaviours, needs and characteristics (Kotler *et al.*, 2017). It can help companies learn more about consumer preferences and needs and tailor strategies for target segments to improve consumer satisfaction and increase sales (Liu et al., 2019). Marketing strategy involves four distinct steps: segmentation, targeting, positioning and differentiation. By segmenting and targeting, a company identifies the specific group(s) of consumers to serve. It is essential to segment these

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consumers correctly. Common market segmentation examples include geographical, demographic, psychographic, and behavioural aspects (Schmitz *et al.*, 2012).

Nevertheless, consumers are becoming more sustainable and are considering purchasing environmentally friendly products (Musová *et al.*, 2021). In their efforts to protect the environment, many customers are willing to pay a higher price for environmentally friendly products. As companies increasingly focus on environmental issues and produce environmentally friendly products, it is also crucial to identify which consumers are interested in such products. Therefore, segmenting the market by consumer interest in the environment is crucial. This could be done by segmenting the market into different 'green' categories or 'green' segments. This paper focuses on segmenting Slovak consumers in the clothing industry based on their environmental behaviour, by using cluster analysis. The aim is to identify and characterise different consumer groups according to their attitudes, preferences, and purchasing behaviour concerning sustainable fashion.

LITERATURE REVIEW

Market segmentation based on consumers' environmental behaviour involves dividing individuals or groups of customers according to their attitudes, beliefs, and actions related to environmental sustainability. This approach identifies that consumers' preferences and purchasing decisions are influenced by their interest in environmental issues such as sustainable practices, green products, and responsible consumption (Kotler and Keller, 2016; Laroche *et al.*, 2021). By identifying distinct market segments that share similar environmental values, businesses can tailor their marketing strategies and offerings to better resonate with each group's unique preferences, fostering stronger connections and increasing their overall environmental impact.

Several green marketing studies have attempted to define green consumer characteristics to segment them (Zuraidah *et al.*, 2012; Burke *et al.*, 2014). A literature review reveals numerous studies that identify demographic variables that influence the profile of a green consumer. If significant, these variables offer businesses simple and effective ways to segment the market and profit from green attitudes and behaviours (Jain and Kuar, 2006). Studies have explored the effects of age (D'Souza *et al.*, 2007), gender (Olli *et al.*, 2001), and education (Torroba Diaz *et al*., 2023). Older age groups, including women with a high level of education, were more likely to be involved in environmental activities. These findings align with similar conclusions in a study by Liobikienė *et al.* (2017), who found that women tend to care more about the environment than men and are more likely to engage in environmentally friendly behaviour. *Table 1* summarises studies and surveys by different authors focusing on market segmentation by environmental consumer behaviour.

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Studies/surveys/authors	Country of the studies/surveys	Number of respondents	Year	Number of segments
Roper ASW Survey	USA	n.a.	1990, 2002	5
Ottman a Reilly	Sri Lanka	n.a.	1998	5
Autio & Heinonen	Finland	203	2004	3
The Natural Marketing Institute	USA	2061 and 2074	2006, 2007	5
Chitra	India	60	2007	4
The Simmons	USA	25 375	2007	4
Department for Environment, Food and Rural Affairs (DEFRA)	England	n.a.	2008	7
Banyte et al.	Lithuania	105	2010	4
Bennett & Williams	USA	n.a.	2011	3
Jaiswal et al.	India	594	2021	3
IPSOS	world	10 000	2022	5
Forrester's Green Segmentation	USA, EU, Australia	n.a.	2023 - 2025	4
Maťová et al.	Slovakia	1061	2024	4

Table 1. *Studies/surveys focusing on market segmentation by the environmental behaviour of consumers*

The Roper Organisation's surveys (1990, 2002) segment consumers into five groups based on their engagement and willingness to pay for green products — from committed environmentalists *(True-Blue Greens)* to indifferent consumers *(Basic Browns)*. Ottman (1998, 2011) also adopted this segmentation. Several other studies have classified consumers by their environmental attitudes and behaviours. Autio and Heinonen (2004) identified three segments among Finnish upper secondary students: *deep lifestylers*, who follow strict green moral codes; *medium lifestylers*, who act green without strong ideology; and *light lifestylers*, characterised by consumerism and low environmental concern. Similarly, Bennett and Williamson (2011) found only 16% of American consumers were 'truly green', while most (66%) fell in the middle — buying green products without strong commitment. The Natural Marketing Institute (2006) segmented the US population into five groups: *LOHAS* (16%) value sustainability; *Naturals* (25%) focus on health and natural packaging; *Drifters* (23%) aim to be green but are swayed by price and trends; *Conventionalists* (23%) practise simple eco-actions like recycling; and the *Unconcerned* (14%) show little interest. This model was repeated in 2007 with minor shifts in segment distribution. Other segmentation models, such as Simmons Company's GreenAware Segmentation (2007), classify consumers as *Behavioural Greens* (those who think and act green), *Think Greens* (green-oriented but less active), *Potential Greens* (minimally engaged), and *True Browns* (not environmentally conscious). Chitra´s segmentation (2007) proposes four categories: *Aspirants*, *Addicts*, *Adapters*, and *Avoiders*, while DEFRA (2008) presents a more detailed segmentation, dividing consumers into seven groups based on environmental attitudes and behaviours, ranging from *Positive Greens* to *Honestly Disengaged*.

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Jaiswal et al. (2021), focusing on India's most densely populated region, identified three consumer segments based on eight critical factors of pro-environmental behaviour. *Keen Greens* see themselves as strongly eco-oriented. *Moderate Greens*, the smallest group, show some intention to purchase green products. The second-largest group (32.42%), labelled *Reluctant Greens*, do not intentionally choose environmentally responsible products. The research agency IPSOS (2022) conducted a global study with 10,000 participants from various countries, identifying five distinct segments: *Activists, Pragmatists, Conflicted Contributors, Busy Bystanders,* and *Disengaged Denialists*.

Based on 2024 data from online adults in Australia, the US, and the Europe-5 markets, Forrester (2024) identified four distinct consumer segments in terms of environmental sustainability: *Active Greens, Convenient Greens, Dormant Greens, and Non-Greens*. While Active Greens intentionally seek out and prefer eco-friendly products, Non-Greens are primarily driven by price and show minimal interest in the environmental impact of their purchases. Forrester's 2025 update confirms a stable share of "Active Greens" and highlights the importance of nuanced segmentation based on attitudes toward price, convenience, and environmental values. A Slovak study by Maťová et al. (2024) focused on general environmental consumer behaviour, identifying four segments of environmentally conscious consumers: *Indifferent Greens, Economical Greens, Engaged Greens, and Image-Conscious Greens.* The segments differed in levels of engagement, price sensitivity, brand perception, and product feature preferences.

MATERIALS AND METHODS

The paper employs cluster analysis to segment Slovak consumers based on their environmental behaviour when purchasing clothes. To achieve the paper's objectives, we conducted two types of research: secondary data analysis and primary quantitative consumer research. The secondary data analysis focused on existing literature, reports, and statistical data related to sustainable fashion consumption, consumer attitudes toward eco-friendly clothing, and trends in the Slovak market. This helped establish a theoretical framework and identify key variables influencing consumer behaviour. The primary research involved a structured questionnaire distributed to a representative sample of Slovak consumers. The survey collected data on purchasing habits, awareness of sustainability issues, willingness to pay for eco-friendly clothing, and motivations or barriers to adopting sustainable fashion choices. Using cluster analysis, we identified distinct consumer segments. Each segment has specific attitudes, preferences and behaviours towards sustainable clothing.

In preparing the literature review, we focused on investigating the starting points of the problem using several standard scientific research methods. The primary quantitative consumer research was carried out in November and December 2022. As a tool, we used an online Google

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questionnaire and distributed it through social media networks, including Facebook and Gmail. The questionnaire consisted of 24 questions and was divided into four sections: general environmental attitudes, clothing purchase behaviour, the industry's environmental impact, and respondents' socio-demographic data. In the questionnaire, we used various types of questions, including closed questions (with one or more answer choices) and Likert scale questions. The information obtained from the questionnaire was prepared using Excel software, checked using the IBM SPSS statistical program and then evaluated. Our survey involved a total of 743 respondents. The sample consisted of Slovak residents aged between 18 and 65, while the research sample was designed to reflect the structure of the Slovak population. To ensure the representativeness of the results, we used quota sampling by gender and age. The test of the sample´s representativeness according to gender and age was performed using the chi-square test in IBM SPSS Statistics at a significance level of α = 0.05. The research sample comprises 393 women and 350 men. According to the age structure, the respondents were divided into the following groups: Generation Z (18-26 years), Generation Y (27-42 years), Generation X (43-57 years), and the Baby Boomer generation (58-65 years). A closer description of the respondents is presented in Appendix 1.

CLUSTER ANALYSIS PROCEDURE

As our sample contains more than 100 objects, we chose IBM SPSS's two-step cluster analysis for our cluster analysis. Two-step cluster analysis is designed to analyse large databases for a primary purpose; these algorithms group observations into clusters using a trait approach (Medium.com, 2023). Two-step cluster analysis is an exploratory tool designed to reveal natural groupings (or clusters) within a dataset that would not otherwise be apparent (IBM Statistics, 2023). For the cluster analysis, we chose the following seven variables for which we indicated the best clustering quality: the perception of the following new environmental trends (Swap, Upcycling, Patchwork, buying clothes from recycled materials, production of vegan products, production of ethical products) and when purchasing environmentally friendly textile products influence me a lot (my interest in the environment). Silhouette's measure of cohesion and separation is shown in (Appendix 2). The silhouette value measures the similarity of an object to its cluster (cohesion) compared to other clusters (separation). The silhouette ranges from -1 to +1, where a high value means the object is well-matched to its cluster and poorly matched to neighbouring clusters. Based on our results, the silhouette measure of cohesion and separation = 0.3, indicating an average quality of the overall cluster. We were able to obtain 3 output clusters.

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RESULTS

After data analysis, three clusters with 737 objects/consumers were identified. The largest cluster comprises 270 respondents, while the smallest comprises 212 respondents (Appendix 2). The ratio of the cluster sizes is 1.27. However, six out of 743 respondents were excluded from clustering due to incomplete answers. Based on the results of the two-step cluster analysis, it is understandable that our clusters show some similarities. However, there are still notable differences within the clusters that provide insight into the distinguishing traits and features that establish each cluster as a distinct entity.

Profile characteristics of Cluster 1

Cluster 1 is the smallest in the distribution, comprising 212 consumers. This group primarily consists of men aged 43 and over, often living with partners or spouses in households of two or four members. Their net household income varies, covering all income groups, and they predominantly live in cities or larger towns. Most have a secondary education, with or without graduation. This cluster shows limited interest in environmental issues, although opinions on individual impacts vary. More than half engage in basic environmental activities, such as recycling or conserving energy, but without a firm commitment to these practices. The rest do not participate at all. They are reluctant to purchase environmentally friendly products and are unwilling to pay the extra cost. Consumers in this group buy clothes only when necessary, for example, to replace worn-out items. They tend to shop in fashion or chain stores. While buying less frequently may seem sustainable, their behaviour is not driven by sustainability. Price, design and colour are key purchasing factors, while brand and fashion are less important to almost half of them. Environmental impact or product sourcing is of concern to less than 10%. Around a third are aware of problems in the clothing industry, with 40% mentioning water pollution and textile waste in landfills. Price is the main factor influencing their choice of eco-friendly products, while social impact or influence is minimal.

	Variable	Numerical value	%	% of the given group
Number of objects		212	28.8%	
Gender	men	132	62.3%	
	women	80	37.7%	
Generation	BB (58 – 65)	53	25%	47,3% of all BB
	X (43 – 57)	75	35.37%	31.5% of all X
	Y (27 – 42)	66	31.13%	23.3% of all Y
	Z (18 – 26)	18	8.49%	17.3% of all Z
Prevailing education	With/without A-levels			
Eco-friendly issues	Not interested, not an active involvement			
Influencing factors	Price			

Table 2. *Cluster distribution of Cluster 1*

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Profile characteristics of Cluster 2

Cluster 2 is notable for its higher representation of women in Generations Y and Z, particularly in urban areas. Consumers in this group live in a partnership or marriage relationship. Most consumers living in a partner relationship are found in this segment. Families with three members in the household are most often part of this cluster, followed by families with four members, and then families with two members. The household´s net income varies in this cluster, and we can find all income groups. From an educational perspective, university-educated individuals predominate in this cluster. We can consider this segment *the most active* because these consumers are interested in environmental issues. They believe that even one person can make a positive impact on the environment. They participate in various environmentally responsible activities, including waste separation, environmental cleaning, and energy and water conservation. They are willing to buy a "green" product and are also willing to pay extra for such a product. They note various environmental problems. The most common problems they noted in the clothing industry are water pollution, the issue of clothes ending up in landfills, and the challenge of clothing recycling. Within segment 2, we record more frequent purchases, typically between 3 and 12 times per year. The place where they tend to shop is usually a fashion store or chain (such as Lidl or Tesco). They consider the product´s design and colour, the price, and its quality and sustainability when buying clothes. Moreover, it is linked to the purchase of sustainable products. When buying an environmentally friendly textile product, consumers are influenced by several factors, such as their interest in the environment, the durability/sustainability/quality of the materials used, as well as the product´s price, which was mentioned by more than 47% of consumers in this cluster. Consumers in this segment are interested in buying environmental (textile) products, and to some extent, they do not mind paying extra for such a product.

	Variable	Numerical value	%	% of the given group
Number of objects		270	36.6%	
Gender	men	92	34.07%	
	women	178	65.3%	
Generation	BB (58 – 65)	30	11.11%	26.8% of all BB
	X (43 – 57)	86	31.85%	36.1% of all X
	Y (27 – 42)	110	43.14%	38.9% of all Y
	Z (18 – 26)	44	16.30%	42.3% of all Z
Prevailing education	University degree			
Eco-friendly issues	Interested and active involvement			
Influencing factors	Durability/ Sustainability/ Quality of materials used, Price, My concern for the environment			

Table 3. *Cluster distribution of Cluster 2*

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Profile characteristics of Cluster 3

This cluster is the middle and the second-largest cluster of our analysis. Men and women are almost equally represented (Table 4). They are more likely to belong to the younger generations, living in urban and rural areas. Most consumers in this group live in a partnership or marriage relationship. However, among all the single consumers in our research, most belong to this segment. Families with two members in the household most often belong to this cluster, followed by families with four members and then with three members in the household. We can find all households´ net income groups in this cluster. From the perspective of education, there are mainly secondary-educated consumers (those with graduation exams or A levels) and university-educated consumers. These consumers are more likely to be interested in environmental issues and concerns. Consumers perceive that even an individual can make a positive impact on the environment. From time to time, they participate in environmental activities such as waste separation, cleaning the environment, and conserving energy and water. They would be more willing to buy a "green" product, and they are also more willing to pay extra for such a product. Within segment 3, purchases occur at a frequency similar to that in segment 2, typically 3 to 12 times per year. The place where they tend to go shopping is also more likely to be in a fashion store or a chain store (such as Lidl or Tesco). When buying clothes, people consider the product's design and colour, its price, and its quality and sustainability. Consumers in this cluster identified several environmental issues, including problems with recycling and textiles ending up in landfills, as well as water pollution. When buying environmentally friendly textile products, consumers primarily look at factors such as the durability/sustainability/and quality of the materials used. They try to behave sustainably when buying clothes, but are not convinced to do so. Since, in some cases, they would be willing to buy environmentally friendly products and pay extra, but are not convinced to do so, we can consider this cluster as undecided.

	Variable	Numerical value	Total %	% of the given group
Number of objects		255	34.6%	
Gender	men	125	49.02%	
	women	130	50.98%	
Generation	BB (58 – 65)	29	11.37%	25.9% of all BB
	X (43 – 57)	77	30.20%	32.4% of all X
	Y (27 – 42)	107	41.96%	37.8% of all Y
	Z (18 – 26)	42	16.47%	40.4% of all Z
Prevailing education	A-level/ University degree			
Eco-friendly issues	They are interested in participating in environmental activities and would buy environmentally friendly products but are undecided.			
Influencing factors	Durability/ Sustainability/ Quality of materials used, Price			

Table 4. *Cluster distribution of Cluster 3*

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Interpretation of the clusters for segmentation determination

As our research concludes, Slovakia has three clusters of consumers based on their environmental behaviour when purchasing clothes (Table 5).

Our Cluster Names	C1 Honestly disengaged	C2 Towards sustainability	C3 Undecided contributors
Number of objects	212	270	255
Percentage	28.8%	36.6%	34.6%
Gender men	132 (62.3%)	92 (34.07%)	125 (49.02%)
women	80 (37.7%)	178 (65.93%)	130 (50.98%)
Prevailing generation	BB & X	Y & Z	Y & Z
Prevailing education	With/without A-levels	Uni degree	A-levels/ Uni degree
Eco-friendly issues	Not interested	interested	undecided

Table 5. *Summary table of cluster distribution*

There are some differences between these clusters. One of the most significant differences is the level of consumer concern. We can clearly state that Cluster 2 is the target group for companies involved in and selling sustainable clothing. However, there is also room to target another group, namely Cluster 3. As this cluster is undecided and sometimes shows an interest in the environment, the right marketing campaigns are an opportunity to reach these consumers and win them as customers.

In previous research (Bartošová et al., 2025), we examined the high quality/durability/sustainability, and price of the material used and tested the hypothesis of whether these factors have the most significant impact on consumers. In this research, we conducted a closer examination of the factor analysis (Appendix 3) and identified which clusters were influenced by these factors. *Honestly disengaged* consumers are most influenced by the product price, followed by durability/sustainability or the quality of the materials used. However, this factor affects less than half of the consumers in cluster 1 (46.23%). More than 85% of these consumers do not consider environmental concerns when purchasing an environmentally friendly textile product. Consumers who are oriented *towards sustainability* are most influenced by the durability/sustainability/quality of the materials used (up to 71.48% of consumers mentioned this factor), followed by the price of the product (52.60%), and less than half are influenced by their concern for the environment (45.55%). *Undecided contributors* are also most influenced by the durability/sustainability/quality of the materials used (60.78%), followed by the product price (57.25%). However, up to 75.69% of consumers in this cluster are not influenced by their environmental concerns when purchasing an environmentally friendly textile product. Other factors (people around me - family, friends and acquaintances; social/cultural influences; influencer(s)/celebrities; no one/nothing) influence only a small number of consumers.

If we compare our research with the survey by the IPSOS agency (2021) carried out in several countries around the world, on a sample of 10,000 respondents, we noted specific differences. The first difference is in the number of identified segments. The IPSOS lists 5 segments, and we recorded only 3

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clusters in our research. When we examine the results, we can conclude that none of the clusters is entirely "green". In other words, we do not have a statistically significant cluster in Slovakia like the so-called "activists". Although this cluster is not statistically represented in Slovakia, it does not necessarily mean that such consumers do not exist in the country. According to our research, the consumption patterns of our segments are either closer to the so-called "activists" (e.g. cluster C2) or to the so-called "disengaged deniers" (e.g. cluster C1). In comparison, our segmentation/typology are more accurate than those of Jaiswal et al. (2021) and their three-cluster segmentation (Keen Greens, Moderate Greens, *and Reluctant Greens*). Although we did not find a "fully green segment", our study identified similarities with the Reluctant Greens cluster, which shares characteristics like those of our Cluster 1, and the Moderate Greens cluster, which resembles the characteristics of our Cluster 3. These findings suggest that further research is needed to understand the potential for sustainability.

DISCUSSION AND CONCLUSION

Our research has identified two segments that are inclined towards sustainability, one of which is Cluster 2, known as *'Towards Sustainability'*. Consumers in this group are actively involved in green activities and are concerned not only with design and price but also with quality and sustainability in clothing purchases. Although their behaviour is not entirely sustainable, they make the most effort compared to other segments. A greater interest in environmental issues is evident among Slovak women, who are predominantly represented in this cluster. Another study has also validated this phenomenon. Regarding environmental concerns and attitudes, women often report stronger environmental attitudes, concerns and behaviour than men (e.g. Gifford and Nilsson, 2014). Some studies indicate that women are more trustworthy, open to new experiences (Ladhari and Leclerc, 2013; Prendergast *et al.,* 2018), innovative (Vilches-Montero *et al.,* 2018), and prefer variety (Durante and Arsena, 2015). This also explains women's openness to new environmental trends when buying clothes. However, when we tested the hypothesis about the relationship between gender and the use of environmental trends in the clothing industry, we did not find any dependence. The above studies describe general consumer behaviour, while we focused on trends in the clothing industry. Generally, our respondents do not often utilise these trends. Most consumers claim they mainly buy clothes from fast fashion or chain stores. This, of course, has an impact on the results of our research.

In Europe, sustainable consumer behaviour may be associated with environmental concern, which is influenced by higher levels of environmental knowledge and perception of environmental risks. Some studies (Gifford and Nilsson, 2014; Musová *et al.,* 2021) also suggest that younger people tend to show higher levels of environmental concern than older people, even though older generations may show more sustainable consumer behaviour. These claims partially correspond to our results. We

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observe that younger generations are more likely to belong to segments that behave environmentally responsibly. However, our research did not confirm a statistical relationship between age and environmental trends in the clothing industry. Our research also suggests that more educated consumers are more concerned about the environment. Torroba Diaz *et al.* (2023) consider consumer education to be key to positively influencing their behaviours. Saari *et al.'s* (2021) study demonstrates that environmental knowledge influences environmental risk perception, and both factors influence environmental concern; however, the path from risk perception is stronger. In addition, environmental concern is shown to strongly influence behavioural intention, which in turn mediates sustainable consumption behaviour, and directly influences the target construct.

Cluster 3 - *´Undecided Contributors´*- represents the group identified in the analysis, characterised by a positive attitude toward sustainability but a lack of consistent behaviour in practice. While members of this cluster express interest in environmentally friendly products and activities, their purchasing decisions are primarily driven by price. As a result, they frequently choose more affordable, yet less sustainable, alternatives—despite self-reported willingness to pay a premium for green products. This pattern aligns with broader consumer behaviour trends observed in Slovakia, where product price remains a key determinant of purchasing decisions (Musová et al., 2018). According to Gubíniová et al. (2018), consumers often prioritise functional features and affordability, even at the expense of environmental considerations. Notably, only 13% of Slovak respondents indicated a willingness to pay a higher price for sustainable products.

The last remaining cluster is Cluster 1, which we have named *'Honestly Disengaged'* because the members of this cluster do not engage in sustainable behaviour out of conviction. Moreover, even if they do buy a sustainable product or do something sustainable, it is not because they believe in it, but because they have been 'forced' to do so in some way (e.g. by the requirement to separate waste, or to return plastic bottles with a deposit to shops that the consumer has paid for, or to use energy-saving fluorescent light bulbs that save the consumer electricity and pay less for it). As we have seen from the surveys presented in Table 1, this type of consumer is found globally. Moreover, it is difficult to persuade such consumers to change their consumer behaviour.

Companies and stakeholders should review their strategies and product offerings, considering consumer trends that emphasise the importance of sustainability. Contemporary consumers demonstrate an increased awareness of the environmental implications of their purchasing behaviours and exhibit a willingness to delay or forgo consumption when products fail to meet sustainability standards (Gunawan et al., 2025). The 'Towards Sustainability' segment shows that consumers, particularly women, who are actively involved in green activities, are willing to pay more for high-quality and sustainable products, although their purchasing decisions are still influenced by

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price. This presents an opportunity for companies to develop products that combine sustainability with attractive pricing and design. On the other hand, the 'Undecided' segment highlights the need for consumer education and awareness of the environmental benefits of sustainable products, as they show interest in green options, but price remains a key consideration. For this reason, companies also have the opportunity to collaborate with influencers who raise awareness about responsible purchasing through social media. Companies should invest in educational campaigns and affordable green products that enable a wider range of consumers to take steps towards sustainability.

LIMITATIONS

The main limitation of this research is the representation of the sample. Although we have ensured a representative sample of gender and age, it may not fully capture the diversity of attitudes and behaviours across all demographic and socio-economic groups. The reliance on self-reported survey data introduces potential biases such as social desirability or misinterpretation. The study focuses solely on the clothing industry, limiting its applicability to other sectors of sustainable consumption. The two-stage cluster analysis helps segment consumers. However, it depends on the variables selected and may not capture all the nuances of environmental attitudes. External factors, such as government policies, economic conditions, or global trends, are not taken into consideration. The study reflects consumer attitudes at a particular point in time, which may change over time. Despite these limitations, the research provides valuable insights into the environmental behaviour of Slovak consumers and lays the groundwork for future studies on socio-cultural influences on sustainable purchasing.

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APPENDIX 1 CHARACTERISTICS OF THE RESPONDENTS

Conceptual domain	Segmentation variable	Categories	Sample (N=743)	Sample (%)
Demographic	Gender	Male	350	47.11%
		Female	393	52.89%
	Age (years)	Generation Z (18-26 years)	112	15.08%
		Generation Y (27-42 years)	240	32.30%
		Generation X (43-57 years)	286	38.49%
		Baby Boomer generation (58-65 years)	105	14.13%
	Number of household members (persons)	1	83	11.17%
		2	210	28.26%
		3	191	25.71%
		4	189	25.44%
		5	44	5.92%
		6 & more	26	3.50%
Geographical	Size of place of residence (inhabitants)	Big city (over 100,000)	254	34.19%
		In a larger city (over 40,000)	107	14.40%
		In a smaller city (from 10 000 to 40 000)	129	17.36%
		In a small town (up to 10,000)	200	26.92%
		In the countryside, near the city	45	6.05%
		I live abroad	8	1.08%
Socio-economic	Net monthly household income (€)	0-600€	74	9.96%
		601-999€	149	20.05%
		1000-1300€	152	20.46%
		1301-1700€	132	17.77%
		1701-2000€	87	11.71˘%
		2001-2300€	55	7.40%
		2301 & more €	94	12.65%
	Education	Elementary school	7	0.94%
		High school without graduation	77	10.36%
		High school diploma	326	43.88%
		University 1st degree	123	16.56%
		University 2nd degree	195	26.24%
		Higher university education	15	2.02%

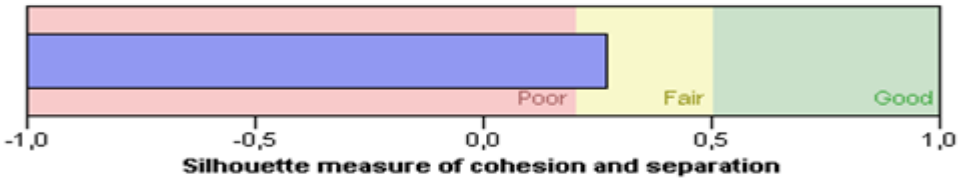
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APPENDIX 2 SILHOUETTE'S MEASURE OF COHESION AND SEPARATION

Model Summary

Algorithm	TwoStep
Inputs	7
Clusters	3

Cluster Quality



Appendix 3 Summary table of cluster analysis of the factors which influence the shopping behaviour of environmentally friendly textile products.

Cases						
Cases	Valid		Missing		Total	
	N	%	N	%	N	%
TwoStep Cluster N* (OT10)	737	99.2%	743	0.8%	743	100%
Cluster	C1		C2		C3	
Factor:	0	1	0	1	0	1
Durability/Sustainability/ Quality of materials used	114	98	77	193	100	155
The price	99	113	128	142	109	146
My interest in the environment	181	31	147	123	193	62
People around me (Family, friends, and acquaintances)	161	51	206	64	197	58
Social/cultural influences	189	23	236	34	219	36
Nobody	185	27	257	13	232	23
Influencers/celebrities / my idol	206	6	250	20	228	53

Note: OT10 - When it comes to buying an environmentally friendly textile product, the following factors are very important to me (more options possible), 0 – no, 1- yes

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ALGORITHMIC AMBIDEXTERITY: NAVIGATING EXPLORATION–EXPLOITATION TRADE-OFFS IN AI-DRIVEN ORGANIZATIONS

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ABSTRACT

This conceptual paper examines how artificial intelligence (AI) transforms organizational learning by introducing the concept of algorithmic ambidexterity. Building on March's (1991) exploration–exploitation framework, the study integrates perspectives from complexity science, ambidexterity theory, and AI-enabled decision systems. Algorithmic ambidexterity is conceptualized as a dynamic capability in which AI-driven systems autonomously rebalance learning activities based on real-time data and environmental complexity. The framework incorporates the NK fitness landscape to model organizational adaptation and highlights the role of hybrid human–AI governance in ensuring ethical, strategic, and contextual oversight. This theoretical contribution extends organizational learning theory into the AI era and provides a foundation for future empirical research into how organizations can use algorithmic learning to navigate complexity, enhance adaptability, and sustain competitive advantage.

Keywords: Exploration-Exploitation Trade-off, Algorithmic Ambidexterity, Artificial Intelligence, Complexity Theory, Organizational Learning, Digital Transformation, Innovation Management

INTRODUCTION

Purpose and Objectives

This paper explores how AI technologies reshape organizational learning by introducing the concept of *algorithmic ambidexterity*. The aim is to develop a theoretical framework that explains how AI systems can dynamically manage the trade-off between exploration and exploitation in complex environments, enhancing both innovation and operational efficiency.

James G. March's (1991) distinction between exploration and exploitation has significantly shaped organizational learning theory. In AI-driven organizations, this trade-off is increasingly governed by algorithms capable of adjusting learning strategies in real time. This study investigates how algorithmic governance enables adaptive ambidexterity, contributing to both theoretical advancement and managerial insight.

In an era marked by technological acceleration and systemic complexity, organizations must innovate while sustaining operational excellence. Artificial Intelligence (AI) emerges as a key enabler of this dual

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imperative, offering scalable and autonomous decision-making capabilities. While traditional models—particularly March's framework—highlight the inherent tension between innovation and efficiency, the infusion of AI into decision processes demands a re-examination of these foundational ideas. This paper responds to that challenge by proposing algorithmic ambidexterity as a conceptual lens to understand AI's transformative role in managing learning tensions.

THEORETICAL BACKGROUND

1. The Exploration–Exploitation Trade-Off and the Foundations of Organizational Ambidexterity

Organizational ambidexterity has long been seen as essential for navigating the tension between pursuing innovation and maintaining operational efficiency. This tension, famously framed by March (1991) as the trade-off between exploration (e.g., experimentation, innovation, risk-taking) and exploitation (e.g., refinement, implementation, efficiency), remains central to understanding organizational learning dynamics. Exploration enhances long-term adaptability but carries risk and uncertain returns; exploitation improves short-term performance but may lead to rigidity and obsolescence.

To address this duality, Tushman and O'Reilly (1996) introduced structural ambidexterity, advocating for the separation of exploratory and exploitative units within organizations. Later, Gibson and Birkinshaw (2004) proposed contextual ambidexterity, whereby individuals and teams balance both modes based on situational demands. These approaches were further extended by dynamic capabilities theory (Teece et al., 1997), which links sensing, seizing, and transforming capabilities to organizational agility in volatile environments.

Later, research has adopted a temporal and paradox perspective, arguing that exploration and exploitation are not necessarily trade-offs to resolve but tensions to manage (Smith & Lewis, 2011; Andriopoulos & Lewis, 2009). Organizations must develop dynamic routines and cognitive flexibility to cycle between or pursue both simultaneously. From this lens, ambidexterity is less about static structures and more about the capacity to navigate complexity and contradiction (Papachroni et al., 2020).

Recent studies further nuance our understanding of algorithmic ambidexterity. Liu (2024) theorizes a continuous, AI-enabled ambidexterity model orchestrated by meta-routines that cycle between exploration and exploitation in real time. Complementing this, Zhang et al. (2025) provide empirical insights from standard multi-armed bandit tasks, showing that while LLMs effectively engage in broad exploration, they lag behind humans in directed exploitation—highlighting critical boundaries of current AI systems.

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Building on March's model, Bocanet and Ponsiglione (2012) introduced a complexity-based extension by applying the NK fitness landscape framework, emphasizing that the balance between exploration and exploitation is shaped by the structure of the environment's complexity. In highly interconnected, rugged landscapes, organizations must dynamically adjust their search strategies to avoid becoming trapped in local optima or lost in excessive search. This complexity lens aligns with recent interest in how adaptive learning systems—human or algorithmic—continuously recalibrate decisions under uncertain, interdependent conditions.

Research in the past three years reinforces this trajectory. For instance, Popa et al. (2022) discuss digital ambidexterity in data-intensive environments, emphasizing the role of AI in reconfiguring strategic routines. Siachou et al. (2023), argue that cognitive and digital alignment is crucial for sustaining ambidexterity in AI-enabled firms. These insights suggest that algorithmic systems can both amplify and recalibrate the exploration–exploitation balance through real-time sensing and learning.

The concept of ambidexterity in organizational studies emerged from the recognition that long-term success depends on a firm's ability to explore new opportunities while exploiting existing competencies. March (1991) seminally framed this as a trade-off between exploration (e.g., innovation, risk-taking, experimentation) and exploitation (e.g., refinement, implementation, efficiency). Over time, scholars proposed structural and contextual solutions to resolve this tension, such as creating separate units for each mode or fostering a culture of dynamic switching (Tushman & O'Reilly, 1996). More recent literature has explored how digital transformation affects this balance. Teece et al. (2016) highlighted that dynamic capabilities—sensing, seizing, and transforming—are essential to maintain ambidexterity in rapidly changing environments. However, most of these frameworks assume human decision-makers at the center, leaving a gap when algorithms take over decision processes.

The onset of digital transformation has introduced entirely new dimensions to March's original framework. Artificial intelligence (AI), machine learning, and big data analytics now play active roles in shaping how organizations balance exploration and exploitation. Scholars such as Brynjolfsson and McAfee (2017) and Faraj et al. (2018) have emphasized that AI systems possess the capacity to enable real-time adaptive learning, dynamically processing vast data streams to support both the discovery of novel insights (exploration) and the optimization of existing operations (exploitation). In this emerging domain, AI systems increasingly engage in what can be termed algorithmic ambidexterity, where intelligent algorithms autonomously monitor, predict, and recalibrate strategic priorities across the exploration-exploitation continuum.

In recent years, scholars have examined human-AI collaboration in organizational learning (Jarrahi, 2018), sustainability ambidexterity balancing financial performance with environmental and social responsibilities (Bocken et al., 2021; Chen, 2019), and organizational resilience under crisis conditions

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such as the COVID-19 pandemic (Wenzel et al., 2021). At the micro-foundational level, neurobehavioral research on cognitive flexibility has provided insights into the individual capabilities that underpin effective ambidexterity in decision-making (Laureiro-Martínez et al., 2015). Together, these developments indicate that the exploration–exploitation trade-off has evolved into a far more intricate, dynamic, and multidimensional phenomenon than originally conceived, shaped by technological advances, institutional complexity, and human cognition.

In sum, while March's 1991 model remains the cornerstone of organizational learning theory, contemporary research has substantially expanded and enriched the framework. The increasing role of AI, digital platforms, multilevel interactions, and paradoxical tensions has transformed the exploration-exploitation discourse into one of the most vibrant and practically relevant areas in modern management scholarship. This paper contributes to this ongoing evolution by advancing the concept of algorithmic ambidexterity, offering a novel lens to understand how AI systems participate directly in the management of organizational learning and strategic adaptation.

2. Algorithmic Decision-Making and Dynamic Adaptation

The trade-off between exploration and exploitation is inherently paradoxical: exploration builds future capabilities but may undermine immediate performance, while exploitation maximizes short-term returns but can lead to strategic stagnation (Gupta et al., 2006). In algorithmic contexts, this tension resembles the multi-armed bandit problem in reinforcement learning, where agents must choose between known rewards and uncertain opportunities (Sutton & Barto, 2018). Techniques like epsilon-greedy or Thompson sampling offer computational solutions, but their organizational implementation is complicated by contextual, structural, and cultural constraints.

The emergence of artificial intelligence introduces a new dimension to ambidexterity. Rather than merely assisting managerial decisions, AI increasingly participates in learning processes themselves, constituting what is now termed *algorithmic ambidexterity*. These systems process vast, real-time, and complex data environments—extending the organization's capacity to learn, adapt, and act under uncertainty (Faraj et al., 2018; Jarrahi, 2018).

Algorithmic ambidexterity supports exploration through anomaly detection, generative modeling, and unsupervised learning that uncover novel insights and opportunities. Simultaneously, exploitation is enhanced via predictive modeling, optimization, and automation, improving efficiency and execution. What differentiates this approach from traditional models is its *real-time recalibration capability*—AI systems can dynamically shift the balance between exploration and exploitation as conditions evolve. However, this shift introduces governance and ethical challenges. While AI offers speed, scale, and precision, it lacks the moral reasoning and contextual judgment required for strategic alignment. Researchers increasingly argue for hybrid human–AI decision models, where humans frame strategic

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intent, supervise outcomes, and ensure ethical standards (Amershi et al., 2019; Binns, 2018; Popa et al., 2022). Such models also mitigate risks related to algorithmic bias and misalignment with organizational values.

Emerging applications provide compelling evidence of algorithmic ambidexterity in action, illustrating how AI systems can simultaneously pursue exploration and exploitation objectives. Dynamic pricing algorithms, for example, test alternative demand scenarios while continuously optimizing for revenue outcomes (Xu et al., 2020). Similarly, generative AI platforms—such as GPT-powered design tools—enable creative experimentation (exploration) while fine-tuning outputs to meet functional constraints (exploitation). At a more advanced level, meta-learning architectures exemplify this dual capability by autonomously adjusting their own learning strategies and decision parameters based on feedback loops, effectively learning how to learn (Finn et al., 2017). These examples reinforce the notion that algorithmic ambidexterity is not merely a technical affordance but a strategic capability deeply embedded in socio-technical systems, enabling organizations to adapt and evolve in complex, data-rich environments. As such, recognizing and leveraging these capabilities is essential for organizations aiming to sustain competitive advantage through dynamic learning and responsive strategy formulation in the AI era.

3. Artificial Intelligence in Balancing Exploration and Exploitation: Toward Algorithmic Ambidexterity

Artificial intelligence is no longer merely a tool for operational efficiency—it has become a strategic asset that redefines how organizations explore new opportunities and exploit existing capabilities. Machine learning, deep learning, and generative AI now support both innovation and optimization, fundamentally altering the balance between exploration and exploitation (Brynjolfsson & McAfee, 2017). AI enables exploration through tools such as generative design, unsupervised clustering, and anomaly detection, which can surface novel opportunities across large, unstructured datasets. At the same time, AI fosters exploitation via predictive maintenance, process automation, and demand forecasting—mechanisms that improve consistency, reduce waste, and scale operational routines (Faraj et al., 2018; Siachou et al., 2023).

This dual-function potential means that AI technologies inherently confront the exploration–exploitation dilemma. Algorithms must choose whether to apply familiar solutions or search for better alternatives, often using feedback signals, environmental volatility, or internal optimization functions as guides. Such decisions are not trivial: without governance, they can reinforce existing biases or chase spurious novelty.

Achieving algorithmic ambidexterity thus requires more than technical deployment—it demands alignment with organizational strategy, data ethics, and human oversight. AI systems must be designed with adaptive learning capabilities (e.g., meta-learning, continual learning) that allow them to

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evolve over time. This evolution should be guided by a governance structure that includes humans in the loop—responsible for auditing, re-training, and recalibrating the system in line with business priorities and ethical norms (Binns, 2018; Popa et al., 2022).

Algorithmic ambidexterity is distinguished by its *dynamic recalibration ability*—AI systems can continuously adjust the degree of exploration and exploitation based on shifting conditions. Firms that design AI not only for automation but for organizational learning gain a unique advantage: they can scale short-term efficiencies while sustaining long-term innovation.

In practice, this means going beyond AI implementation to build organizational capabilities that support ongoing adaptation. These include AI literacy, data governance maturity, ethical oversight mechanisms, and cultural readiness for human–AI collaboration. Organizations must ask not just "what can AI do for us now," but "how will our AI learn, adapt, and improve in strategic alignment with our future?"

Building on recent advancements in the field, Liu (2024) provides a rigorous reconceptualization of organizational ambidexterity in the AI era. Her framework of algorithmic ambidexterity posits that ambidexterity can be dynamically orchestrated through AI-enabled meta-routines, which coordinate parallel exploration, sequential exploitation, and feedback-driven adaptation. This model extends traditional structural, contextual, and sequential approaches by embedding real-time learning mechanisms into organizational processes, enabling continuous recalibration of strategic behaviors without the need for formal separation or temporal switching. Liu's contribution addresses critical gaps in prior ambidexterity theory—specifically, its limited ability to scale in volatile environments and its reliance on human-centric decision-making. In contrast, the proposed iterative framework highlights how AI can function as both a sensing and decision-making entity, allowing organizations to overcome bounded rationality and achieve recursive, system-wide learning. This mechanistic view aligns with our conceptualization of algorithmic ambidexterity as an emergent capability that arises from the integration of AI into learning loops, strategy formulation, and governance. Together, these insights reinforce the need to view algorithmic ambidexterity not merely as a balance of two competing logics, but as a computationally enabled dynamic capability critical for organizational adaptability in complex environments.

Managing the algorithmic exploration-exploitation balance in complex environments requires specific strategies. This includes dynamically allocating AI resources based on real-time data, designing AI systems with built-in mechanisms for both novelty generation and efficiency optimization, and addressing the "automation-augmentation paradox" to ensure synergistic human-AI collaboration. The role of leadership and organizational culture is crucial in fostering this new form of ambidexterity, particularly in highly dynamic and uncertain environments.

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DISCUSSION AND IMPLICATIONS

Theoretical Implications

This paper extends the organizational learning literature by embedding the exploration–exploitation trade-off within AI-driven decision systems. While traditional ambidexterity models focus on human cognition and structural design, algorithmic ambidexterity conceptualizes learning as an ongoing, data-driven recalibration managed through intelligent algorithms. This shift offers a new lens for understanding how learning unfolds in complex environments characterized by high information velocity and decision automation. Furthermore, by incorporating the NK fitness landscape and complexity theory, the paper provides a multidimensional framework for understanding adaptive learning in non-linear, interdependent environments—an area still underdeveloped in mainstream ambidexterity theory.

Managerial and Organizational Implications

For practitioners, the model provides actionable insights into how AI can be deployed not just for efficiency but for dynamic strategic learning. Organizations seeking to build algorithmic ambidexterity must develop more than technical proficiency; they must cultivate capabilities in data governance, ethical AI, and hybrid human–machine collaboration. Leaders should treat AI systems not merely as tools but as co-learning agents, capable of autonomously exploring opportunities and refining operations in tandem. To do so effectively, firms need to implement governance mechanisms that ensure transparency, adaptability, and alignment with long-term strategic objectives.

From a managerial perspective, this study contributes to the literature by demonstrating how *algorithmic ambidexterity operationalizes the exploration–exploitation balance through AI-enabled systems*, extending existing models of organizational learning and ambidexterity. Unlike traditional approaches that emphasize human cognition and structural design (Tushman & O'Reilly, 1996; Gibson & Birkinshaw, 2004), our findings highlight the role of AI in continuously recalibrating learning activities based on real-time data and environmental complexity. Aydiner et al. (2023), for instance, show that organizational energy—comprising cognitive, emotional, and behavioral dimensions—enables digital transformation by fostering cultural flexibility in healthcare organizations. Similarly, Alshura and Alzghoul (2023) emphasize the role of strategic orientations (e.g., innovation and learning orientation) in enhancing service innovation and agility. Our study builds on and extends these insights by positioning AI not only as a support tool but as a co-learning agent embedded within dynamic socio-technical systems. The conceptual model presented here advances managerial understanding by illustrating how algorithmic ambidexterity can serve as a dynamic capability—supporting both innovation and operational efficiency through hybrid human–AI governance. Practically, the study

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offers a roadmap for organizations seeking to leverage AI not just for automation, but for continuous strategic learning and adaptation.

Future Research Directions

This conceptual framework opens several avenues for empirical exploration. Future research can examine how organizations operationalize algorithmic ambidexterity across industries and technological platforms, as well as the contextual factors—such as organizational culture, digital maturity, and sectoral turbulence—that shape its success. There is also a need for longitudinal studies to assess how hybrid governance models evolve over time and how they influence organizational resilience, innovation performance, and ethical outcomes in AI implementation.

This paper adopts a conceptual development approach to examine how artificial intelligence reshapes organizational learning through the emerging phenomenon of algorithmic ambidexterity. Building on March's (1991) exploration–exploitation framework, complexity theory (via the NK fitness landscape model), and recent advances in AI-enabled decision-making, the paper synthesizes multiple theoretical streams to propose a new organizational capability. The methodology follows an integrative literature review, drawing from organizational learning, dynamic capabilities, paradox theory, and AI governance literatures. Through this synthesis, the paper develops a theoretical model that positions algorithmic ambidexterity as a dynamic, real-time recalibration of learning processes, where AI systems autonomously balance innovation and efficiency under conditions of environmental complexity and data abundance.

The model of algorithmic ambidexterity proposed in this study extends March's (1991) foundational framework on exploration and exploitation by embedding it into AI-driven organizational learning processes operating within complex adaptive systems. This conceptualization draws on the integration of four complementary theoretical streams: organizational learning, ambidexterity, complexity theory, and artificial intelligence governance.

At its core, organizations continuously face the fundamental learning tension between exploration — activities associated with experimentation, innovation, search, and discovery — and exploitation — activities focused on refinement, efficiency, implementation, and incremental improvement (March, 1991). Traditional approaches to managing this tension have largely focused on structural or contextual solutions. Structural ambidexterity separates exploration and exploitation into distinct organizational units (Tushman & O'Reilly, 1996), while contextual ambidexterity allows individuals and teams to dynamically adjust their behaviors based on environmental demands (Gibson & Birkinshaw, 2004). Both approaches acknowledge the need for balance but face inherent managerial, cognitive, and structural limitations, particularly as organizational complexity increases.

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To address this limitation, complexity theory provides valuable insights into the nature of the environments in which organizations operate. Using the NK fitness landscape framework (Kauffman, 1993), Bocanet and Ponsiglione (2012) argued that organizations function within adaptive landscapes characterized by varying degrees of interdependence and ruggedness. The greater the interdependencies among organizational elements (higher K), the more rugged the landscape becomes, generating multiple local optima. In such contexts, excessive exploitation can prematurely trap organizations on suboptimal performance peaks, while excessive exploration can lead to inefficiency and search failures. Complexity theory thus highlights that effective learning requires adaptive search strategies sensitive to the structure of the landscape, dynamically adjusting between local search (exploitation) and distant search (exploration) in response to ongoing feedback.

The emergence of artificial intelligence as an organizational learning agent introduces a significant extension to these models. AI systems possess the computational capacity to process vast, high-velocity, and high-dimensional data streams that exceed human cognitive limits. Through advanced machine learning techniques — including supervised learning, unsupervised learning, reinforcement learning, and generative models — AI systems are increasingly capable of performing both exploratory and exploitative functions. They autonomously identify novel patterns, test hypotheses, and suggest innovative alternatives while simultaneously optimizing current processes, forecasting outcomes, and enhancing operational efficiency (Brynjolfsson & McAfee, 2017; Faraj et al., 2018). Unlike human managers, AI agents operate with remarkable speed, scale, and consistency across both learning modes. Crucially, algorithmic ambidexterity allows for continuous recalibration of exploration and exploitation trade-offs based on real-time environmental data and organizational feedback. Rather than relying on periodic strategic reviews or rigid structural solutions, AI systems can adjust learning processes dynamically, identifying when shifting conditions demand greater exploratory search or intensified exploitation. This continuous balancing mechanism allows organizations to maintain agility in complex, rapidly evolving environments, avoiding the risks of both premature lock-in and excessive search costs.

However, while AI systems offer tremendous potential for adaptive learning, they also introduce new governance challenges. Algorithmic ambidexterity requires a hybrid governance model wherein human managers and AI systems collaborate in managing organizational learning. Humans retain essential responsibilities for framing strategic objectives, ensuring ethical compliance, and interpreting complex socio-technical consequences that algorithms may overlook. AI, in turn, handles the technical complexity, scale, and real-time processing required for ongoing recalibration of learning activities. This hybrid arrangement acknowledges both the power and limitations of AI in organizational

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contexts, ensuring that algorithmic learning remains aligned with organizational values, goals, and societal responsibilities.

The proposed conceptual model thus positions algorithmic ambidexterity as an emergent organizational capability that integrates advanced machine learning technologies into the adaptive management of exploration and exploitation within complex environments. It suggests that organizations equipped with algorithmic ambidexterity are better positioned to navigate rugged fitness landscapes, dynamically adjust their learning strategies, and sustain long-term competitiveness amid growing environmental complexity. This model offers a foundation for future empirical research to examine the conditions, mechanisms, and boundary factors that shape how organizations successfully develop and govern algorithmic ambidexterity.

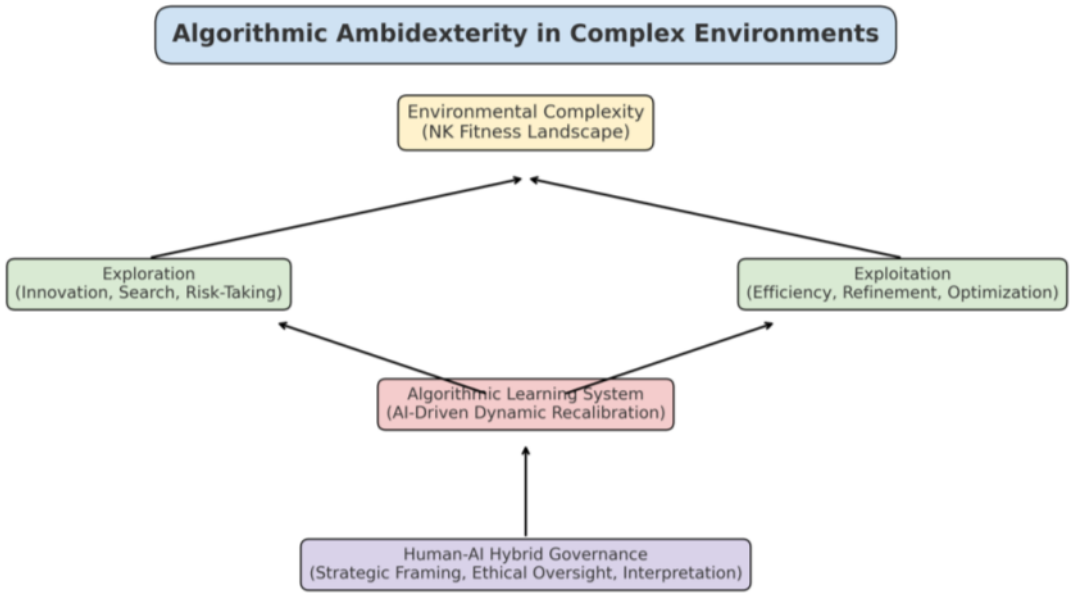


Figure 1. *Proposed Conceptual Model*

The conceptual model of algorithmic ambidexterity integrates multiple theoretical streams to capture how organizations balance exploration and exploitation under conditions of increasing environmental complexity, supported by AI-driven decision systems. At the foundation of the model lies the enduring tension between exploration, which involves activities such as innovation, experimentation, and risk-taking, and exploitation, which focuses on efficiency, refinement, and optimization of existing routines (March, 1991). This classical trade-off continues to represent a central challenge for organizations as they pursue both adaptability and operational excellence.

The model explicitly incorporates the notion of environmental complexity, represented through the lens of NK fitness landscapes (Kauffman, 1993; Bocanet & Ponsiglione, 2012). In this framework, the degree of interdependence between organizational variables (parameter K) determines the ruggedness of the adaptive landscape. The more interdependent and dynamic the environment, the more difficult

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it becomes for organizations to navigate toward optimal performance peaks. Under such conditions, rigid commitment to either exploration or exploitation increases the risk of organizational failure, either by trapping firms in local optima or exhausting resources through unproductive search. Therefore, organizations operating in complex environments require adaptive mechanisms that allow continuous and flexible recalibration between exploratory and exploitative learning.

Central to the proposed model is the role of algorithmic learning systems. Artificial intelligence technologies, particularly those leveraging machine learning, reinforcement learning, and real-time analytics, are capable of autonomously processing vast volumes of complex, multidimensional data. These systems can detect emerging patterns, identify new opportunities, and generate alternative strategic options that support exploration. Simultaneously, they enhance exploitation by optimizing decision rules, forecasting outcomes, and continuously fine-tuning operational processes. What differentiates algorithmic ambidexterity from earlier forms of organizational ambidexterity is its capacity for dynamic, data-driven recalibration of the exploration–exploitation balance based on ongoing environmental feedback, without the same temporal or cognitive limitations faced by human decision-makers.

At the lower level of the model, algorithmic learning processes are embedded within a hybrid governance structure that combines human and AI capabilities. While algorithms excel in processing speed, scalability, and technical precision, human actors retain responsibility for setting strategic objectives, providing ethical oversight, and interpreting the broader social and organizational implications of algorithmic decisions. This hybrid governance model ensures that algorithmic ambidexterity remains aligned with organizational goals, mitigates risks associated with automation biases, and allows the integration of human judgment into complex adaptive learning processes.

Overall, the model proposes that organizations capable of developing algorithmic ambidexterity—through the integration of environmental sensing, adaptive algorithmic learning, and hybrid governance—will be better positioned to navigate complexity, continuously learn, and sustain long-term competitive advantage in fast-changing environments. The model extends the exploration–exploitation framework into the domain of artificial intelligence and complexity theory, offering a foundation for both theoretical advancement and future empirical investigation.

By integrating these AI-driven approaches, organizations can move beyond a static balance of exploration and exploitation to a dynamic, adaptive equilibrium. This ensures that they not only exploit current knowledge for short-term gains but also continuously explore new frontiers for long-term resilience and sustained competitive advantage in the face of ongoing market turbulence and technological evolution.

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CONCLUSION

This paper introduces the concept of 'algorithmic ambidexterity' and demonstrates how AI transforms classic organizational learning frameworks. Practically, it offers a governance model for managers to balance innovation and efficiency through AI while maintaining ethical oversight and strategic flexibility. Findings suggest that AI systems enable organizations to recalibrate exploration and exploitation dynamically. Algorithmic ambidexterity reduces managerial decision latency, improves resource allocation, and allows firms to simultaneously innovate while optimizing existing processes. However, challenges emerge related to employee autonomy, governance, and unintended biases embedded in algorithms. AI reshapes how organizations navigate the exploration-exploitation paradox. Rather than viewing these as competing choices, algorithmic ambidexterity allows dynamic optimization. Future research should further investigate the long-term effects of algorithmic governance on organizational learning, employee roles, and innovation ecosystems.

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REDEFINING SERVICE QUALITY IN LONG TERM ORGANIZATION. A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

As global populations age, long-term care (LTC) services face increasing pressure to deliver high-quality, person-centered care. Although service quality in LTC has received attention in healthcare literature, limited research has explored it from a multi-stakeholder perspective. This study aims to identify the key drivers of service quality in LTC organizations and develop a comprehensive framework that reflects the complexity of care delivery in these settings.

A systematic literature review (SLR) was conducted using the SCOPUS database, resulting in a final sample of 70 peer-reviewed articles selected from an initial pool of 1.661. The studies were analyzed through descriptive and thematic content analysis to uncover patterns related to quality dimensions, stakeholder involvement, and best practices in LTC.

Results indicate that LTC settings' quality is shaped by functional elements (e.g., safety, efficiency, physical environment) and relational-intangible aspects (e.g., empathy, autonomy, communication). The study proposes an extended framework - LTO CARE SERVQUAL model an expanded model that integrates the perspective of four stakeholder groups - residents, families, frontline staff, and management - and highlight the importance of co-creation, dignity-centered care, and operational excellence.

This study advances existing service quality models by incorporating a multi-stakeholder and multidimensional approach specific to LTC settings. The proposed framework provides healthcare managers, policymakers, and service designers with a practical tool to assess and enhance the quality of care in elderly support organizations, addressing current gaps in theory and practice.

Keywords: Long-Term Care (LTC), Service Quality, Patient Experience, Healthcare Management, Stakeholder Perspective, Elderly Care

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1. INTRODUCTION

The demographic shift toward an aging population represents one of contemporary welfare systems' most pressing social challenges. Given the increasing number of elderly individuals requiring institutional support, there is a growing demand for LTC organizations to move beyond mere healthcare provision and foster environments that promote dignity, comfort, and overall human well-being.

While the concept of service quality has been widely explored since the late 1970s (Gummesson, 1979; Grönroos, 1982; Parasuraman et al., 1985), in healthcare settings, it has largely focused on clinical performance, often neglecting the broader experience of care (Singh & Prasher, 2019). Although several models have been developed to assess aspects of patient satisfaction, they tend to overlook the holistic and multifaceted nature of the care experience, which includes not only outcomes but also perceptions, interactions, and emotional responses (Verhoef et al., 2009). In service sectors such as tourism and hospitality, the concepts of customer experience and experience quality have been extensively examined (Kim et al., 2012; Voss et al., 2008), emphasizing the role of both tangible and intangible elements - including interactions with staff, physical environments, and social dynamics (Sampson, 2012; Verhoef et al., 2009). In the healthcare field, research on experience quality remains scarce. Existing contributions - such as those by Raleigh et al. (2012) and Ponsignon et al. (2015) - have proposed initial frameworks but have yet to fully capture the complexity of experience quality, which is inherently context-dependent. Factors such as the dual perspective of service providers and recipients (Fottler et al., 2006), the distinction between planned and realized experiences (Voss et al., 2008), and the involvement of multiple stakeholders - including families and policymakers - must be considered to gain a comprehensive understanding. In this regard, LTC organizations constitute a unique healthcare setting that requires further investigation. As the needs and expectations of today's seniors evolve, the structures also need to change. Despite the centrality of hospitality in fostering well-being among residents and their families, this dimension has received limited scholarly attention.

This research project aims to fill this gap by developing an integrated managerial model adopting a multistakeholder and multilevel perspective of key actors - including senior residents, caregivers, managers, and policymakers. Notably, this study pursues three main objectives**:**

1. To identify the key drivers and dimensions that define service quality in long-term care (LTC) organizations.

2. To explore how various stakeholders, including residents, families, healthcare workers, and

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management, perceive and influence these quality dimensions; and

3. To develop an integrated and adaptable framework (LTO CARE SERVQUAL) that supports both theoretical analysis and practical application for quality enhancement in LTC settings.

A SLR was developed to achieve the research goals. The paper is formatted as follows: firstly, the method for carrying out the literature review was detailed; then, descriptive and thematic analyses were managed. The findings and discussions are shown in the final sections.

2. METHOD

Given the exploratory nature of this research and its aim to synthesize fragmented knowledge across healthcare, management, and LTC-specific domains, a SLR was deemed the most appropriate methodological approach. The SLR enables a structured and replicable process to critically analyze a broad body of academic work, allowing for the identification of key themes, gaps, and theoretical developments in the field (Deyner and Tranfield, 2009).

As outlined by established methodological guidelines (Merli et al., 2018), a SLR involves a series of transparent and replicable steps to ensure academic rigor, reduce selection bias, and provide a comprehensive synthesis of the literature. First, the research questions were stated, and guidelines were developed for collecting the literature. Secondly, a plan for classifying, describing, and coding the literature was developed. As a final step, the literature was synthesized.

Words identifying the overall context of this research, words focusing on the "service quality and experience quality" as a wide and holistic concept, and words identifying the target population of the research, including the patients, families and caregivers were used to detail research string.

The Boolean operator (OR) has been applied as it ensures that synonyms and variations of key terms are captured, and the Logical operator AND has also been used as it ensures that the search retrieves studies that intersect all key areas (healthcare settings, quality dimensions, and the target population).

SCOPUS was selected as the primary database due to its broad coverage of peer-reviewed journals in healthcare, social science, and management fields, aligning with the multidisciplinary nature of this research. Compared to Web of Science and ProQuest, SCOPUS offered the most comprehensive and relevant results for the search terms used (Mongeon et al., 2016). According to the SCOPUS database

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research selection functionalities, the keywords were searched, and a total of 1.661 papers were obtained. Subsequently, inclusion criteria have been applied to reach the final sample.

Figure 1 shows the research strategy we followed to identify the articles. After having defined the timeframe, subject, type, and language of the papers, exclusion criteria were adopted to screen them for the systematic review: paper abstracts were read to identify the ones "out of scope" of our research. 118 papers resulted at the end of the process.

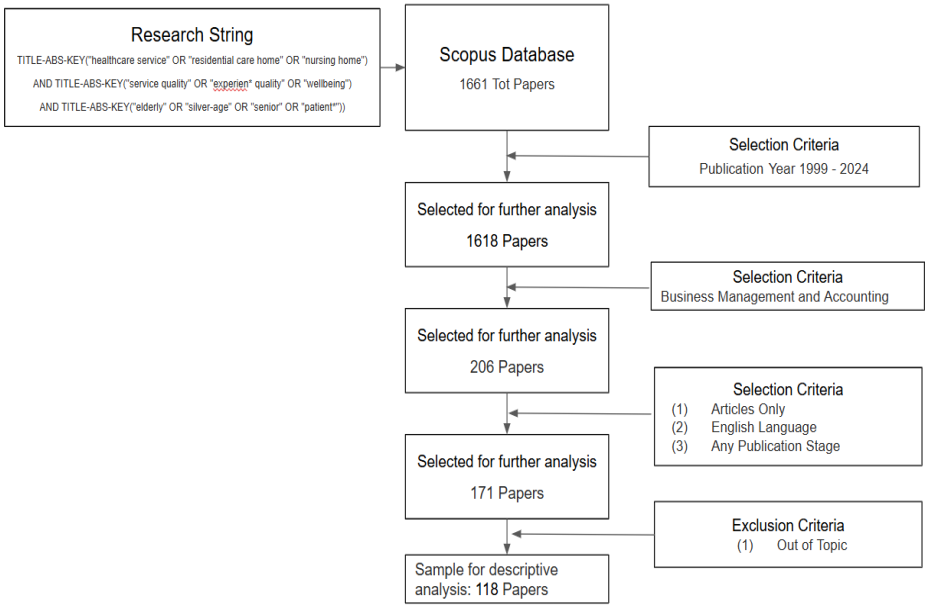


Figure 1– Search Strategy to identify paper for the systematic literature review (Source: Authors' elaboration)

According to Rey-Marti et al. (2016), we established the following analytical categories for the descriptive analysis: (1) Years in which the articles were published; (2) Countries where authors have published research; (3) Journals in which authors have published research; (4) Type - Theoretical or empirical paper - and adopted methodology - qualitative or quantitative.

This approach allowed for a robust cross-sectional analysis of how service quality in LTC settings has been conceptualized and operationalized across contexts, supporting the development of a stakeholder-inclusive framework grounded in both theoretical and empirical evidence.

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3. DESCRIPTIVE ANALYSIS

3.1. Years in which the articles were published

Our research strategy focused on the last 25 years, between 1999-2024.

Four periods have been identified, showing overall increased attention to the topic of the research, in particular:

- 1999-2000: Only two papers were published in the UK and the U.S., with a complete stop from 2001 until 2008.
- 2008-2014: Publications have been published every year with an average of 2,7 papers per year
- 2015-2019: The number of papers increased, reaching an average of 11,4 publications per year, more than double compared to precedent periods
- 2020-2024: Starting from the COVID Emergency up to now, the number of papers has been reduced to 8 per year.

3.2. Countries where authors have published research

Contributions have been published across 39 countries across the world. India (with 27 publications) and the U.S. (with 13 publications) represent the countries with the highest number of contributions, followed by Pakistan and Italy with 5 publications, and Turkey, Malaysia, Iran, and China with 4. The only other European country appearing within the first 10 is Sweden, with three papers.

Papers have been examined, looking at how many countries have published across the 4 periods the timeframe has been split. The number of countries publishing has significantly changed, showing an increased interest in this research topic. From only two countries in Period 1, starting from 2008, the number of countries rose to 19 and more than doubled in period number 3. The underlying trend testifies to the overall increasing global interest in the topic under investigation.

Period of time	n° of Countries publishing papers
1st period of Time	2
2nd period of Time	19
3rd period of Time	57
4th period of Time	40

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Table 1 Number of Countries publishing across the timeframe (Source: Authors' elaboration)

India has the highest number of contributions, more than double that of the United States; however, the United States is the only country publishing across the full timeframe. The first country to publish in Europe was the United Kingdom, while Italy and other countries started between period 2 and period 3.

3.3. Journals in which authors have published

118 papers selected as the final sample were published in 65 journals. However, most of the contributions are published by Emerald in the International Journal of Health Care Quality Assurance. Journals have been listed in Table 2, looking at how many relevant papers have been published in each of them, filtering down to Journals with at least 5 papers.

SCImago Journal Rank (SJR) has also been added:

	JOURNAL	N° Of Papers	Publisher	(SJR)
1	International Journal of Health Care Quality Assurance	17	Emerald	57
2	Total Quality Management and Business Excellence	7	Routledge	94
3	International Journal of Pharmaceutical and Healthcare Marketing	7	Emerald	30
4	TQM Journal	6	Emerald	97
5	International Journal of Quality and Reliability Management	6	Emerald	97

Table 2 - Journals with the highest number of relevant publications (min. of 5) (Source: Authors' elaboration)

India and the United States have been selected for deep investigation as leading contributors to the selected research field. In addition to those, as the research has been conducted in Italy, Italian publications have also been considered, together with other European countries, to be much more similar to Italy in terms of demographic and social structures. Papers with a citation index of at least 100 were also considered, even if they did not belong to a U.S. and European country sample, for their relevance in achieving the research aim.

Thus, the original selected sample of 118 has been further analyzed by looking at the following:

1. Countries with a major number of publications: India and the U.S.

2. Countries with similar social and economic background to Italy: Europe

3. Citation rank (at least 100)

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Papers from India, the United States, and European countries have been selected. Additionally, papers with the highest number of citations have been added to the research for a total of 70 papers

3.4. Adopted Methodology

Considering the adopted technology, most of the scholars proposed empirical investigation. Quantitative analysis (51 papers) prevails over qualitative (15 papers) and theoretical contributions (4 papers).

4. THEMATIC ANALYSIS

In line with the research aim, a thematic analysis was carried out. The thematic analysis aimed not only to classify recurring quality drivers but also to interpret how these dimensions interrelate across different stakeholders and contribute to a more holistic understanding of service quality in LTC organizations. This analytical step supports the development of the integrated model proposed in this study. Rather than treating each stakeholder in isolation, this section identifies both shared and divergent priorities, allowing for a nuanced analysis of how service quality is co-produced and perceived in LTC contexts.

4.1. Long Term Organizations (LTO): concept, definitions, and peculiarities

Selected literature includes a wide variety of healthcare organizations such as nursing homes and elderly care facilities, public and private hospitals, and even digital healthcare services. As observed from the analysis of the keywords, most of the papers look at the patient experience and the service quality, focusing on the overall healthcare services rather than Long Term Organizations (LTOs), for which there is no unique definition. They may include, in fact, any organization offering elderly care services, which may or may not include individuals with special needs and disabilities. These facilities can be public or private, though most studies do not specify this distinction. Variations in conditions and classifications are observed across the analyzed papers, offering different perspectives and analytical contexts.

Kajonius et al. (2016), referring to the Swedish publicly financed, universal elderly care system, distinguished and analyzed two separate sectors: "assisted living at home" (home care) and "institutionalized care" (nursing homes). The first is about providing care at people's homes to help them live independently and with their families. The service is then personalized and designed to be flexible and adapt to the individual needs, which can include cleaning and cooking. The second one

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provides care facilities to people requiring extensive care that cannot be provided at home, often due to deteriorating health conditions. Han et al. (2018) refer to "nursing home" as a mix of private (for-profit) and public (non-profit) organizations providing long-term services and support administered by the Centers for Medicare & Medicaid Services (CMS) in the U.S. Bertezene et al., (2009) refer to "establishments for dependent elderly persons (EDEP)," "homes for the elderly" and “Care units in hospitals looking after dependent elderly persons” as general terms for facilities providing care for older people. Paul et al. (2018) focus on a specific kind of French nursing home for elderly people, the CODE, defined as registered as “Abilitéà l’aide social”, hosting people who cannot afford nursing home services are sent there through the regional government, and public funds cover their costs. Since most of the papers consider general healthcare services and view Long-Term Care (LTC) as a subgroup with specific needs, the research approach has been looking at the patient and experience quality for the healthcare sector and key differences and specific characteristics of LTC services have been identified across the studies. Quality drivers identified across the literature have been analyzed and then grouped, as in the following.

4.2. The Patience Experience

Patient experience is a multidimensional process with many drivers impacting the care process based on the relationship and the stakeholders involved. It is one of the three pillars of healthcare quality, together with "clinical effectiveness" and "patient safety," and it is shaped by how patients perceive the service process during their journey. McCarthy et al. (2016) define patient experience as what a patient thinks, feels, and communicates about his experience with the service process or product he has encountered. It encompasses all interactions and touchpoints, from the initial contact to post-treatment follow-up. According to the authors, the drivers of patient experience emerging from the literature belong to two main groups: *functional drivers* (tangible and operational elements of healthcare delivery) and *rational drivers* (*I*nterpersonal dynamics and communication between patients and healthcare providers)**.** Senapati et al. (2023) analyzed data from patients within nursing homes and mid-tier and top-tier corporate hospitals. They have found that drivers of the patient experience are a combination of tangible and intangible aspects where the relationships among the stakeholders involved in the care process are crucial. Tangible attributes related to the *Servicescape* (physical environment of the healthcare facilities, including cleanliness, equipment, waiting areas, and accessibility) are just one of the six components of the broader picture where interpersonal dynamics are exploited in the other five sub-drivers: *doctor services* (meaning the quality of interactions between doctors and patients, including listening skills, expertise, respect for patient opinions, and inclusiveness in decision-making), *nursing services* (related to the level of care and responsiveness

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provided by the nurses to ensure patient comfort but also supporting doctors), *Information and Communication* (referring to the clarity and transparency of physician-patient communication, *Empathy* (professional courtesy, compassion, emotional support) and finally *Pain Management* (extent to which patients feel healthcare providers manage their pain through appropriate procedures). Senapati et al., (2024) have also found similar results.

Recurrent themes may be identified across the literature. Scanning them, we identified the following common drivers of service quality:

1. *Functional Drivers***,** focusing on tangible and operational elements of healthcare delivery that meet a patient's fundamental expectations:

- *Effectiveness and Efficiency of Service Delivery***:** efficiently, with their needs addressed promptly and organized.

- *Servicescape:* Hospital environment and layouts, cleanliness, equipment, noise levels

- *Tangible Aspects of Care***:** comfortable waiting areas, well-maintained facilities, modern equipment, and the appearance of staff

2. Rational Drivers focus on patient perceptions, emotions, and relationships.

- *Respect and compassion* from clinicians are important as patients expect to be treated with dignity, kindness, and empathy by all healthcare team members. It includes attentive listening, clear communication, and sensitivity to their concerns and anxieties.

- *Patient Empowerment and Involvement,* providing patients with the information they need to understand their condition, treatment options, and potential risks for actively participating in decision-making processes.

- *Transparency and trust in the patient-provider relationship*, as well as open and honest communication, particularly in the event of errors or complications, are fundamental for building trust.

A Patient-centric approach is common across the reviewed papers, but scholars have also highlighted the role and impact each stakeholder has during the service delivery process. These findings confirm that residents prioritize relational and emotional dimensions of care, reinforcing the importance of intangible service elements that are often overlooked in traditional models.

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A complete and correct evaluation of the service quality cannot be then assessed without considering the contribution offered by the service providers to not only the patients but also to families, caregivers, and employees.

4.3. The Patients' parents

While not extensively explored in the sources, the perspective of the patient's family is acknowledged as an essential consideration in healthcare service quality, especially in Indian papers where assistance from family members is typical across the entire duration of the stay in the hospital. They function as a bridge between service providers and patients, attending to their emotional needs, providing comfort measures, and keeping adequate communication. Relatives want to be informed about the patient's progress, treatment plans, and potential risks or complications. Because they act as a bridge, families appreciate healthcare providers who acknowledge their role as caregivers and provide them with the support they need. It could include emotional support, practical guidance on caregiving tasks, and access to resources and information (Padma et al., 2009).

Quality drivers for residents and families in residential elderly care settings are multifaceted, encompassing interpersonal, environmental, and systemic elements and their specific needs. Curry et al. (1999) conducted a multi-method approach to compare service quality perceptions across different settings and stakeholder groups. They found that nursing home residents and their relatives' perspectives regarding healthcare quality reflect shared concerns and distinct priorities. Residents primarily focus on their immediate experiences within the facility, valuing a sense of security, personal dignity, and consistent attentiveness from caregivers. Their daily interactions shape their perception of quality, with responsiveness and empathy playing a central role. Delays in assistance, particularly when calling for help, are a significant source of dissatisfaction, as these moments contribute to a broader feeling of vulnerability. Residents also emphasize the assurance provided by staff, seeking confidence in the competence and reliability of those delivering their care. While the physical environment of the nursing home is acknowledged, it is generally considered secondary to the quality of human interaction and the level of individualized attention received. Relatives, by contrast, approach healthcare quality with an external perspective, prioritizing transparency, accountability, and reliability. They expect timely communication from staff regarding changes in their loved one's health status and care plans, as well as consistent adherence to scheduled treatments and routines. While empathy remains a key concern for family members, their focus is often directed at broader systemic issues such as staffing levels, service efficiency, and the overall management of care provision. They are particularly sensitive to any indications that staff are overwhelmed or unable

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to provide the level of attention required, as this raises concerns about whether their loved one's needs are being fully met. While both residents and their families value safety, dignity, and quality service provision, their perspectives diverge due to their respective caregiving roles. For families, the primary concern is the assurance of safety and security as they entrust the facility with the well-being of their loved ones. They seek regular communication and transparency from healthcare providers, emphasizing the need for clear updates on medical status, treatment plans, and any changes in care provision. Families also prioritize accountability, requiring structured mechanisms for lodging complaints, resolving concerns, and ensuring that clear lines of responsibility exist within the facility's management and care teams. Additionally, facility reputation, physical appearance, accreditation status, and adherence to regulatory standards are critical factors in evaluating care quality, influencing decision-making and trust in the institution. While residents focus more on the continuity of their routines, personal comfort, and maintaining independence in daily activities, families are often preoccupied with long-term care planning, including end-of-life considerations and the stability of care arrangements. In conclusion, from the family perspective, trust and communication emerge as non-negotiable aspects of service quality, suggesting that institutional transparency is as important as technical competence.

4.4. The role of Workforce and Management style

The workforce is critical in delivering quality service because a motivated, well-trained, and supported workforce is essential for high-quality service.

A key driver of quality among healthcare employees is the presence of structured planning and documentation systems. Those working in administration, compliance, and quality control emphasize the necessity of clear operational plans, accurate documentation, and standardized workflows. They perceive that a well-structured quality planning framework enhances service efficiency and regulatory compliance, reduces errors, and improves patient safety. Healthcare employees share this perspective across different roles who recognize the availability and enforcement of well-defined policies and protocols as fundamental to maintaining institutional quality standards and ensuring consistency in care delivery. However, for these frameworks to be effective, policies and guidelines must be clearly communicated and accessible to all staff.

Frontline healthcare workers, including nurses, paramedical staff, and clinical support teams, think patient safety and risk management are critical quality drivers. Employees in hospitals that implement safety protocols, structured incident reporting systems, and ongoing quality monitoring mechanisms perceive better patient outcomes and a lower incidence of medical errors. However, workforce

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shortages, resource constraints, and insufficient institutional support often impede the effectiveness of safety management practices, increasing the likelihood of service failures and adverse patient outcomes. Doctors and senior clinical staff emphasize the importance of active participation in quality management initiatives, such as internal audits, accreditation procedures, and patient safety programs. Their involvement in these activities contributes to quality improvement efforts and strengthens their confidence in the hospital's commitment to excellence. Employees evaluate the impact of quality improvement programs based on measurable outcomes, including patient satisfaction, staff morale, and operational efficiency. Across all employee groups, training and continuous professional development emerge as essential drivers of healthcare quality. Employees in hospitals that provide regular quality management training, clinical skill development programs, and leadership enhancement initiatives report higher levels of confidence in service quality. Conversely, institutions that lack structured training programs experience higher employee dissatisfaction and disengagement, particularly among nurses and paramedical staff. Across all stakeholder groups, the analysis reveals a consistent tension between tangible resources (e.g., infrastructure, equipment, compliance) and intangible factors (e.g., empathy, communication, psychological safety). This confirms the necessity of a multidimensional framework that integrates both. Notably, relational drivers, often treated as secondary, play a central role in shaping perceived service quality in LTC settings. These findings justify the development of the LTO CARE SERVQUAL model, which explicitly reflects this balance.

5. TOWARD AN INTEGRATED FRAMEWORK OF QUALITY SERVICE LTO SETTING: THE "LTO CARE SERVQUAL."

Building on prior efforts to adapt service quality models to healthcare, this study takes a step further by proposing the LTO CARE SERVQUAL framework - a novel, multidimensional tool specifically tailored to the unique challenges of long-term care organizations. Selected literature has adapted and extended tools used for service quality to healthcare services, tailoring the outcomes to specific needs to analyze and identify the quality drivers for healthcare services. This approach allowed for the identification of the peculiarities of healthcare. Notably, Ramsaran-Fowdar (2008) incorporated the Multi-Expectation Standards (MES) as a modification of the SERVQUAL model. Thus, the Authors proposed PRIVHEALTHQUAL, which enriches the SERVQUAL by including dimensions such as expertise, fairness, and information dissemination, which is more suitable for evaluating healthcare service quality. Ramsaran-Fowdar (2008) investigated the concepts of "*desired service*" (what patients ideally would like to receive), "*adequate service*" (the minimum level of service they will tolerate without dissatisfaction), and "*perceived service*" (what they actually perceive); more specifically, they

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measured the difference between perceived service and desired service - called the "Measure of Service Superiority (MSS)" - and the difference between perceived service and adequate service called "Measure of Service Adequacy (MSA). Analyzing the results of 750 distributed surveys, the authors found that the original SERVQUAL dimensions do not fully capture all aspects of healthcare service quality, but two additional dimensions needed to be added: Core Medical Services/Professionalism, focusing on medical expertise, technical skills, and treatment effectiveness and Information Dissemination, focusing on clear medical information to patients. Despite its relevance in the field under investigation, the PRIVHEALTHQUAL results from exploration in a limited set of healthcare organizations- namely private hospitals in Mauritius – neglecting the peculiarities of public structures and LTOs. Given the above, we adopted a wider perspective to involve the peculiarities of LTOs in both private and public settings and to offer a multidimensional and multistakeholder framework of service quality in the LTO care system. The scanned literature was explored and systematized to identify the key quality drivers perceived by the patients and their families as well as the service providers (workers and management). As a result, the LTO CARE SERVQUAL MODEL was developed (see Table 3). Unlike existing frameworks that often adopt a provider- or patient-centric view, the LTO CARE SERVQUAL is grounded in a multi-stakeholder approach, capturing the dynamic interplay between residents, families, workers, and management. This perspective is critical in LTC settings, where quality is co-produced and deeply relational.

LTO CARE SERVQUAL MODEL		
Stakeholder	Tangible Drivers	Intangible Drivers
Workers	Equipment, infrastructure, staff ratios, wage fairness, safety tools, documentation systems	Connection with residents, Leadership style, autonomy, team cohesion, recognition, meaningful work, psychological safety
Management	Cost efficiency, compliance, staffing rate, IT systems, performance tools, Cost-efficiency, IT systems, procedures, accreditation, performance monitoring	Culture, trust in staff, brand image, staff empowerment, collaboration, social responsibility
Residents	Servicescape (environment, comfort, private rooms), safety, cleanliness, accessibility, food quality, homelike environment, staff image	Empathy, respect, involvement, emotional support, safety, promptness, communication, flexibility
Families	Facility accessibility, aesthetics, homelike environment, waiting areas	Assurance of care, Transparent updates, trust, reassurance, involvement in care decisions, empathy

Table 3 - LTO CARE SERVQUAL MODEL (Source: Authors' elaboration)

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The model distinguishes drivers in Tangible and Intangible for each stakeholder and identifies four cross themes: Environment & Infrastructure (Cleanliness, comfort, accessibility, design; Adequate equipment and safe facilities; Use of technology); Human Interaction & Relationship (Communication and transparency, Trust and emotional safety, Empathy, warmth, connectedness); Organizational Culture & Processes (Staff autonomy and recognition, Leadership and psychological safety, Individualized care processes and resident involvement) Operational Efficiency & Compliance (Guidelines and protocol implementation, Performance management and cost-efficiency, Workforce management and training).

It not only synthesizes empirical patterns identified in the literature but also offers a pragmatic structure for decision-makers. By organizing quality drivers into tangible and intangible categories for each stakeholder group, it helps organizations identify targeted areas for improvement - whether in emotional care, communication protocols, staff empowerment, or operational efficiency. Moreover, the model facilitates cross-stakeholder alignment, a vital yet underexplored factor in sustaining quality in long-term care.

6. DISCUSSIONS AND CONCLUSIONS

This study has examined the evolving concept of service quality in LTCOs through a SLR. The findings highlight that quality in LTC is shaped not only by tangible elements - such as facilities, staffing levels, and compliance - but also by intangible drivers, including empathy, autonomy, trust, and emotional support.

A key insight emerging from the thematic analysis is that service quality is a co-produced phenomenon, deeply influenced by the interactions among residents, families, staff, and management. Functional and relational drivers operate simultaneously, and their balance is essential to ensure both safety and dignity in care delivery. For example, while residents prioritize empathy and emotional support, families emphasize transparency and trust, and workers seek autonomy, leadership support, and recognition. These layered expectations create a complex service environment that cannot be understood from a single stakeholder lens.

In response to this complexity, the study introduces the LTO CARE SERVQUAL model, which integrates and extends existing frameworks by organizing quality drivers along two dimensions - tangible and intangible – and across four key stakeholder groups. This model provides a more context-sensitive tool for evaluating and designing quality services in LTC settings, advancing beyond

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prior models like SERVQUAL and PRIVHEALTHQUAL that were limited to provider or patient perspectives

The proposed model has theoretical and practical implications. Theoretically, it contributes to the advancement and systematization of the literature by offering a multi-stakeholder, multidimensional perspective that aligns with recent calls for more inclusive healthcare quality assessments. Practically, the framework helps managers and policymakers identify and prioritize quality improvements that reflect the lived experiences of all involved parties, fostering more humane, participatory, and effective care systems. In sum, the LTO CARE SERVQUAL model addresses a crucial gap in the literature by aligning conceptual rigor with practical utility. It reflects the multidimensional nature of quality in LTC and can guide strategic decisions in policy, accreditation, and organizational design. Future research could apply or test this framework empirically in specific national or institutional contexts, using it as a basis for performance measurement, service co-design, or training programs.

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ADHERENCE TO EUROPEAN SUSTAINABILITY REPORTING STANDARDS: A CASE STUDY OF THE OIL AND GAS INDUSTRY

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ABSTRACT

This study aims to analyze the European Sustainability Reporting Standards and the sustainability reports of a sample of entities in the oil and gas industry to verify their compliance with the new regulations. The new concept of double materiality, introduced by Corporate Sustainability Reporting Directive (CSRD), is of particular importance and becomes a key element throughout the study. This new approach will allow entities to take a more comprehensive view of their sustainable performance and the financial performance already considered in financial reporting.

Regarding the impact materiality, specifically the identification of materially relevant topics, our results show that all the entities consider that the environmental topic that deserves the most concern is human and workers' rights, followed by health and safety at work. In general terms, considering that the application of the CSRD will only become mandatory in 2025, it is plausible to draw a positive conclusion regarding the various topics addressed in this study. The results align with expectations, given that the oil sector faces the most significant challenges in balancing resource exploitation with sustainable development.

The sector increasingly strives to adopt practices that minimize environmental impacts and promote the transition to renewable energy sources, signalling a shift from fossil fuels. Furthermore, the current paradigm of entities seeking and adopting sustainable practices aligns with legitimacy theory, as they recognize the need to demonstrate their social and environmental commitment to achieve success.

Keywords: Sustainability; ESRS Standards; Double Materiality; Oil and Gas Sector

1. INTRODUCTION

The evolution of the concept sustainability has left its mark over the years, and it began to gain greater notoriety in the last century. At first, efforts to ensure a sustainable planet were ad hoc and poorly planned. But the importance attached to sustainability has been growing and the concern shown by

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the population means that everyone now understands that it is necessary to guarantee the continuity of our species by living a sustainable life.

From a business point of view, organizations have stood out positively by adopting sustainable practices and measures, both environmentally and socially. The fact that an entity is sustainable acts as a tiebreaker in the market; those that make their business environmentally friendly gain prominence (Qian, H. et al., 2024). Certainly, some sectors are more worrying than others, and the oil sector appears to be the sector facing the most difficulties in becoming sustainable.

The new Directive 2022/2464, together with the introduction of the new sustainability standards (ESRS – European Sustainability Reporting Standards), has sought to further help entities to adopt sustainable practices, without compromising their core business, and to push them towards a true business activity without greenwashing practices.

This research focuses on the study of the ESRS and the analysis of sustainability reports of entities in the oil sector, verifying the compliance of sustainability reporting with the requirements of the new standards. This sector was chosen because the oil industry is one of the biggest contributors to climate change, but also the one that faces the most challenges in meeting international climate goals and adopting sustainable practices (Beck, C. et al., 2020). This study, divided into five parts, is structured as follows: In the next section, we discuss the literature review. The third section explains the data collection procedure and the research methodology. The fourth section presents the results and analyzes them. Finally, in the last section, we discuss the conclusions, implications, limitations, and future research directions of the study.

2. LITERATURE REVIEW

The new sustainability standards introduce new features about what has been implemented by entities, namely the new approach to double materiality. From 2025, concerning the financial year 2025, all sustainability reports must be drawn up by the European sustainability reporting standards and incorporated into the management report, in digital format. Given these new trends, this study focused on the interpretation of the new concept of materiality - double materiality - to understand how it is being applied by the entities under analysis.

Sustainability reporting resulted from the growing awareness of environmental and social issues, as well as pressure from stakeholders to obtain more detailed information on the environmental, social and corporate governance performance of entities.

According to Brogonzoli (2005), the sustainability report “combines accounting information with ethical and social aspects to effectively communicate how an entity seeks to achieve its objectives,

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using a short-, medium- and long-term perspective", and can be understood as a tool for disclosing entities' commitment to sustainability. The significant increase in demand for information on corporate sustainability, with non-financial reporting becoming a key aspect for non-interested parties, led to the emergence of a new set of European sustainability reporting standards in 2023: the European Sustainability Reporting Standards (ESRS).

The need to coordinate new updates to sustainability reporting with the requirements of the European Green Deal led the European Commission to publish the European Directive 2022/2464, also known as the Corporate Sustainability Reporting Directive (CSRD), which covers the sustainability reporting of entities. Above all, it is important to note that the new directive makes it clear that the non-financial information of entities will assume the same importance as the financial information reported in the financial statements. Niculescu & Burlaud (2023) reiterate that, about the implementation of the CSRD, "this change is a response to the new requirements to improve companies' reporting of social and environmental information, making it more transparent, reliable and relevant, to serve as a lever for the transition to a more sustainable and inclusive economy".

Initially, as this directive is aimed at entities in the Member States of the European Union, the first ones to apply the directive to sustainability reporting will be those already covered by the Non-Financial Reporting Directive. Next, will be entities that were not covered by this directive and, subsequently, all listed SMEs. After a few years, it is intended that the adoption of the CSRD is extended to entities not belonging to the European Union. It should be noted that the first sustainability report under the requirements of the new directive will only be made in 2025, concerning the year 2024. In this sense, it is important to understand how these new standards are structured, which total 12, divided according to their scope. The ESRS have four main groups, always focusing on ESG standards: General Standards, Environmental Standards, Social Standards and Governance Standards.

The fact that this is a new regulation for the European community means that it requires special attention in the first years of implementation, to correct any distortions and improve certain issues. Nevertheless, the European Commission stipulates that 2024 will be the year in which the first covered entities begin to incorporate the ESRS into their reports. The main objective is to ensure that by 2030, the year in which all 17 Sustainable Development Goals must be met, it will be possible to assess the progress in the sustainability practices currently implemented around the world.

With the implementation of the European Sustainability Reporting Standards, a new concept of materiality has emerged: double materiality. As mentioned above, the importance of materiality that has been used only relates to the entities' financial information. In contrast, this new concept aims not

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only to address this information but also the impacts associated with social and environmental parameters. Browsing through the content of the ESRS standards, especially ESRS1, which describes the general requirements, it is possible to see that double materiality has two dimensions: impact materiality and financial materiality. The 21st paragraph also states that all sustainability issues should be reported based on the principle of double materiality. The big news is therefore the new perspective of impact materiality, which consists of disclosing information of a social and environmental nature, addressing sustainability issues, and informing all stakeholders about the impact the entity is having on the environment (Dechow, 2023).

Some authors (Niculescu & Burlaud, 2023) categorize impact materiality as an "inside-out" perspective, i.e. the impact that each entity has not only on sustainability matters but also on common societal and corporate governance issues. On the other hand, they highlight financial materiality as an "outside-in" materiality, which main aspect is understanding how certain environmental and social factors can affect the entity's financial performance (PricewaterhouseCoopers, 2024).

Another approach to the concept of impact materiality relates to the fact that entities increasingly feel the need to not only comply with environmental and social metrics but also to convey a sense of trust for their investors' decision-making. Thus, double materiality assumes a direct relationship between the entity's core business and sustainability (Delgado-Ceballos, J. et al., 2023), insofar as internal factors ("inside-out") and external factors ("outside-in") are considered.

The new perception of materiality implemented by the CSRD can be interpreted as a tool that maintains a link between ESG standards and the 17 Sustainable Development Goals. Environmental, social, and corporate governance information appears to be a starting point for achieving each of the 17 Sustainable Development Goals, which are increasingly considered when making decisions, assuming a materially relevant financial character. In turn, the impact materiality is represented by the entity's sustainable performance and all the efforts made to achieve environmental and social objectives.

Although a distinction is made between the two new categories of materiality, it is important to note that the concept implemented by Directive 2022/2464 must be considered as a whole and can be used as a framework that "reconciles the interests of investors in sustainability with the impact of the business on the environment and society" (Delgado-Ceballos, J. et al., 2023).

From a regulatory perspective, each entity is responsible for assessing the double materiality, which should always be prepared focusing on the most relevant issues for the business. Double materiality represents a change in the auditing process, especially in the areas most closely related to sustainable development and social responsibility issues. In the first phase, it is important to ensure that the

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standard is correctly applied, with an opening for possible changes to be made because of its implementation. Chiu (2021) stresses that "adopting double materiality requires new mindsets, resources, and processes for measurement and evaluation, and can generate instances of conflict with the traditional materiality concept. These two strands of analysis may not be easy to reconcile.".

3. RESEARCH METHODOLOGY

This study aims to analyze the sustainability reporting of certain entities in the oil sector, to verify their compliance with European Directive 2022/2464 and, consequently, with the requirements of the new ESRS standards. The main idea is to qualitatively analyze European sustainability reporting standards to verify and predict the impact of their adoption and implementation by European entities in the oil sector. Thus, together with the central question of this study, the following research questions arise: how is the concept of double materiality addressed in the sustainability reporting of oil sector entities? and how does the approach to the concept of double materiality comply with ESRS standards?

This research is supported by two well-known theories: the legitimacy theory and the stakeholder theory. According to Sahari, S. et al. (2018), the legitimacy theory states that all entities must maintain a stance in line with their mission, vision, and values, while carrying out their normal activities, legitimizing the entity's behavior and reputation in society (Loh, L. et al., 2017). The stakeholder theory is based on the principle that entities must consider the interests and opinions of stakeholders, together with the perspectives of shareholders, overvaluing the moral and ethical aspects of stakeholder management.

Regarding the definition of the sample, several key aspects were considered which enabled the choice of entities in the oil sector. Firstly, and playing a crucial role in determining the sample, we tried to choose entities listed on the stock exchange. Secondly, we selected entities that were part of sustainability indices at the European level. Lastly, after fulfilling the previous requirements, only entities whose sustainability report mention the new concept of double materiality were selected.

The Europe 600 Oil & Gas Index, produced by STOXX, was the starting point for defining the sample. This index only includes entities with an ICB (Industry Classification Benchmark) classification, which is defined as a system for categorizing entities by sector and/or industry according to their main sources of revenue. This system allows entities to be organized into four levels: industry, super sector, sector, and subsector. As a result, it is possible to obtain the twenty oil sector entities in the European market with the highest revenues (Table 1). In addition, this index shows the stock exchange on which each entity is present. However, only ten of these twenty organizations present sustainability reports that mention the new concept of double materiality (Table 2).

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Table 1. Twenty oil sector entities in the European Market with the highest revenues – STOXX Europe 600 Oil & Gas Index

Company Name	Country	Exchange	Double Mention	Materiality
NESTE	FI	NASDAQ Helsinki	Yes	
SHELL	GB	EURONEXT Amsterdam	No	
OMV	AT	Vienna Stock Exchange	Yes	
TENARIS	IT	EURONEXT Milan	No	
SNAM RETE GAS	IT	EURONEXT Milan	Yes	
ENAGAS	ES	Bolsa de Madrid	No	
ENI	IT	EURONEXT Milan	No	
REPSOL	ES	Bolsa de Madrid	Yes	
ORLEN	PL	Warsaw Stock Exchange	No	
VESTAS WIND SYSTEMS	DK	NASDAQ Copenhagen	Yes	
SIEMENS ENERGY	DE	Deutsche Boerse	Yes	
TOTALENERGIES	FR	EURONEXT Paris	No	
VALLOUREC	FR	EURONEXT Paris	No	
TECHNIP ENERGIES	FR	EURONEXT Paris	Yes	
AKER BP	NO	Oslo Stock Exchange	Yes	
GALP ENERGIA	PT	EURONEXT Lisbon	No	
GAZTRANSPORT ET TECHNIGAZ	FR	EURONEXT Paris	No	
EQUINOR	NO	Oslo Stock Exchange	Yes	
SUBSEA7	NO	Oslo Stock Exchange	Yes	
BP	GB	London Stock Exchange	No	

Table 2. Ten oil sector entities in the European Market – STOXX Europe 600 Oil & Gas Index – that mention the new concept of double materiality on sustainability reports

Company Name	Country	Exchange	Double Mention	Materiality
NESTE	FI	NASDAQ Helsinki	Yes	
OMV	AT	Vienna Stock Exchange	Yes	
SNAM RETE GAS	IT	EURONEXT Milan	Yes	
REPSOL	ES	Bolsa de Madrid	Yes	
VESTAS WIND SYSTEMS	DK	NASDAQ Copenhagen	Yes	
SIEMENS ENERGY	DE	Deutsche Boerse	Yes	
TECHNIP ENERGIES	FR	EURONEXT Paris	Yes	
AKER BP	NO	Oslo Stock Exchange	Yes	
EQUINOR	NO	Oslo Stock Exchange	Yes	
SUBSEA7	NO	Oslo Stock Exchange	Yes	

The choice of sample also considered the importance of the ESG model for the entities. The London Stock Exchange Group (LSEG) has a mechanism for measuring the commitment, performance, and effectiveness of the ESG model implemented by entities (LSEG, 2023). This measurement is determined by the attributes of each pillar within the ESG model; each of which is assigned a value and, consequently, the average of the three pillars is calculated. Following the same logic, Sustainalytics has a tool that measures the degree of exposure of selected entities to materially

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relevant ESG risks specific to the oil sector (Sustainalytics, 2023). For all the entities listed in Table 1, it was found that they are also presented in these two indices.

Taking as a starting point the objectives of ESRS1, which presents the general requirements for implementing the directive, the third objective relates to double materiality as the basis for disclosing sustainability information. The requirements set out in this objective of ESRS1 cover topics related to the entities' stakeholders, the two new areas of double materiality, impact materiality, and financial materiality; and, above all, the assessment and definition of the material impacts, risks and opportunities (Table 3). With the application of these requirements, all sustainability issues disclosed by entities must be supported by the principle of double materiality.

Table 3. ESRS1 – Third objective and double materiality as the basis for disclosing sustainability information

Objective	Double materiality as the basis for sustainability disclosures
3	
3.1	Stakeholders and their relevance to the materiality assessment process
3.2	Material matters and materiality of information
3.3	Double materiality
3.4	Impact materiality
3.5	Financial materiality
3.6	Material impacts or risks arising from actions to address sustainability matters
3.7	Level of disaggregation

To analyze whether the concept of double materiality complies with ESRS1, the legal information was cross-checked with the information disclosed in the entities' sustainability reports under analysis, validating all the content of the third objective at an individual level. The main objective is to obtain comfort about the evidence of all the requirements of the third objective in the sustainability reports of the entities in the oil sector.

Stakeholders and their relevance to the materiality assessment process

Paragraph 22 of ESRS1 refers to stakeholders as "those who can affect or be affected by the company". In addition, it mentions the existence of two groups of stakeholders: affected stakeholders and users of sustainability statements. Affected stakeholders can be interpreted as all those who are affected by the entity's actions and relationships, namely employees, collaborators, suppliers, consumers, customers, public authorities, regulators, and central banks. The contribution of stakeholders in identifying impacts, risks, and opportunities, as well as in carrying out a materiality assessment, plays a fundamental role in the entity's commitment to act accordingly and responsibly.

When analyzing the sustainability reports of the entities shown in Table 3, the stakeholders identified are very similar and fall into the categories disclosed in Appendix A of ESRS1 (Table 4).

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Table 4. Comparison of stakeholders disclosed in sustainability reports with Appendix A of ESRS1

Company Name	Employees and Other Workers	Suppliers	Consumers	Customers	End-Users	Local Communities	Public Authorities
NESTE	✔	✔	✔	✔	✘	✔	✔
OMV	✔	✔	✘	✔	✘	✔	✔
SNAM RETE GAS	✔	✔	✘	✔	✘	✔	✔
REPSOL	✔	✔	✘	✔	✘	✔	✔
VESTAS WIND SYSTEMS	✔	✔	✘	✔	✘	✔	✔
SIEMENS ENERGY	✔	✔	✘	✔	✘	✘	✔
TECHNIP ENERGIES	✔	✔	✘	✔	✘	✔	✔
AKER BP	✔	✔	✘	✔	✘	✔	✔
EQUINOR	✘	✔	✘	✔	✘	✔	✔
SUBSEA7	✔	✘	✘	✔	✘	✔	✘

The category of end-users, i.e. the end-users of the companies' products or services, does not include the stakeholders disclosed in the sustainability reports of the sample in question. This is because most organizations include end-users in the category of consumers since they represent the individuals who purchase the products and services that the organizations offer. However, it is important not to confuse these two categories. For example, oil refineries sell their fuel to distribution companies, which are considered consumers. These entities then distribute the fuel to gas stations which, in turn, sell the product to the individuals who need it, assuming the role of end-users. This topic states that the assessment of materiality must consider the opinion of the entity's stakeholders and, in the reports studied, there is evidence of this contact through workshops and continuous feedback, enabling entities to align their strategies with key sustainability issues. Communication with stakeholders increases knowledge of the entity's value chain, leading to an updated materiality assessment with recent and relevant information.

Material matters and materiality of information

The assessment of materiality, along with stakeholder involvement in this process, helps identify the impacts, risks, and opportunities that the entity deems materially relevant to environmental issues. To quote paragraph 26 of ESRS1, "The assessment of materiality is the starting point for sustainability reporting under ESRS".

The entities under analysis have taken the first step in assessing materiality, i.e. communicating with stakeholders about environmental issues. Then, by checking the sustainability reports, it is possible to obtain proof that all materially relevant topics have been covered, depending on the entity's activities and intended performance.

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In a regulatory context, ESRS2 presents the general disclosure requirements that entities must follow when identifying impacts, risks, and opportunities and assessing materiality. In complying with these requirements, and quoting paragraph 53 of the standard, "Companies shall disclose the following information:

(a) A description of the methodologies and assumptions applied in the processes described;

(b) An overview of the process used to identify, assess, prioritize, and monitor the company's potential and actual impacts on people and the environment, based on the process inherent in the company's sustainability due diligence (...);

(c) An overview of the process used to identify, assess, prioritize, and monitor risks and opportunities that have or may have financial effects. (...)

(h) If the process or processes have changed compared to the previous reporting period when the process was last modified and the future review dates of the materiality assessment.".

Of the ten entities under study, the requirements presented by AKER BP, EQUINOR, OMV, SNAM, and TECHNIP ENERGIES have been met. Although they don't all follow the same format, their sustainability reports seek to disclose the impacts resulting from the normal course of the entity's activity, as well as the factors that can influence them.

Starting with AKER BP, the sustainability report seeks to ensure that the materially relevant topics identified answer the following question: why is this topic material to the entity? In other words, AKER BP aims to explain the environmental, social, and corporate governance impacts associated with each material topic previously identified and discussed with the various stakeholders. Thus, AKER BP's main objective is to ensure that all impacts, risks, and opportunities form the basis of the sustainability report's content. Regarding the comparability of the material topics identified in the 2022 financial year, the entity states that they remain the same, having only undergone changes caused by the implementation of the ESRS.

Turning our attention to SNAM, which, like AKER BP, divides its material topics according to the ESG standard, and presents a more elaborate approach to the process of identifying impacts, risks, and opportunities. For each topic, there is a description of the impact on the organization, the type of impact (positive or negative), whether it is a potential or actual impact, the time horizon of the impact (short, medium, or long term), the source of the impact (directly related activities or activities that are hierarchically related) and, finally, how the material topics impact the organization's stakeholders. Compared to the same period last year, of the fifteen material topics identified, ten have changed. Considering EQUINOR's sustainability report, the company has decided to identify the material

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topics according to previously defined strategic pillars. Next, for each topic, a set of indicators is defined, which were intended to be achieved by 2023, and their status is presented: achieved, not achieved, plan under development and on track to be achieved in the long term, and plan under development and not on track to be achieved in the long term. In addition, a comparison is made of the performance achieved in 2022 and 2023, with 70% of the results being subject to change.

Aligned with the OMV's disclosure, the stance adopted by this entity takes on a qualitative role in the impacts, risks, and opportunities of material topics. Initially, a description of the type of risk is provided, which can be either a threat or an opportunity. Subsequently, the impact of the topic under analysis is assessed using an inside-in perspective, which evaluates the internal impact on the entity; and/or an inside-out perspective, which considers the external effects. In addition, measures to mitigate the impact of the identified material topics are presented, with OMV's measures standing out as particularly extensive and comprehensive in this regard.

Finally, in TECHNIP ENERGIES' report, the identification of impacts is more discreet, being succinct and objective. This approach aligns with the company's strategy of prioritizing the most significant issues for stakeholders and those that could have a substantial impact on the business. Of the ten entities analyzed, it stands out that those that disclose the fewest relevant topics are the ones that comply the most with the requirements of ESRS2.

Double materiality

Based on what was said earlier in this article, double materiality encompasses an aspect more related to sustainable impact, impact materiality, and a factor that covers financial issues, financial materiality. Therefore, the presence of each one of these materialities in sustainability reports will be checked individually, as they are two different objectives.

Nevertheless, it should be noted that paragraph 38 of the ESRS1 mentions that "assessments of impact materiality and financial materiality are interrelated, and therefore the interdependencies between these two dimensions should be taken into account". Furthermore, the same paragraph warns that impacts on sustainability, i.e. relevant in terms of the impact materiality, can become materially relevant from a financial perspective if they are shown to impact the entities' financial performance. In addition, it is important to note that the material topics encompass issues that are materially relevant both in terms of impact and financial implications. Both aspects are crucial for a correct understanding of the entity's sustainable performance.

Most entities under analysis have a section in their sustainability reports for assessing double materiality, where they identify stakeholders and materially relevant topics and relate them to each other using diagrams, graphs, tables, or figures. These diagrams are called a double materiality matrix

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and are intended to classify the impact of the material topics identified on the entities' environmental and financial issues.

There are various ways of presenting materiality and disclosing the topics previously identified, both in terms of their impact and their financial impact. Each entity showcases its approach to double materiality in the manner it finds most suitable and visually clear, ensuring that users of financial and sustainability information can access all the necessary details (BCSD, 2024).

Impact materiality

Looking at the topic of impact materiality, we see that it concerns the environmental and social footprint of entities, namely the impacts that affect them from a sustainability point of view. Any topic identified during the materiality assessment proves to be materially relevant from the point of view of impact whenever it relates directly to the entity's core business and its value chain. The ESRS distinguishes impacts into two groups: actual negative impacts and potential negative impacts, since "for actual negative impacts, materiality is based on the severity of the impact, whereas for potential negative impacts, it is based on the severity and likelihood of the impact" (ESRS1, 2023, para. 45). Thus, a new topic emerges which is of great importance in sustainability reporting: severity of impact.

From a regulatory point of view, the severity of an impact is characterized according to three factors: scale, scope, and irremediable nature, which are defined in Appendix A of ESRS1.

The topic of impact materiality is often associated with environmental issues. However, it should be noted that all topics related to the ESG standard are addressed within the scope of impact. Based on professional judgment, the materially relevant impact-related topics disclosed in the sustainability reports of the analyzed entities can be categorized according to the ESG parameter they represent: environmental, social, or corporate governance. In the corporate governance sphere, only five entities – OMV, Repsol, Snam, Subsea 7, and Vestas Wind Systems – consider compliance with regulations, responsible leadership, and good relations with the authorities to be materially relevant topics. Regarding social and environmental issues, all the entities agree that the topics disclosed deserve priority attention.

Some topics identified in the sustainability reports are common across all entities, while others stand out for their uniqueness. From the analysis of the ten entities considered in the sample, it can be concluded that human and workers' rights, namely their working conditions, are the most relevant topic for all entities. This is followed by the workers' health and safety in the workplace, with nine entities presenting this topic in their reports; and in seven entities, diversity is also materially relevant from an impact point of view. Topics such as climate change, pollution, biodiversity, and energy transition are considered material for around half of the entities analyzed.

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By focusing on the double materiality matrices disclosed in the sustainability reports, as exemplified above, it can be interpreted in accordance with the provisions outlined in paragraph AR10 of Appendix A of the ESRS1. Depending on the severity of the topics – i.e., the likelihood of their occurrence having a negative impact on the entities – they assign a qualitative scale, where the greater the severity of the impact, the more crucial it becomes. From the group of topics that the entities consider to be the most material, we investigated the severity that they attribute to them, and it was possible to conclude that, although almost all the entities disclose topics of a social nature within the ESG framework, it is the environmental topics that stand out because their severity is characterized as crucial.

Assigning a degree of severity to materially identified topics makes it possible to understand the extent and depth of the effects they can have on the environment. Today, the topics identified as crucial are not unknown to anyone. It is up to the users of sustainable information to convey the message that the impact of these topics, even though it may be minimal, is crucial for the planet.

Financial materiality

When looking at the other approach to double materiality, financial materiality relates to the sustainability component of entities insofar as, quoting paragraph 49 of the ESRS1, "a sustainability issue is a material from a financial point of view if it triggers or is likely to trigger material financial effects on the company."

Just as risks, opportunities, and impacts can affect the sustainable paradigm of entities, these same risks, opportunities, and impacts can trigger significant financial effects on them. In a sphere of sustainable development, there are dependencies on natural and social resources that condition the normal functioning of the activity and core business of entities, as well as influencing possible commercial relationships with third parties.

As with impact materiality, the topics identified in the entities' sustainability reports under analysis can be classified based on financial materiality. Although fewer than the environmental topics, all ten entities under study have materially relevant topics from a financial point of view. The cross-cutting nature of topics with a financial impact is not so visible, but there are several entities that disclose common topics. An analysis of the reporting conducted by the ten entities under review reveals that topics related to business conduct, the value chain, and dialogue with stakeholders are common to most of them. In addition, topics that are more representative of current concerns, such as innovation, digitalization, cybersecurity, and privacy, are also beginning to emerge.

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All entities must assess the probability of occurrence, and the potential financial impact of the materially relevant topics identified, so that it is possible to estimate the effects - positive or negative - on the entity's development, financial situation, cash flows, access to financing, and cost of capital.

By examining the double materiality matrices in the entities' sustainability reports under study, as previously done, it is possible to identify the topics that are most relevant from a financial materiality perspective. According to paragraph AR14 of Appendix A of the ESRS1, entities should classify the material topics they identify as risks or opportunities since it is assumed that risks have a negative impact on the entity, while opportunities have a positive effect on it. The double materiality matrix for each entity shows the degree of financial importance attributed to each of the materially relevant topics identified. In general terms, the topics that cut across most of the entities and have the highest level of importance are issues related to the conduct of the business, the value chain, and dialogue with stakeholders.

With hindsight, it's important to recognize that a materially relevant topic can be equally significant from both a financial impact perspective and an impact materiality standpoint. However, to understand its severity and significance, different approaches must be adopted for each area of materiality.

Material impacts or risks arising from actions to address sustainability matters

Taking a more theoretical approach, and based on paragraphs 52 and 53 of ESRS1, the actions that an entity intends to implement to minimize negative impacts and mitigate risks may have consequences for some of the sustainability issues it addresses. By way of example, if an entity has implemented an action plan for an electric vehicle supplier, assets used for producing combustion vehicle parts may risk becoming obsolete. To recap, the objective of making the entity more sustainable has resulted in a decrease in the non-current assets.

Level of disaggregation

This requirement must be met when it is necessary to disaggregate material risks, impacts, and opportunities so that they can be better understood. It should also be noted that the information can be broken down by country, significant site, or significant asset. In the context of this study, and considering all the risks, impacts, and opportunities identified, there are no significant variations depending on the region where the entities' activities operate. In addition, the core business of all the entities under analysis is in the same sector.

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4. ANALYSIS AND DISCUSSION OF RESULTS

The purpose of this article's results analysis is to briefly and objectively analyze the conclusions drawn in the previous section and, finally, to answer the research question. To meet the proposed objective, a brief analysis of the selected sample was carried out, based on key concepts, namely Directive 2022/2464, ESRS standards, and double materiality.

As mentioned above, the growing emphasis on sustainability has led to a variety of changes. By considering ESG parameters in the management of entities, particularly in matters of assessing double materiality, possible risks are identified and mitigated which, by using only financial materiality, would not be detected. However, the fact that the double materiality approach is still a novelty generates different opinions.

Eccles (2024) states that "the use of financial materiality or double materiality is fraught with political issues and much complexity, with no consensus in sight". However, throughout this article, it has been observed that the double materiality approach is being effectively implemented by entities in the oil sector, which is also one of the most concerning sectors in terms of sustainable development.

Returning to the initial idea and the contextualization made at the beginning of this study, the new CSRD promises to change the vision of entities in relation to sustainable development. In addition, the new ESRS standards are intended to bring sustainability reports into line with management reports.

The sample of twenty companies initially selected, which was reduced to just ten because only ten sustainability reports mentioned the new concept of double materiality, appears to be quite heterogeneous in a sector that is highly concerned about sustainability. Although this regulation is still new and will only become mandatory in the 2024 report, all ten companies are proactively incorporating the most relevant aspects into their reports.

In addition to an overview of the Directive 2022/2464 and the ESRS standards, it is important to understand how familiar entities are with the new concept of double materiality. Furthermore, it is essential that entities begin to adopt this new approach so that, when it becomes mandatory, they are fully prepared for correct implementation. When analyzing more specific information, namely directly related to ESRS, it was found that entities comply with the requirements of Objective 3 of ESRS1: "Double materiality as a basis for disclosing information on sustainability". This objective provides guidelines for the correct implementation of the double materiality concept, specifically in relation to the entire process of identifying materially relevant topics. In the sample, it was found that a large part of the ten entities showed interest and capacity in starting to implement the concept of double materiality in the preparation of their sustainability reports. From the analysis carried out, the results

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obtained are very positive and demonstrate the objectivity of the ESRS1 and the whole new approach to double materiality.

When analyzing the sample of ten entities that prepared their 2023 sustainability reports based on ESRS principles, the main differences were found in their communication with stakeholders (3.1 Stakeholders and their relevance to the materiality assessment process) and the identification of materially relevant topics from the point of view of impact (3.4 Impact materiality).

Regarding stakeholders, and based on those characterized by the ESRS1, it was possible to see that most of the entities under analysis identify their stakeholders in accordance with the legislation. As mentioned, and explained above, none of the entities in the sample include end-users in their stakeholders' category, since in most cases this category is grouped with that of customers. Thus, most of the entities are complying with the stipulations of the ESRS1.

In terms of the impact materiality, more specifically the identification of materially relevant topics, the main environmental causes that attract the attention of the entities are shown in Table 5.

Table 5. Number of materially relevant impact-related topics identified by entities in their sustainability reports

Impact-related topics	Number of entities
Energy Transition	5
Biodiversity	5
Pollution	6
Climate Change	6
Diversity	7
Health and Safety	9
Human and Labor Rights	10

As mentioned above, all the entities in the sample consider that the environmental topic that deserves the most concern is human and workers' rights, followed by health and safety at work. Awareness of the well-being of employees has gained particular importance over the last few years, and measures and legislation have been put in place for occupational safety that were once unthinkable.

In general terms, considering that the application of the CSRD will only become mandatory next year, it is plausible to draw a positive conclusion regarding the various topics addressed in this study. The results obtained align with expectations, given that the oil sector faces the greatest challenges in balancing resource exploitation with sustainable development.

Currently, the sector is increasingly striving to adopt practices that minimize environmental impacts and promote the transition to renewable energy sources, signaling a shift away from fossil fuels. Furthermore, the current paradigm of entities seeking and adopting sustainable practices aligns with

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legitimacy theory, as they recognize the need to demonstrate their social and environmental commitment to achieve success.

5. CONCLUSION

The main objective of this article was to assess the compliance of sustainability reporting by entities in the oil sector with the new ESRS standards, introduced by Directive 2022/2464. Since this legislation will only come into effect next year, the aim was to determine whether the entities were already familiar with the subject and how they had started integrating the standards into their sustainability reports for 2023.

Initially, after gathering the sustainability reports for the 2023 financial year from all entities in the sample, the focus was on how they mentioned the new directive and utilized the ESRS. This analysis resulted in a reduced sample of only ten entities, as the others had not yet incorporated any reference to the ESRS in their reports.

The new sustainability standards introduce several novelties compared to what has been implemented so far, notably the approach to double materiality and the requirement for an external audit of non-financial reporting, which, starting in 2024, must be included in the management report. Due to these new trends, this study focused on interpreting the new concept of materiality, and double materiality, and aimed at understanding how this is being applied by the entities under analysis.

Regarding the question posed at the beginning of this research, that is how the concept of double materiality is addressed by entities in the oil sector and its compliance with the ESRS, it is possible to draw a favorable conclusion regarding the interpretation and application of the concept, as well as its compliance with the requirements outlined in ESRS1.

The analysis of the sustainability reports allowed for the identification of relevant aspects that demonstrated, in fact, compliance with the standards. Initially, the identification of materially relevant topics from a sustainability perspective considered the views of all the entities' stakeholders. Subsequently, the two components of double materiality—financial materiality and impact materiality—were treated individually to identify aspects that were materially relevant from both financial and environmental perspectives. The results obtained show that the entities analyzed have significantly achieved compliance with these requirements.

Regarding some limitations faced during the work, the fact that the publication of the ESRS standards only occurred at the end of 2022, and will only be mandatory starting in 2024, was undoubtedly the main limitation of this study. Given that this is a novelty for the auditing field, it was expected that

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not many entities would be looking to introduce the new topics covered by these standards. However, the study was successful because there were entities that sought to implement ESRS in preparation for their legal obligation, in their 2023 reports.

The new Directive introduces several novelties to the sustainability landscape, as mentioned earlier. Thus, in terms of suggestions for future studies, it will be interesting to explore the field of mandatory external audits for sustainability reports and take the perspective of the external auditor, ensuring an explanation of the correct – or incorrect – implementation of the ESRS. Another suggestion for a potential study is to understand the financial impact that entities will need to bear on implementing this new regulation, which is typically included in so-called compliance costs.

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THE MEDITERRANEAN DIET AS INTANGIBLE HERITAGE: INTEGRATING CREATIVITY VALUE INTO BIOECONOMY CURRICULA

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ABSTRACT

The Mediterranean diet, recognized by UNESCO as an Intangible Cultural Heritage, transcends mere culinary tradition; it embodies a holistic lifestyle that emphasizes values such as knowledge, hospitality, intercultural dialogue, creativity, and respect for diversity. These principles have been passed down through generations in the countries bordering the Mediterranean Sea. Beyond its food components, the Mediterranean diet promotes sustainable agricultural practices, the preservation of biodiversity, and community resilience. In an era increasingly focused on global sustainability challenges, incorporating the creative and sustainable principles of this heritage into bioeconomy curricula can provide a path for transformative change. This paper explores how the values associated with the Mediterranean diet, along with innovative learning methodologies, can enhance bioeconomy education within Higher Education Institutions (HEIs). Using a narrative literature review, this study identifies 11 educational vectors that integrate creativity, sustainability, and interdisciplinary innovation based on the Mediterranean lifestyle: Interdisciplinary Modules, Experiential Learning Opportunities, Collaborative Research, Creative Methodology, Socio-Economic Dimensions of Bioeconomy in Curricula, Collaborative and Innovation-Focused Learning Environments, Cross-Cultural Exchange Programs, Interdisciplinary Sustainability Projects, Technology and Digital Tools, Collaboration with Local Communities. By aligning bioeconomy education with cultural heritage, this study proposes a framework for curriculum innovation that prepares future bioeconomy leaders to address global sustainability challenges.

Keywords: Sustainability, Curriculum Integration, Higher Education, Interdisciplinary Education, Cultural Preservation, Sustainable Food Systems, innovative learning, Creative Learning, Decision-making process, Cl4Bio

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INTRODUCTION

This paper aims to examine how the Mediterranean diet as an Intangible Cultural Heritage can contribute to reshaping bioeconomy curricula through the lens of creativity and sustainability. The main objective is to propose an interdisciplinary framework that leverages cultural heritage to foster innovation, sustainability, and holistic education in Higher Education Institutions (HEIs).

The Mediterranean diet is well known as one of the healthiest eating patterns. However, its contribution transcends mere culinary aspects (Chkoniya et al., 2024). UNESCO's designation of the Mediterranean diet as an Intangible Cultural Heritage is based on the values it represents, including hospitality, intercultural dialogue, creativity, respect for diversity, and sustainable living practices (Vrontis et al., 2021; Wimpenny et al., 2022). These values pass from generation to generation in the countries around the Mediterranean Sea, creating the foundation for strong communities that emphasise care for the environment, support for local economies, and social unity (Biggi et al., 2024). The bioeconomy focuses on using renewable bio-resources to produce food, materials and energy, which are vital in solving the urgent global sustainability issues (Drejerska, 2024). Nevertheless, effectively integrating these principles into education requires creative and innovative methods. This paper investigates how the cultural and sustainable values of the Mediterranean diet can be integrated into bioeconomy curricula at HEIs, preparing the next generation of leaders to devise innovative solutions for global sustainability challenges.

RESHAPING EDUCATION FOR BIOECONOMY

Most of the academic research in the field of bioeconomy uses the traditional approach, with a focus on the environmental aspects of sustainability (Pink et al., 2024). This perspective frequently highlights the environmental advantages of bioeconomy initiatives, such as renewable energy, carbon emissions reduction and sustainable agriculture. Participants in various surveys generally show confidence in the favourable environmental effects that the bioeconomy can produce, especially in terms of resource efficiency and environmentally friendly practices (Parlato et al., 2024). However, there is a noticeable gap in awareness concerning the socio-economic dimensions of the bioeconomy, including its potential to drive economic growth and social wellbeing. As a result, the bioeconomy is frequently viewed solely through an environmental lens, with limited emphasis on the interdisciplinary connections between ecological sustainability and economic or social development (Trigkas et al., 2023).

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HEIs play a leading role in advancing the objectives of the Green Deal. They are a catalyst for bioeconomy growth by contributing to technological innovations, strategies, and solutions that help the forward. By providing students and researchers with essential skills, HEIs accelerate environmental care, economic resilience, and social wellbeing (Kalnbalkite et al., 2022).

However, there is a lack of comprehensive research on the broader aspects of bioeconomy education, while environmental science is represented, socioeconomics, policy development, and bioeconomic innovation often remain underexplored (Coryton et al., 2022). The lack of integration of bioeconomy topics within HEI curricula increases this research gap since students are not exposed to the full range of subjects related to the bioeconomy, including its social, economic and innovation potential impact. Consequently, there is an opportunity to evolve teaching and research methodology that connects environmental sustainability with socio-economic growth. This requires an interdisciplinary understanding of the bioeconomy. The growing need for an integrated approach to bioeconomy research underscores the importance of curriculum innovation and collaborative frameworks that address environmental and socio-economic perspectives in bioeconomy education and practice.

MEDITERRANEAN DIET'S CONTRIBUTION TO THE BIOECONOMY

The Mediterranean diet contributes to public health and preserving cultural food traditions while addressing creativity and social and environmental challenges. It presents a practical and progressive approach to a sustainable, health-promoting lifestyle in turbulent times that the world is facing today (Sofi et al., 2025). This diet promotes sustainable agricultural practices, and seasonal eating with a strong emphasis on biodiversity and valorisation of local communities. These principles are aligned with the definition and main goals of the bioeconomy since they support the responsible utilization of natural resources (Torres et al., 2023). The focus on plant-based foods, seasonal and local ingredients, and minimizing the environmental impact in this way make the Mediterranean lifestyle provide significant insights into sustainable agriculture, food systems, and waste reduction (Fiore et al., 2024).

The diet's contribution to biodiversity preservation holds particular relevance in bioeconomy education, as it supports short supply chains by encouraging the use of fresh, natural, local and seasonal ingredients (Alexandri et al., 2023). By incorporating this heritage into educational curricula, students can better understand how agricultural practices prioritising ecosystem health contribute to long-term food security, climate resilience, and sustainable economic development (Matías et al., 2024; Papadopoulou et al., 2025). In addition, the Mediterranean lifestyle emphasises creativity and

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community resilience, which holds potential to encourage students to be imaginative and develop innovative bioeconomy solutions inspired by regional customs.

CREATIVITY WITHIN BIOECONOMY EDUCATION

The resolution of complex bioeconomy problems requires creativity. Students need to be inspired to think beyond traditional disciplinary boundaries as they handle sustainability concerns (Vuojärvi H. et al., 2024). This creativity can be stimulated by innovative teaching strategies such as project-based learning, multidisciplinary teamwork, and experiential learning (Putri et al., 2024). One of the most appropriate frameworks for integrating creativity into bioeconomy courses could be the Mediterranean diet. Students can apply creative problem-solving techniques to adapt traditional knowledge to modern bioeconomic solutions by looking at the philosophy behind the diet (Sharma et al., 2024). Moreover, innovative teaching and creative learning methodology can help students understand how cultural heritage can inspire innovation in agriculture, food production, and the use of renewable resources.

METHODOLOGY

This paper follows the literature review method to analyse how the Mediterranean diet can be integrated into HEI bioeconomy curricula (Motevalli, 2024). The research considers several academic articles, case studies, and reports on the Mediterranean diet, bioeconomy, and creativity in higher education. The study focused on three factors:

1. Mediterranean Diet and Sustainability. This explains how the principles of the Mediterranean diet - such as sustainable farming, biodiversity preservation, and the promotion of local food economies - align with the objectives of the bioeconomy.

2. Creativity in Education. This section is focused on the role that creativity can play within bioeconomy curricula and examines how creative learning methods (for example, project-based learning and interdisciplinary collaboration) can contribute to improving the problem-solving skills of HEIs students.

3. Curriculum Integration. This section reviews case studies with examples of effective integration of cultural heritage and sustainability concerns into HEIs, particularly within the scope of bioeconomy. Special attention was given to innovation and interdisciplinary project opportunities.

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DISCUSSION

This paper consolidates key tendencies in creative learning and bioeconomy and suggests a framework for integrating Mediterranean diet principles into HEIs curricula. Additionally, it provides actionable recommendations for HEIs aiming to innovate and adjust their educational approaches. The proposed 11 vectors of integrating creativity value into bioeconomy curricula through Mediterranean lifestyle were identified: Interdisciplinary Modules, Experiential Learning Opportunities, Collaborative Research, Creative Methodology, Socio-Economic Dimensions of Bioeconomy in Curricula, Collaborative and Innovation-Focused Learning Environments, Cross-Cultural Exchange Programs, Interdisciplinary Sustainability Projects, Technology and Digital Tools, Collaboration with Local Communities.

These findings align with previous research on interdisciplinary and cultural-based learning innovations (Shams et al., 2022; Kokkinopoulou et al., 2025; Vuojärvi , 2024). By incorporating the Mediterranean diet and its associated values, HEIs can offer educational experiences that reflect both regional heritage and global sustainability goals, consistent with previous studies in EuroMed Journal of Business.

CONCLUSION

The Mediterranean diet is one of the healthiest eating patterns in the world, which, according to UNESCO, extends beyond nutrition. It is closely related to the lifestyle, which, besides dietary choices, embraces cultural traditions, creativity, social interactions, and environmental aspects (Melguizo-Ibáñez H. et al., 2023; Okolo, 2025). Mediterranean lifestyle is proven through centuries and serves as an invaluable model for understanding sustainability within the context of the bioeconomy. The Mediterranean lifestyle transmits rich knowledge, sustainable practices, creativity, and cultural tradition relevant to the development of the bioeconomy. By integrating these values into curricula, HEIs can encourage innovation and interdisciplinary collaboration among students in a bioeconomy context.

This study contributes to the growing discourse on integrating sustainability and cultural heritage into business and economics curricula. It offers a novel framework for embedding Mediterranean diet values into bioeconomy education, thereby filling a gap in interdisciplinary curriculum design and aligning with Mediterranean-focused innovation literature (Fiore, 2021u; Vuojärvi et al., 2024). This approach is expected to support the next generation of bioeconomy leaders in developing sustainable solutions in the era of constant global challenges. The integration of cultural heritage with creative

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values into education can help decision-makers of the future drive transformative change in the bioeconomy.

This paper consolidates key tendencies in creative learning and bioeconomy and suggests a framework for integrating Mediterranean diet principles into HEIs curricula. Additionally, it provides actionable recommendations for HEIs aiming to innovate and adjust their educational approaches by recommending 11 vectors of integration of creativity value into bioeconomy curricula through Mediterranean lifestyle were identified: Interdisciplinary Modules, Experiential Learning Opportunities, Collaborative Research, Creative Methodology, Socio-Economic Dimensions of Bioeconomy in Curricula, Collaborative and Innovation-Focused Learning Environments, Cross-Cultural Exchange Programs, Interdisciplinary Sustainability Projects, Technology and Digital Tools, Collaboration with Local Communities.

Interdisciplinary Modules

Existing literature reports cases under the framework of the Mediterranean diet, which create interdisciplinary courses by combining sustainable agriculture and cultural heritage within the bioeconomy. This allows us to comprehend how conventional methods can complement modern bioeconomy solutions. Promote collaboration among departments such as agriculture, environmental studies, economics, sociology, and cultural heritage and create a comprehensive learning experience.

Experiential Learning Opportunities

Develop fieldwork study in Mediterranean regions to enable students to directly observe and engage with traditional agricultural practices, local food systems, and sustainable farming methods. Collaborate with local Mediterranean communities or sustainable farms to establish internship opportunities where students can apply their theoretical knowledge in real-world contexts and use hands-on, creative learning methods.

Collaborative Research

The existing experience shows that research collaborations between HEIs and food system stakeholders benefits if implemented based on Mediterranean sustainability models, focusing on biodiversity, sustainable agriculture, and circular economies. It is important to encourage students to participate in research projects focused on the bioeconomic potential related to the Mediterranean diet and organize international workshops and conferences to bring together academics, practitioners, and

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policymakers to exchange insights on integrating Mediterranean traditions into modern bioeconomy frameworks.

Creative Methodology

There is also a possibility to incorporate innovative teaching methods, such as design thinking and project-based learning, to empower students to solve bioeconomy challenges with creative solutions. There are examples of case studies that encourage exploration of artistic processes, including culinary arts and food design, that promote bioeconomy. Another opportunity is included in storytelling and underscores the cultural importance of the Mediterranean diet, inspiring students to express their learning through creative formats such as films, podcasts, and visual arts.

Socio-Economic Dimensions of Bioeconomy in Curricula

Revise curricula to include environmental considerations and the socio-economic dimensions of bioeconomy, such as job creation, local food systems, and economic resilience, mainly through the perspective of Mediterranean practices. Introducing courses focused on social innovation, entrepreneurship, and community resilience, highlighting how Mediterranean lifestyle values, such as neighbourliness and local cooperation, can inform and enhance contemporary bioeconomic models.

Collaborative and Innovation-Focused Learning Environments

Create innovation hubs or bioeconomy laboratories within universities that inspire students to explore and develop new ideas and solutions focused on sustainable agriculture, green technologies, and food systems, drawing from the Mediterranean model. Organise hackathons, innovation challenges, and sustainability competitions to foster students' creative thinking about applying Mediterranean traditions in bioeconomy settings.

Cross-Cultural Exchange Programs

Studies indicate that it is important to develop cross-cultural exchange programs that enable students to explore the philosophy behind the Mediterranean lifestyle across various cultural contexts. This initiative can help us to understand traditions in different bioeconomic systems. Additionally, it promotes Collaborative Online International Learning (COIL) that connects online students from Mediterranean countries with their peers in other parts of the world, fostering collaboration and enriching global learning experiences.

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Interdisciplinary Sustainability Projects

There is a possibility to incorporate sustainability principles across different disciplines, and bring together students from different areas, such as economics, business, and engineering. This way, students are introduced to bioeconomy concepts, highlighting the values of sustainability, biodiversity, and social harmony inherent in the Mediterranean diet. Establish dedicated sustainability modules emphasising the interconnection between local food practices, the environment, and global bioeconomic trends, encouraging students to recognise sustainability as a fundamental, cross-cutting issue.

Technology and Digital Tools

There is an opportunity to integrate digital platforms and interactive learning tools to establish virtual classrooms where students can immerse themselves in Mediterranean agricultural systems and their bioeconomic implications. Encourage the use of digital storytelling and interactive virtual simulations to engage students with the effects of the Mediterranean diet on culture, food systems, and sustainability.

Collaboration with Local Communities

The HEI partnership with local communities, small food cooperatives, and farmers can provide students with real-world applications of bioeconomy and sustainability practices, aiming to establish community-based projects that allow students to work directly with stakeholders by using hands-on learning experiences.

CHALLENGES AND OPPORTUNITIES

Incorporating the Mediterranean diet into bioeconomy education presents various opportunities and some challenges. One of them is the gap identified between connecting traditional knowledge with modern practices. Numerous bioeconomy programs focus on technical abilities and scientific understanding, which can obstruct cultural and heritage-focused education integration. The interdisciplinary method to merge cultural heritage with sustainability and bioeconomy might also require extensive curriculum redesign and teacher collaboration. Despite challenges, HEIs have an opportunity to innovate their educational models by partnering with local communities, including food producers and cultural organizations. This provides students with meaningful real-world learning experiences that enable students to apply the principles of the Mediterranean lifestyle in

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modern contexts, ultimately leading to the development of bioeconomic solutions that are both innovative and traditional with roots in cultural heritage.

CONCLUSION

The Mediterranean diet is one of the healthiest eating patterns in the world, which, according to UNESCO, extends beyond nutrition. It is closely related to the lifestyle, which, besides dietary choices, embraces cultural traditions, creativity, social interactions, and environmental aspects (Melguizo-Ibáñez H. et al., 2023). Mediterranean lifestyle is proven through centuries, and serves as an invaluable model for understanding sustainability within the context of the bioeconomy. The Mediterranean lifestyle transmits rich knowledge, sustainable practices, creativity, and cultural tradition relevant to the development of the bioeconomy, and by integrating these values into curricula. HEIs can encourage innovation and interdisciplinary collaboration among students in a bioeconomy context. This approach is expected to support the next generation of bioeconomy leaders in developing sustainable solutions in the era of constant global challenges. The integration of cultural heritage with creative values into education can help decision-makers of the future drive transformative change in the bioeconomy.

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DETERMINANTS OF FIRM GROWTH: A BIBLIOMETRIC ANALYSIS AND RESEARCH AGENDA

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ABSTRACT

The growth of small firms has a significant impact not only on the firms themselves but also on the economy and society. This paper aims to provide an overview of research on the determinants of small firm growth and to identify possible avenues for future research. A total of 111 articles were selected from the Web of Science database. Following a bibliometric analysis, the most relevant authors, journals, and countries are presented. Additionally, the main areas that these papers cover are summarized. Finally, 5 possible avenues for future research and related research questions are proposed.

The results show a growth in the number of publications in this area in recent years, with the determinants of small business growth being framed within several key categories. This paper describes the main topics of interest within this area, the primary concepts and methods used. To the best of the authors' knowledge, this is the only study using a bibliometric approach on the topic of firm growth determinants.

Keywords: Small firms, Determinants, Firm Growth, Bibliometric

INTRODUCTION

Growth is one of the main objectives for managers of small businesses and significantly guide their strategic decisions. In order to comprehend what motivates, drives, and influences the growth of small businesses, it is essential to understand what characteristics, decisions, and variables managers and firms have that can contribute to this growth. Despite the substantial increase in research in this area, recent reviews of the literature on small business growth point to several limitations, particularly concerning the conceptual development caused by excessive fragmentation of content and lack of integration into more comprehensive models (Davidsson and Wiklund, 2017).

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The relevance and pertinence of a bibliometric analysis on the determinants of firm growth in small firms rests on two pillars: (1) the new contribution to the literature since there are no other studies that address this topic of the determinants of small firm growth using a bibliometric approach (searches in the Google Scholar, Scopus and Web of Science databases did not return any work of this kind, however, mention should be made to the work of Rocha & Ferreira (2021) that used a bibliometric approach to study, not only the determinants - as is the case of this study - but the whole ground about high-growth companies, which is a specific subset of firms that experience rapid growth); and (2) the structural importance that small firms have for the world economy and for society in general resulting from the overwhelming percentage of the number of these firms relative to the number of large firms, the large number of workers these firms employ, and the value added they generate (Sinkovics, Sinkovics and Archie-Acheampong, 2021; Garcia-Martinez *et al.*, 2023).

One of the factors positively associated with the growth of small and medium-sized enterprises (SME) is job creation (Haltiwanger, Jarmin and Miranda, 2013; Huber, Oberhofer and Pfaffermayr, 2017) which asserts the importance of understanding these determinants of firm growth for refining instruments of public policy. For instance, Daunfeldt et al. (2015) show that SME growth increases the probability of survival of these firms while also bringing benefits at the level of economies of scale resulting from their growth. Richard & Sidney (2012) define growth as an organizational outcome resulting from the combination of firm-specific resources, capabilities and routines.

By employing a bibliometric analysis approach, it was possible to identify a series of articles that explored these determinants of firm growth and allowed to systematize and uncover patterns on the main categories of these firm growth determinants. The content analysis also allowed to identify the main interconnected terms and concepts surrounding the topic. The generic overview of the state of the art on these firm growth determinants made it possible to identify several research avenues for future research. The research objectives of this study are therefore: (1) To explore and systematize the determinants of small business growth; (2) To identify and categorize the main themes, terms, and concepts related to the determinants of small business growth; (3) To contribute to the conceptual development of the field; and (4) To suggest future avenues of research in the field of small business growth.

MATERIAL AND METHODS

Bibliometric analysis has been a research method that has gained immense popularity in business research in recent years (Donthu, Kumar, Pattnaik, *et al.*, 2021; Khan *et al.*, 2021) and its popularity,

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according to Donthu, Kumar, Mukherjee, et al. (2021) can be attributed to "(1) the advancement, availability, and accessibility of bibliometric software such as Gephi, Leximancer, VOSviewer, and scientific databases such as Scopus and Web of Science, and (2) the interdisciplinary cross-pollination of bibliometric methodology from information science to business research". Despite not having the details of other literature review methodologies, such as systematic literature reviews, this method can be highly useful for obtaining an initial overview of the state of the art in a particular field.

To conduct a bibliometric analysis, the first step followed was the selection of the database(s) from which the various articles would be collected. The need to obtain reliable, valid research associated with impact metrics and high-quality standards led to the choice of the Web of Science (WoS) database. The next step is the selection of specific keywords to return articles fitting the theme under study. This paper focuses on two key elements related to business growth: focus on small businesses and focus on the determinants of their growth. Therefore, a combination of 3 terms was used initially: firm growth, determinants and small. Some considerations can be made about the choice of these keywords. A preliminary review of the resulting articles indicated that many articles addressed this subject studying not only small firms but also medium-sized firms, which resulted in multiple studies on the determinants of firm growth of SME companies. Naturally, since the objective is to study the determinants of firm growth only in small firms, the fact that several articles address SME as a whole is a challenge and a caution that must be taken when trying to draw conclusions exclusively for small firms.

The final query that was used to search the "Web of Science" portal was: "firm growth" AND "determinants" AND "small".

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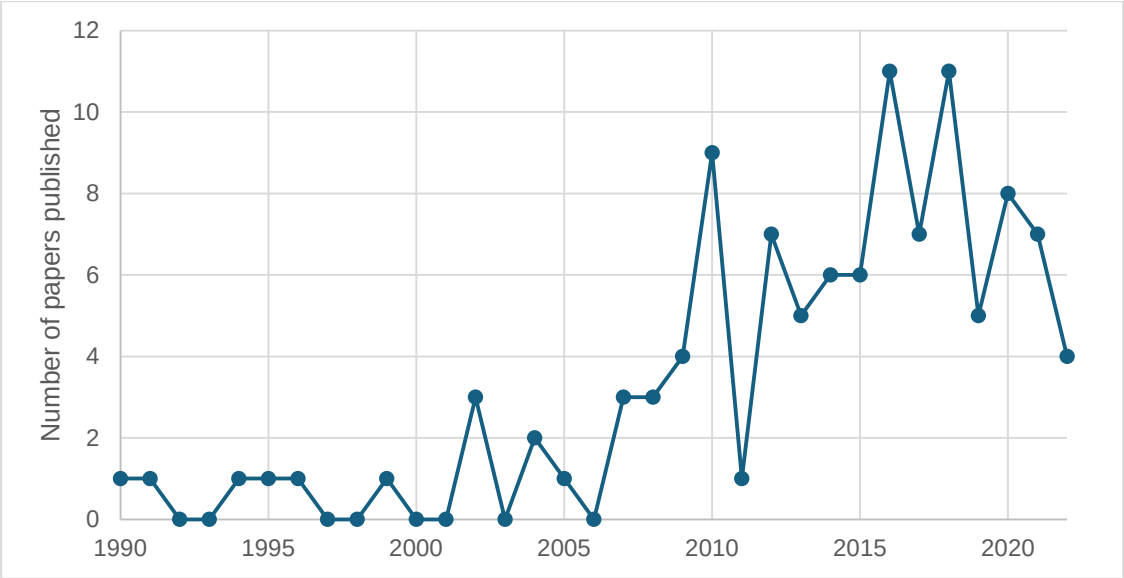


Figure 1. *Evolution of the number of publications on determinants of firm growth*

The search was conducted in January 2023, resulting in 161 documents. In order to improve the results some filters were applied to the list of 161 records. First, only articles written in English were selected and this filter resulted in 159 records. Afterwards, only articles from the areas of "6.3 Management" or "6.10 Economics" were selected, which resulted in 147 records. Finally, the last filter criterion applied was derived from reading the title and abstracts of the various articles. Several articles, despite meeting the criteria defined so far, were not directly related to the determinants of firm growth and were, therefore, excluded from the final list. The final list was thus left with a total of 111 articles that served as the basis for the bibliometric work that followed. As far as time constraints are concerned, no filters were placed in order to present all articles and capture the temporal evolution of the results. As can be seen in Figure 1, we have seen a solid growth in the number of articles published over the years. The 1990s show the appearance, albeit in low numbers, of the first results, and the following two decades show the solid growth of this topic.

RESULTS

This section is divided into two parts. First, the results of the bibliometric analysis are presented, highlighting the most cited articles, the most influential journals, and the most productive and influential authors. Additionally, the most used keywords and the respective networks through the VOSVIEWER software are also presented. The second part of this section identifies the main topics covered by the articles obtained through bibliometric analysis and organizes them into categories that

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aim to represent the different angles that have been used in the study of the determinants of firm growth in small firms.

Results of the bibliometric analysis

Most cited articles

Table 1 lists the 20 most cited articles from the final list. Each entry includes the journal where each article was published, the total number of citations (TC), the year of publication (Y) and the ratio of total citations per year (TC/Y). The article with the highest number of citations is by Davidsson, P and was published in *the Journal of business venturing* in 1991.

Most influential journals

The total of 111 articles considered were published across 74 different sources (96.4% of these being journals, with the remainder being conference publications). Of these 74 sources, 14 journals have more than one publication from the selected list of articles. These 14 journals, along with their total number of publications (TP), total number of citations (TC) and the ratio of the number of citations per publication (TC/TP), are listed in Table 2. Notably, four out of the five journals with more than two publications specialize in small business, which attests to the suitability of the final list of articles to the focus on small business that this work intends to have. It is also noteworthy that *Small business economics* represents a total of 19 publications, which corresponds to 17% of the 111 articles considered. *Journal of small business and enterprise development* follows with five publications. *Journal of small business management,*

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Id	Reference	Article title	Source title	TC	Y	TC/Y
1	(Davidsson, 1991)	Continued entrepreneurship - ability, need, and opportunity as determinants of small firm growth	Journal of business venturing	327	1991	10,55
2	(Becchetti & Trovato, 2002)	The determinants of growth for small and medium sized firms. The role of the availability of external finance	Small business economics	272	2002	13,60
3	(Dobbs & Hamilton, 2007)	Small business growth: recent evidence and new directions	International journal of entrepreneurial behavior & research	253	2007	16,87
4	(Nichter & Goldmark, 2009)	Small Firm Growth in Developing Countries	World development	246	2009	18,92
5	(Keeble & Walker, 1994)	New firms, small firms and dead firms - spatial patterns and determinants in the united-kingdom	Regional studies	222	1994	7,93
6	(Audretsch et al., 2004)	Gibrat's Law: Are the services different?	Review of industrial organization	167	2004	9,28
7	(Goedhuys & Sleuwaegen, 2010)	High-growth entrepreneurial firms in Africa: a quantile regression approach	Small business economics	165	2010	13,75
8	(Dosi et al., 1995)	Learning, market selection and the evolution of industrial structures	Small business economics	161	1995	5,96
9	(McPherson, 1996)	Growth of micro and small enterprises in southern Africa	Journal of development economics	147	1996	5,65
10	(Davidsson & Henrekson, 2002)	Determinants of the prevalence of start-ups and high-growth firms	Small business economics	147	2002	7,35
11	(Blackburn et al., 2013)	Small business performance: business, strategy and owner-manager characteristics	Journal of small business and enterprise development	124	2013	13,78
12	(Sternberg, 2009)	Regional Dimensions of Entrepreneurship	Foundations and trends in entrepreneurship	118	2009	9,08
13	(Danis et al., 2010)	The impact of managerial networking intensity and market-based strategies on firm growth during institutional upheaval: A study of small and medium-sized enterprises in a transition economy	Journal of international business studies	91	2010	7,58
14	(Nunes et al., 2012)	Is there a linear relationship between R&D intensity and growth? Empirical evidence of non-high-tech vs. High-tech smes	Research policy	88	2012	8,80
15	(Huynh & Petrunia, 2010)	Age effects, leverage and firm growth	Journal of economic dynamics & control	79	2010	6,58
16	(Bigsten & Gebreeyesus, 2007)	The small, the young, and the productive: Determinants of manufacturing firm growth in Ethiopia	Economic development and cultural change	75	2007	5,00
17	(Segarra & Teruel, 2014)	High-growth firms and innovation: an empirical analysis for Spanish firms	Small business economics	75	2014	9,38
18	(Lopez-Garcia & Puente, 2012)	What makes a high-growth firm? A dynamic probit analysis using Spanish firm-level data	Small business economics	68	2012	6,80
19	(Coad & Hölzl, 2008)	On the Autocorrelation of Growth Rates Evidence for Micro, Small and Large Firms from the Austrian Service Industries, 1975-2004	Journal of industry competition & trade	63	2009	4,85
20	(Peric & Vitezic, 2016)	Impact of global economic crisis on firm growth	Small business economics	59	2016	9,83

Table 1. *Most cited articles*

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Applied economics and *International small business journal-researching entrepreneurship* share the third place with three publications each.

Id	Journal	TP	TC	TC/TP
1	Small business economics	19	1205	63,42
2	Journal of small business and enterprise development	5	190	38,00
3	Journal of small business management	3	109	36,33
4	Applied economics	3	82	27,33
5	International small business journal-researching entrepreneurship	3	66	22,00
6	Service industries journal	2	16	8,00
7	International journal of managerial finance	2	18	9,00
8	International journal of entrepreneurial behavior & research	2	275	137,50
9	Economic research-ekonomska istrazivanja	2	8	4,00
10	Management research review	2	18	9,00
11	Journal of business venturing	2	383	191,50
12	International review of entrepreneurship	2	7	3,50
13	Journal of developmental entrepreneurship	2	3	1,50
14	South east european journal of economics and business	2	17	8,50

Table 2. *Most influential journals*

Most productive and influential authors

Table 3 lists all the authors with two or more publications on the studied topic. The authors Serrasqueiro, Z and Nunes, PM, lead the list of authors with the highest number of publications, with eight and seven publications respectively (with several co-authored articles). The presence of three Portuguese, three Swedish and two North American authors in this list of 11 authors is also noteworthy, representing the importance of these countries in this area of research.

Id	Author	Country	TP	TC	TC/TP
1	Serrasqueiro, Z	Portugal	8	166	20,75
2	Nunes, PM	Portugal	7	157	22,43
3	Yazdanfar, D	Sweden	5	43	8,60
4	Ohman, P	Sweden	4	30	7,50
5	Leitao, J	Portugal	3	127	42,33
6	Krasniqi, Besnik	Kosovo	3	31	10,33
7	Audretsch, DB	United States	2	214	107,00
8	Daunfeldt, SO	Sweden	2	13	6,50
9	Davidsson, P	Australia	2	474	237,00
10	McPherson, MA	United States	2	147	73,50
11	Stenholm, P	Finland	2	83	41,50

Table 3. *Most influencial authors*

Most relevant keywords

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Based on the keywords suggested by the authors in their articles, in Figure 2, it can be seen a co-occurrence network-based bibliographic analysis that combines content-based and systematic literature studies (Ciano et al., 2019), to observe how keywords are interconnected across different articles while also incorporating the temporal component of the year of publication (from 1990 to 2022).

The keywords presented and their links will be the starting point for the analysis carried out in the next section. Beyond the statistical approach followed so far, the need for content analysis, organization of concepts into a general picture, identification of the state of the art and identification of possible gaps for future research constitute the greatest challenge and interest for research.

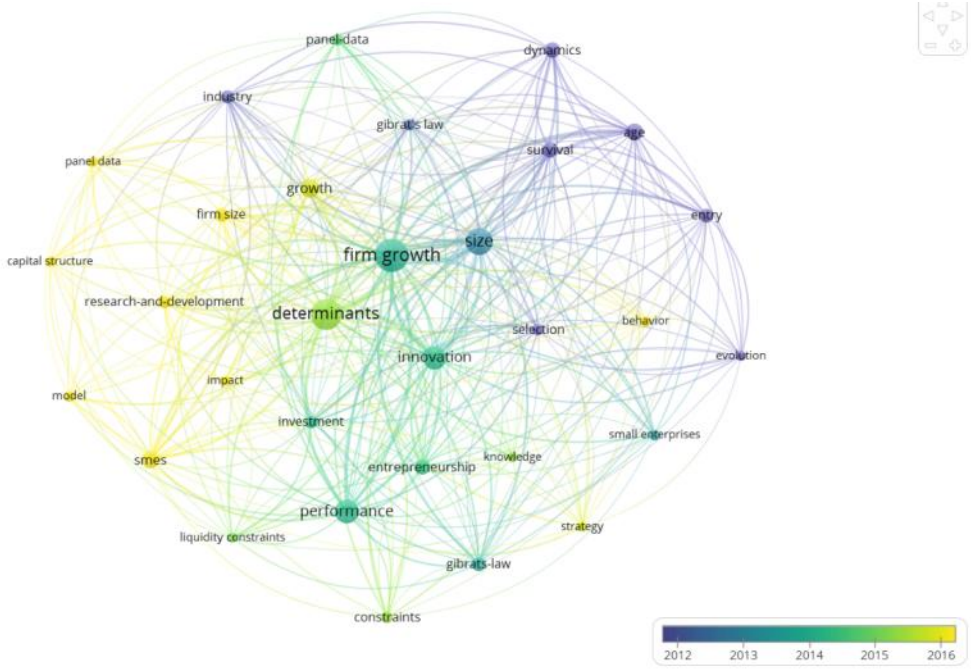


Figure 2. *Co-citation analysis of keywords*

Content analysis

The VOS viewer software was used to estimate the total strength of co-occurrence relationships of keywords. The VOS viewer generates a network with 31 nodes, each representing one of five temporal dimensions. The Web of Science database's bibliographic information was extracted in .CSV format and imported into VOS viewer software without changes. For the keyword analysis, a minimum threshold of five keywords per article was set. The selected key terms were then mapped and clustered to analyze co-occurrence networks. To improve clarity and accuracy, associations were normalized afterwards; for example, occurrences of "gibrats-law" and "gibrat's law" were counted as a

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single entity, and references to "firm size" and "size" were combined, as were "constraints" and "liquidity constraints".

Using Figure 2 as a starting point, we identify two fundamental elements for discussing this bibliometric analysis: the existence of certain keywords that require clear, objective and integrated definitions in the main topic under analysis and the identification of certain relationships between two or more keywords with different levels of interconnections, which serve different approaches and research streams in the study of firm growth determinants in small firms.

From the analysis, it can be deduced that "firm growth" is a central theme in literature, frequently co-cited with other related terms. As expected, terms such as "firm growth" (69 occurrences), "determinants" (60), or "growth" (22) have a high number of occurrences due to their direct relationship with the keywords considered in the initial search. On the other hand, the high prominence given to terms such as "innovation" (33), "investment" (10) or "research-and-development" (10) and their relationship with the main terms, highlights a key research question: Does investment in research and development activities positively boost the growth of small businesses? Articles such as Mendes (2010) addresses this topic regarding Portuguese service SME.

Likewise, the strong presence of terms like "size" (59) and "gibrats-law" (21) indicates a focus on studies examining Gilbrat's law in different contexts. Articles by (Audretsch, Klomp and Santarelli, 2004), Fiala & Hedija (2019) and Fotopoulos & Giotopoulos (2010) are examples of studies that investigate the applicability of Gilbrat's law in different contexts. Another prominent research stream is identified by terms such as "constraints" (16), which study the impact of financial constraints on firm growth, exemplified by Donati (2017).

The review of the 111 articles reveals a classical approach to studying the determinants of firm growth, with different variables categorized into three main types: characteristics of the entrepreneur, characteristics of the firm, and external factors to the firm. Despite the diverse terminology used for these three categories the essence remains consistent across studies, supporting the three categories presented before. Storey (1994) proposed an additional category for the strategy component, highlighting factors such as workforce and management training, market positioning, planning, technological sophistication, and state support as key strategic elements influencing firm growth. His framework, outlined in a structured classification, also identifies various entrepreneurial characteristics—such as motivation, education, management experience, prior self-employment, and functional skills—alongside firm-specific attributes like age, sector, legal form, location, size, and

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ownership. Meanwhile, Nichter & Goldmark (2009) added another category focused on social networks.

Reading the various articles also allowed to find patterns regarding the approach taken to validate the impact of certain determinants on firm growth. Most articles consider different factors such as the size of the firms included in the study (ranging from micro firms to small firms to SME), the mathematical model used (e.g., linear regression, ordinary least squares), and the specific industry focus (with several papers analyzing only certain industries). The dependent variables (representative of firm growth) are often measured by the growth in the number of employees, while the independent variables concern the determinants studied. Other variants found throughout the various articles stem from the consideration of specific countries, different time intervals and variations in sample size and data collection methods, such as surveys or panel data. A possible follow-up on this study could involve framing the 111 articles in a summary table containing columns for each of these dimensions. This would allow for a more detailed understanding of the approaches used in the study of the determinants of firm growth in small firms.

RESEARCH AGENDA

This section attempts, based on the bibliometric analysis performed (statistical and content analysis) and the reading of the various articles, to identify potential research sub-topics within this topic of small business growth and its determinants. The aim is to focus on new relationships, variables, and under-explored topics rather than well-studied areas such as the impact of investment in research and development, firm characteristics, and entrepreneur characteristics on firm growth. This exploration includes the classification of determinants, growth patterns along the lifecycle of small businesses, and the impact of strategic decisions on small firm growth. Five main sub-topics and their respective research propositions and questions are proposed.

Explore the relationships between firm growth and firm performance

Despite the widely accepted notion that firm growth is indicative of success, growth alone does not guarantee firm performance. A firm may have a significant increase in employees but simultaneously experience a decrease in profits, productivity, or other performance indicators. Thus, introducing the concept of sustainable firm growth may be a necessary element for studies on the determinants of firm growth, otherwise we may be identifying determinants of non-sustainable growth in the long run which, of course, is not desirable for small firm managers. In this sense, institutional theory and

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corporate behavioral theory can help explain why firms choose low or no growth strategies. The work of Yazdanfar & Öhman (2015) can serve as a reference for this sub-topic.

RQ1: Is firm growth positively associated with performance growth?

RQ2: What variables determine the difference between firm growth accompanied by firm performance and firm growth without firm performance?

To answer the proposed research questions, a positivist quantitative approach can be adopted using secondary data from company databases to test the correlation between firm growth and firm performance (RQ1) and seek to identify variables that justify differences between those firms who experience firm growth accompanied by firm performance and those who experience firm growth without firm performance (RQ2).

Focusing on companies other than high growth ones

Research should quantify the percentage of small firms that experience high growth and direct efforts to categorize and conceptualize managers and firms that have small levels of growth or purposeful zero growth (as a defense mechanism). Leminen & Westerlund (2014) provide a starting point for this inquiry.

RQ3: Are firms that deliberately choose not to grow more resilient to risk?

RQ4: Do high-growth firms perform better than constant small growth firms?

This phenomenon of managers who do not deliberately seek growth remains to be explored, particularly with regard to the motives of this attitude and the characteristics of these types of managers. An explanatory qualitative approach could be a good starting point.

Focus on growth patterns rather than growth levels

Following McKelvie & Wiklund (2010), the focus should shift from growth levels to growth patterns, examining the dynamics over time.

RQ5: How to explain non-constant growth patterns of firms?

RQ6: What is the impact of exponential growth patterns on firms' performance?

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To address these questions, one could start by identifying and classifying growth trends using time series analysis, then conducting clustering analysis to group companies with similar growth trajectories and compare their performance outcomes.

Strategic decisions impact on growth outcomes

Study the impact of key strategic decisions related to competitive advantage, flexibility or business vision setting on firm growth to investigate whether different strategy methods produce different growth outcomes.

RQ7: Do firms that choose to follow a single competitive strategy have higher levels of growth than those that follow multiple competitive strategies?

RQ8: Are the levels and patterns of firm growth the same for the three classic competitive advantage strategies (leadership by cost, differentiation and segmentation)?

To assess growth outcomes, a mixed-method approach could be used, which combines case studies of firms with various strategic orientations with quantitative analysis, that can inform executives of small businesses about the most effective strategic choices for fostering growth and assist them in avoiding common pitfalls associated with specific strategies.

Incorporate and test other variables related to industry structure in the classical models of the determinants of firm growth

Explore how the characteristics of a given industry (number of competitors, suppliers and customers power, innovation levels, ratio of entry and exit of new firms) may serve as determinant of firm growth.

RQ9: Do more attractive industries experience higher levels of growth?

RQ10: Do industries with lower levels of firm concentration experience higher levels of growth?

RQ11: How can we explain companies that show high-growth levels in declining industries?

To address these questions, econometric models can be used to analyze industry and firm-level data in order to uncover major external factors that impact growth.

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CONCLUDING REMARKS

The bibliometric analysis of the factors that determine small enterprises' growth provides several key insights. This research took a comprehensive approach by reviewing 111 academic articles from the Web of Science database, providing a robust sample for analysis. The search was conducted in January 2023. The study highlighted a significant increase in the number of articles published on this subject in recent years, indicating growing interest on small business growth.

A bibliometric analysis of the factors that influence firm growth in small enterprises uncovers the most cited publications, noticeable journals, prominent authors, and relevant keywords. Davidsson's 1991 article in the Journal of Business Venturing is the most cited, while the journal Small Business Economics is the most popular and influential. Serrasqueiro and Nunes are the most prolific authors. The evaluation of keywords suggests a considerable focus on terms such as "innovation," "investment," and "Gibrat's law," indicating important research streams investigating the effects of R&D on business growth and the validation of Gibrat's law across contexts. These factors were examined in terms of their impact on firm growth.

Furthermore, the factors were categorized into three broad groups: entrepreneur's resources, firm characteristics, and firm strategy. This categorization aligns with a common approach seen in several articles. The content analysis demonstrates the interconnection of these keywords, as well as the importance of clear definitions and integrated approaches to understanding small-business growth determinants.

Additionally, this research highlights unexplored areas and proposes potential sub-topics for future investigation. Suggested research questions include exploring the relationship between firm growth and firm performance, the impact of strategic decisions on growth, and analyzing a firm's growth strategy rather than just growth rates. These recommendations aim to address existing gaps in the literature and dig into less studied components that impact firm growth.

IMPLICATIONS

From a theoretical point of view, this study has important implications by helping to reduce the conceptual fragmentation that characterizes this topic, as identified by other authors (ref.). The conceptual synthesis of a topic of growing interest, as well as the identification of gaps and proposals for future research avenues, contribute to the advancement of knowledge in the area of small business growth. This study also has practical implications for professionals interested in applying the

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determinants of small business growth, particularly as forecasting tools—whether by financial and capital market analysts or by business angels. These growth determinants may also be useful for business incubator managers seeking to select the most promising candidates for their incubation programs.

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STRATEGIC INNOVATION IN DIGITAL FASHION: A CASE STUDY OF TRIBUTE BRAND

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ABSTRACT

This paper examines the innovative trajectory of Tribute Brand, a pioneering digital fashion brand, with a focus on its strategic evolution from augmented reality-based products to NFT-enabled digital assets and platform ecosystems. Using a qualitative case study approach, including insights derived from in-depth interviews with Tribute Brand's founder and secondary industry sources, this study identifies key factors driving the brand's successful market adoption. Initially framed within Rogers' Diffusion of Innovations theory, the analysis reveals that Tribute Brand's growth and market position are better understood through platform-based innovation and value co-creation frameworks. The brand's strategic pivots, collaborative partnerships with traditional luxury brands, and active consumer engagement through co-created digital fashion experiences emerged as critical to its success. Furthermore, Tribute Brand's commitment to interoperability and sustainable phygital (physical-digital) products highlights crucial strategic challenges and opportunities within digital luxury ecosystems. The study contributes to academic discourse by underscoring the necessity of agility, interoperability, and robust ecosystem-building for digital-native luxury brands. Additionally, the findings provide practical insights for luxury brands aiming to navigate digital innovation successfully, suggesting directions for future research on consumer perceptions of digital luxury and the evolution of industry standards.

Keywords: digital luxury fashion, luxury marketing, diffusion of innovations, platform-based innovation, value co-creation, interoperability, consumer engagement, digital ecosystems, network effects, innovation adoption.

INTRODUCTION

The primary objective of this study is to analyse the strategic innovation trajectory of Tribute Brand, the world's first direct-to-consumer digital-only luxury fashion brand. Specifically, the study aims to examine the challenges and opportunities associated with the adoption of innovation in digital fashion. It also evaluates the role of digital branding and consumer engagement within a luxury context. Additionally, the research examines how NFTs and virtual goods influence the development of new

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business models in the fashion industry. Finally, it assesses the relevance of Rogers' Diffusion of Innovations theory in comparison to platform-based innovation and value co-creation frameworks.

Luxury brands have historically been slow to adopt digital tools due to concerns that online platforms compromise brand exclusivity, emphasising the challenge of balancing accessibility with the elite brand image (Okonkwo, 2009; Bjørn-Andersen and Hansen, 2011; Hoang et al., 2022). However, the rapid digitisation of consumer lifestyles, accelerated by technologically savvy Gen Z and Millennial cohorts, compelling luxury brands to evolve their strategies to appeal to digital-native consumers, including influencer marketing, augmented reality, and integrated online experiences (Shin and Kang, 2019; Copeland and Lyu, 2020; Dobre et al., 2021; Wahid et al., 2022; Cao, 2023). Digital fashion – virtual clothing and accessories experienced through augmented reality (AR), virtual environments, or on digital avatars – has emerged as a compelling solution for engaging these new consumers while addressing sustainability concerns in the industry (Augurio et al., 2024; Mishra et al., 2024). Similarly, non-fungible tokens (NFTs) have further enabled digital ownership of fashion assets, introducing scarcity and authenticity to virtual goods (Fortagne and Lis, 2024).

Within this dynamic and evolving landscape, Tribute Brand (TB) is often cited as the world's first direct-to-consumer digital-only fashion brand (Sedin, 2022). With the official launch in early 2020, the brand sells "contactless" cyber garments that are applied to customers' photos or avatars, rather than being physically worn (Abad, 2020). Tribute Brand's mission centres on sustainability and self-expression, arguing that new physical garments are unnecessary in an era of abundant existing clothing and compelling virtual alternatives (Tribute Brand, 2025). By creating virtual garments ("contactless cyber fashion") that produce no physical waste, yet fit any gender or size, Tribute Brand seeks to redefine the fashion paradigm for the digital age (Newswire, 2021).

LITERATURE REVIEW: THEORETICAL FRAMEWORKS FOR DIGITAL FASHION INNOVATION

Diffusion of Innovation

The Diffusion of Innovation (DOI) theory, developed by Rogers (1962), provides a foundational framework for understanding how new ideas, technologies, and practices spread within a social system over time. At its core, the theory categorises adopters into five groups—innovators, early adopters, early majority, late majority, and laggards—each characterised by varying risk tolerance levels, social influence, and openness to change. Central to DOI is the role of communication channels, time, and social context in shaping the adoption curve of an innovation (Greenhalgh et al., 2004; Sharma and Nayak, 2015).

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In the context of digital fashion, DOI offers a compelling perspective to analyse the adoption dynamics of virtual garments, NFTs, and AR-based try-on experiences (Kim and Chakraborty, 2024). Digital fashion challenges traditional definitions of materiality and ownership, introducing fully virtual products designed for avatars, social media displays, or gaming platforms (Fortagne and Lis, 2024). The novelty and abstract nature of these innovations imply high uncertainty, making DOI's emphasis on early adopters and opinion leaders particularly relevant (Dedehayir et al., 2017). In this segment, early adopters typically include digitally literate consumers—especially Gen Z—who are not only technologically adept but also value sustainability, individuality, and novelty in consumption (Burnasheva et al., 2019). Recent research shows that Gen Z consumers readily experiment with virtual fashion items, including NFTs and AR-based garments, often driven by avatar identity, digital self-expression, and fashion innovativeness—traits that closely align with the early adopter profile in Rogers' Diffusion of Innovations theory (Shin, 2021; Milanesi et al., 2024; Günduru and Deniz, 2024).

Nevertheless, the application of DOI to digital fashion also reveals its limitations. The intangible nature of digital garments, combined with the complex technological ecosystem—blockchain infrastructure, AR/VR interfaces, and interoperability concerns—indicates that traditional diffusion patterns may be insufficient. Some scholars suggest that complementary frameworks such as platform-based innovation and value co-creation may better capture the multifaceted interactions between users, platforms, and brands (Claussen and Halbinger, 2020; Lu and Hsiao, 2022; Pavlovaitė, 2022).

Platform-Based Innovation

In the tech industry, platform-based innovation refers to creating a multi-sided network or ecosystem where value is generated through interactions between producers, consumers, and partners facilitated by a typical architecture (Gawer and Cusumano, 2014; Parker et al., 2016). Unlike in traditional linear models of innovation, where a firm innovates internally and pushes products out, platforms harness external contributions and user feedback to drive innovation (Scholten and Scholten, 2012; Zhang et al., 2024). Platforms act as intermediaries that enable and actively shape innovation by standardising interfaces, governing interactions, and curating content (Pavlovaitė, 2022).

In the context of digital fashion, platform-based innovation provides a viable alternative to the traditional supply chain model. Digital fashion is inherently intangible, operating at the intersection of creative industries, immersive technologies, and decentralised ownership frameworks (Draskovic and Markovic, 2020; Hardianto, 2023). The core offerings—virtual garments, AR try-on experiences, and NFTs—rely heavily on interoperable, scalable platforms that support interaction between designers, developers, and users (Claussen and Halbinger, 2020; Drašković and Tomić, 2024). This aligns with the core principles of platform-based innovation, where value is generated not only by the platform owners but also through the contributions and engagement of the user community (Dong et al., 2021).

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Such models suit fashion's social and expressive dimensions, offering continuous feedback loops that influence design iterations and cultural relevance in real-time.

Value Co-Creation

Value co-creation theory shifts from the traditional view of consumers as passive recipients of value to active participants in the value-creation process (Prahalad and Ramaswamy, 2004; Vargo and Lusch, 2008). Originating from service-dominant (S-D) logic as articulated by Vargo and Lusch (2004), the theory emphasises that value is not embedded in products or services by firms alone but is co-created interactively through the integration of resources between firms, customers, and other stakeholders. Co-creation involves collaborative engagement, dialogue, and mutual exchange, where the consumer plays a key role in designing and developing products, experiences, and meanings (Piligrimienė et al., 2015).

Value co-creation becomes particularly significant in digital fashion, where offerings are often intangible and technology-mediated. Unlike traditional retail models that rely on physical garments and one-way value delivery, digital fashion platforms allow users to engage dynamically in content creation, customisation, and even the resale of virtual assets (Radulescu et al., 2023). This collaborative environment aligns closely with the tenets of value co-creation, in which consumers do not merely consume fashion but actively shape its form, function, and symbolic value (Dong et al., 2021).

Moreover, the co-creation process in digital fashion extends beyond individual interactions to broader ecosystems that include developers, influencers, and communities. This collective model of innovation and consumption is amplified by digital affordances such as social media, NFTs, and metaverse environments, which provide scalable venues for expressing identity and fostering cultural narratives (Huggard and Särmäkari, 2023). These co-creative experiences are economically valuable and emotionally and symbolically significant for participants, highlighting the experiential dimension of value (Prahalad and Ramaswamy, 2004). Furthermore, value co-creation challenges traditional boundaries between producer and consumer, raising new questions about authorship, ownership, and compensation in virtual markets (Huggard and Särmäkari, 2023).

METHODOLOGY

This study adopts a qualitative single-case study design to deeply investigate the strategic innovation trajectory of Tribute Brand. The qualitative case study approach is particularly suitable because it enables an in-depth exploration of contemporary phenomena within their real-world context (Yin, 2018). Tribute Brand was selected as a critical and revelatory case given its pioneering role as the first direct-to-consumer digital-only luxury fashion brand, providing unique insights into strategic

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innovation practices in digital fashion. This methodological choice enables a comprehensive examination of nuanced strategic decisions and contextual factors that would be difficult to capture using quantitative methods alone.

Primary data collection involved a semi-structured interview conducted with Gala Marija Vrbanić, the founder and CEO of Tribute Brand, in early 2024. The interview lasted approximately 60 minutes, was conducted via Zoom, was recorded, and was transcribed verbatim. The semi-structured format ensured flexibility in exploring topics such as the brand's history, strategic decisions, innovation processes, and future vision. Transcripts were analysed using thematic analysis, employing open coding to identify and categorise key themes and insights (Price and Smith, 2021). To enhance the credibility and reliability of the findings, interview data were systematically triangulated with secondary sources.

Secondary data were obtained from a range of publicly available sources, including industry reports, fashion media articles (e.g., Vogue Business, Business of Fashion), official brand communications, press releases, and relevant analytical commentaries from reputable fashion and technology blogs. These secondary sources provided factual details regarding Tribute Brand's products, market strategies, timelines, and key partnership announcements. The data were utilised to cross-validate and contextualise primary interview insights, contributing to the robustness of the overall analysis.

The analysis was structured into two sequential stages. First, a chronological narrative detailing Tribute Brand's strategic evolution from 2020 to 2024 was constructed using both primary and secondary data sources. Second, the narrative was examined through the theoretical lenses of Rogers' Diffusion of Innovations, platform-based innovation, and value co-creation frameworks. Key events, strategic decisions, and outcomes identified in the narrative were explicitly mapped onto these theoretical frameworks to comprehensively explore and interpret their implications. This two-stage analytic approach supported the study's primary aim of analytic generalisation, wherein theoretical insights generated from this single-case study provide broader implications for understanding digital innovation adoption in luxury fashion contexts (Yin, 2018).

Recognising the fundamental limitations of single-case studies in terms of generalizability, this research emphasises analytic rather than statistical generalisation. The deep insights derived from Tribute Brand's case are intended to offer conceptual clarity and generate propositions for further exploration within the fields of digital innovation and luxury marketing scholarship.

CASE STUDY: EVOLUTION OF TRIBUTE BRAND

Founding and Early Growth

Tribute Brand was co-founded by Gala Marija Vrbanić, along with Filip Vajda, Marina Jukić, and Igor Lipovac, and launched in April 2020 in Zagreb, Croatia, and is considered the world's first direct-to-

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user (DTC) digital fashion brand in the world (Zomorodi et al., 2022). Vrbanić had a background in traditional fashion design but grew dissatisfied with the industry's waste and exclusivity. Therefore, TB advocates functional, sustainable physical clothing and digital fashion optimised for self-expression, aiming to address the rising environmental cost of traditional garment production (Tribute Brand, 2025).

The inspiration for Tribute's aesthetic came from video games like The Sims and Grand Theft Auto, where players can endlessly dress virtual characters (Allaire, 2020). From the beginning, Tribute Brand's concept was 100% digital garments sold direct-to-consumer – garments that exist only in virtual form but can be "worn" in photos or videos via image editing or AR. This novel idea fortuitously launched just as the COVID-19 pandemic forced global lockdowns. With physical fashion shows cancelled and consumers glued to screens, the timing created an exceptional opportunity for virtual fashion. Consequently, consumers from around the world – including those in the U.S., Europe, Asia, and Australia – began experimenting with TB's offerings, eager for creative self-expression while stuck at home.

During this early phase, Tribute Brand's business model was centred on a premium digital tailoring service delivered via a simple web shop. Customers would browse an online collection of fantastical garments (e.g. neon-hued jackets, iridescent dresses), each available in limited quantity (typically only 100 digital "units" of each item could ever be sold). After purchase (at prices ranging from roughly $30 to $99 for most items), the customer uploaded a photo of themselves (Metselaar, 2021). Tribute's design team would digitally dress the customer's photo in the chosen outfit using 3D software, producing a high-quality, hyper-realistic image of the person wearing the virtual clothes. The result was delivered to the customer, allowing them to share it on social media or use it as they pleased. The only limitation was each design's upload cap (to maintain exclusivity, no more than the set number of people could ever get an image wearing a given design). By blending scarcity with on-demand digital fitting, Tribute created a sense of owning a couture piece, except the closet was virtual. This approach gained significant media publicity in 2020.

Encouraged by growing consumer interest, Tribute Brand gradually raised its prices and expanded its collections through late 2020. It also began offering "Taylor Made Cyber Services," essentially tailored digital fashion creation: clients could hire TB to digitise any idea or even an existing physical garment into a virtual wearable format. By the end of 2020, inbound collaboration requests started coming from established fashion houses impressed by TB's work. Notably, Jean Paul Gaultier's team approached Tribute Brand to create a digital version of one of Gaultier's suits, and Carolina Herrera sought a partnership to produce a virtual, Tribute brand style, version of a Carolina Herrera gown for the New

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York Fashion Week 2021 show. These collaborations materialised in 2021, marking Tribute's crossover into mainstream luxury fashion.

Pivot to NFT-Based Offerings (2021–2022)

By late 2020 and early 2021, TB's team observed that while one-off AR outfit fittings were great for PR and niche users, the technology (and perhaps consumers) was not ready for prevalent, sustained use of AR fashion. Using AR requires consumers to have the app, and the novelty of wearing a digital garment on one's phone could wear off without deeper engagement. Thus, in 2021, Tribute Brand turned from an AR-centric model to an NFT-focused strategy.

Early 2021 saw a frenzy of interest in NFTs as artists and creators began selling digital art and collectables on the blockchain. The brand adopted new technology with its first fashion NFT drop on Dematerialised (DMAT), a pioneering platform for digital fashion NFTs (Newswire, 2021). With their next NFT drop, "The Real Deal" collection, TB showcased the transformation of fashion from traditional to digital and back. The drop consisted of three levels: a digital NFT version, a mixed reality experience, and a physical product, with the NFT serving as proof of authenticity and ownership.

The Real Deal drop sold out quickly and generated significant attention in both fashion and tech communities. It proved that consumers were willing to pay for digital fashion NFTs at luxury price points – in this case, ranging roughly from a few hundred to a few thousand dollars for the various tiers (RTISTIQ, 2025). It also signalled Tribute Brand's successful reinvention as an NFT-native brand.

By the end of 2021, Tribute had largely shifted its sales model. Rather than selling unlimited digital outfits for a flat fee, they began doing limited NFT "drops", where each drop might include a mix of digital-only pieces and phygital (physical+digital) offerings.

The momentum built in 2021 led to a significant milestone: in mid-2022, Tribute Brand raised a $4.5 million seed funding round to fuel its platform vision (Schulz, 2022). The round was led by crypto-focused investors like Collab+Currency, with participation from notable groups such as Red DAO and Flamingo DAO (decentralised autonomous organisations specialising in digital fashion collectables). That leading NFT collectors themselves invested in Tribute stresses how much the brand had become synonymous with quality in digital fashion. According to investor Megan Kaspar (a founding member of Red DAO), Tribute's digital fashion products were "unparalleled…in both detail and aesthetic" compared to anything else on the market at the time (Schulz, 2022).

Platform and Phygital Integration (2022–2023)

After securing funding, TB shifted to developing a comprehensive platform for digital fashion consumption and thoughtfully integrating physical products as an ecosystem component. The founders recognised that physical fashion would still play a role in the foreseeable future, but in their

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paradigm, it should serve a functional and complementary role to digital experiences. In late 2022, TB launched its first physical clothing line, each piece containing an NFC tag that links to a digital twin item usable in AR or virtual platforms (Right Click Save, 2025). For example, a physical hoodie might come with an NFT that allows the owner's avatar to wear the same hoodie in a metaverse game or to summon a special AR effect via the Tribute app. By binding physical and digital through NFC-chipped NFTs, TB aimed to ensure continuity of experience – the customer becomes part of the digital fashion world even when buying a physical product.

In 2022, TB launched PUNK, which draws inspiration from Victoria's Secret PINK, redefining the stereotypical and problematic imagery historically associated with the lingerie brand. By bridging virtual and physical fashion, the collection emphasised non-conformity, anti-authoritarianism, and cultural critique, offering a fresh take on the punk aesthetic while challenging traditional beauty standards (SHOWstudio, 2022). The drop included three unique assets: (1) a 3D digital mascot ($PUNKY) – an NFT pet dog avatar in punk aesthetics, (2) a physical tracksuit embedded with an NFC chip (redeemable by holding the NFT), and (3) a custom PUNK typeface for visual branding (Schulz, 2022). Additionally, the PUNK collection included Metaverse World and a Fortnite game map with possibilities for applying collectables. The idea was to allow owners to express themselves "across realms" – a PUNK tracksuit could be worn in real life, its NFT counterpart used on one's avatar in a virtual party, and the pet mascot roaming a metaverse world.

Parallel to product launches in 2023, Tribute made progress in building its digital platform infrastructure and community spaces. In March 2023, Tribute Brand opened a virtual flagship store on MONA, an open metaverse platform for user-created 3D worlds (Show Studio, 2023). By partnering with Mona (which provides the 3D world-building tools), Tribute extended its brand presence into the metaverse in a way that encourages user-driven exploration, effectively co-creating the brand experience with its community.

Another major initiative in 2023, combining innovation and sustainability, was the launch of ODDS. Announced in May 2023, ODDS is a collaborative project between Tribute Brand, the generative art NFT series Chromie Squiggle (by Art Blocks), and the artisanal knitwear company Waste Yarn Project (Fashion Tech News, 2023). The result is a collection of one-of-a-kind, zero-waste sweaters that exist both physically and as digital tokens. By late 2023, over 200 unique ODDS sweaters had been generated and produced, each representing a fusion of digital art, consumer co-creation, and sustainable fashion. ODDS exemplifies TB's commitment to value co-creation: buyers are not just consumers but participants in the design process, and the product's value stems from a triad of contributions – Tribute's tech and style, Chromie Squiggle's art code, and Waste Yarn Project's craftsmanship. The

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project received acclaim in both tech and fashion circles for bridging NFT culture with a tangible, eco-friendly outcome (Zuri, 2023).

Phygital Runway and Dual Platforms (2024)

By 2024, Tribute Brand had firmly established itself at the forefront of digital fashion, continuing to break new ground in how physical and digital experiences intersect. In October 2024, Tribute was invited to showcase at Los Angeles Fashion Week (LAFW) – a significant nod from the traditional fashion world. True to form, Tribute delivered not an ordinary runway show but a phygital spectacle that encapsulated its vision for the future of fashion shows. The presented collection, titled UNIFORMA, featured 10 physical looks and 10 digital looks, displayed side by side (Moran, 2024). At the event (hosted on a Hollywood rooftop), models wearing physical garments stood or walked on stage, but the fashion show as attendees experienced it came to life through AR on giant LED screens and tablets around the venue. TB partnered with STYPE, a company providing advanced motion-capture camera systems typically used in broadcasting, to achieve real-time integration of digital content with the live runway.

The UNIFORMA show was not just a tech demo. Nevertheless, it was the manifesto of Tribute Brand that was made visible. The theme highlighted a clear separation (and synergy) between physical and digital fashion. The physical UNIFORMA pieces were made by upcycling materials from Croatian factories into minimalist, modular garments (e.g. trench coats, sweater sets, rubber shoes) that could be worn repeatedly in various combinations). In contrast, the digital looks drew on exuberant L.A. pop culture motifs – a gown made of swirling dollar bills, a dress shaped like a giant cosmetic beauty blender, and an avatar with a comical cigarette burn hole through its torso.

By late 2024, Tribute Brand's platform launch was on the horizon. The multi-brand digital fashion platform – delayed somewhat by the need to build complex in-house technology – is set to debut fully, inviting other fashion brands and independent creators to sell their digital designs alongside Tribute's brands (such as PUNK). In interviews, Vrbanić emphasises that the aim is to "remove the word 'digital' from 'digital fashion'", implying that in the near future, fashion will simply be fashion, whether experienced physically or digitally (Schulz, 2022). This outlook signals maturity: digital fashion is not a gimmick or a separate category for TB, but an integral part of fashion as a whole, as communication and social interaction seamlessly blend between physical and virtual spaces.

Interoperability and Future Outlook

A recurring theme in Tribute Brand's strategy is the push for interoperability, which enables digital fashion assets to be used across various virtual environments rather than being locked to a single platform. Acquiring a digital asset will only appreciate in value if interoperability is achieved across

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decentralised platforms via blockchain technology. For example, a skin bought in Fortnite cannot be worn in Roblox or Decentraland, as each uses proprietary systems. Thus, TB has aligned itself with more open, decentralised platforms like Mona (for virtual worlds) and is building its systems on blockchain standards that, in theory, any compatible platform could integrate. The broader metaverse community echoes this need: as one report notes (Global Growth Insights, 2025), "digital outfits often remain locked within specific platforms" today, and overcoming this siloing is key to the growth of the virtual fashion market.

In practice, Tribute has already enabled some cross-platform use: owners of Tribute NFTs can import certain items into Monaverse spaces (as seen with PUNK avatars and ODDS sweaters). The company is also watching the gaming industry for shifts. There is speculation that upcoming blockbuster games (like Grand Theft Auto VI) might include creator marketplaces or NFT integrations that could allow third-party digital fashion to enter their worlds. When a major game or social platform opens up, TB wants to be ready with a catalogue of high-quality assets and a loyal user base eager to carry their digital wardrobe wherever they go. This is why interoperability is viewed as both a technical hurdle and a strategic opportunity: the first brands to establish their items as portable "identity assets" across the metaverse will gain significant brand equity. It aligns with Tribute's early adopter audience as well – their core users are likely to be present on multiple virtual platforms and will derive value from the continuity of their fashion identity across them.

By the end of 2024, Tribute Brand had transformed from a niche Instagram-based digital tailoring service into a multifaceted digital fashion enterprise. It spans a physical product line with IoT connectivity, a burgeoning NFT marketplace/platform, and experiential showcases that blend realities. The brand has navigated the hype cycles of AR and NFTs, emerging with a more resilient model that does not depend on any single technology but rather integrates several. It has cultivated a community (via NFTs and social media) and earned a reputation as a pioneer – Vogue Business included Vrbanić in its 2023 Innovators list for Web3, noting how Tribute's aesthetic and processes have influenced others in the space (Vogue, 2023). With that influence comes competition: dozens of start-ups and even established luxury players are now launching digital fashion projects, from Gucci's virtual sneakers to start-ups like DressX partnering with Roblox. Tribute Brand's ability to maintain its edge will likely depend on how well it can scale its platform and continue delivering value (both creative and functional) to its users across both physical and digital domains.

DISCUSSION AND CONCLUSION

This study examined the strategic innovation development of Tribute Brand in the theoretical context of Rogers' Diffusion of Innovations, platform-based innovation, and value co-creation frameworks.

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While Rogers' DOI provided valuable insights regarding Tribute Brand's initial adoption among digital-native consumers, especially early adopters, it was insufficient to fully explain the brand's sustained growth and strategic pivot toward comprehensive digital ecosystems. Instead, platform-based innovation and value co-creation emerged as more robust explanatory frameworks, capturing Tribute Brand's strategy of leveraging network effects, interoperability, and consumer-driven innovation. The shift from an AR-centric model to NFT-based and phygital strategies highlights the significance of dynamic capability and agility in responding to technological and market changes.

Key findings from the case emphasise the strategic importance of interoperability and platform scalability in digital fashion innovation. Tribute Brand's proactive approach toward open platforms and blockchain standards reveals a clear understanding of ecosystem-driven competitive advantage. Furthermore, the integration of physical and digital experiences into cohesive phygital offerings demonstrated an effective strategy for enhancing consumer engagement, promoting sustainability, and creating novel experiential value. These strategies suggest that digital-native brands should concurrently focus on both technological infrastructure and experiential innovation to drive consumer value and market success.

Tribute Brand's evolution demonstrates how digital-native luxury brands can strategically navigate technological disruptions through ecosystem building, consumer co-creation, and technological interoperability. By embracing these strategic dimensions, Tribute has successfully exceeded its initial niche positioning to become an influential innovator within the luxury fashion industry. This study contributes to digital innovation research by highlighting how platform ecosystems and co-creation complement traditional diffusion theories, particularly in contexts characterised by rapid technological and consumer behaviour shifts. Additionally, the research suggests that future inquiries should focus on how strategic innovation affects consumer perceptions of luxury authenticity and how emerging interoperability standards may reshape industry-wide digital practices.

IMPLICATIONS

The findings of this study extend existing theoretical perspectives on innovation adoption by highlighting limitations of traditional diffusion frameworks in digital-native luxury contexts. Specifically, this research demonstrates that understanding innovation diffusion in digital fashion necessitates the integration of platform-based innovation and value co-creation theories, particularly in relation to ecosystem development, network effects, and user-driven innovation. Furthermore, the success of Tribute Brand's phygital strategy provides empirical support for expanding theoretical constructs of consumer value creation, emphasising that experiential and digital aspects significantly influence consumer perceptions and value propositions within luxury markets.

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Practitioners within luxury fashion and digital marketing can derive several actionable insights from Tribute Brand's case. First, digital innovation should be considered integral rather than supplementary in luxury branding strategies, particularly as younger consumers increasingly value digital experiences and products. Luxury brands can enhance consumer engagement through investments in digital and phygital strategies, such as AR experiences, NFTs, and digitally linked physical products. Second, leveraging platforms and strategic partnerships enhances competitive advantage, suggesting that traditional luxury brands should actively engage in co-creation and collaborative ecosystems rather than relying solely on internal innovation. Third, interoperability should be prioritised as a foundational element of digital product strategies, as cross-platform usability significantly amplifies consumer value and brand loyalty. Ultimately, luxury brands should adopt agility and adaptive strategic planning to effectively respond to rapid technological advancements and shifting consumer demands, thereby ensuring sustained relevance and competitive positioning in evolving digital markets.

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OVERCOMING DIVERSITY AND INCLUSION BARRIERS: OPERATIONALIZING INTERSECTIONALITY AS ORGANIZATIONAL BEST PRACTICE

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ABSTRACT

Purpose: Intersectionality offers an analytical framework for addressing the limitations of Diversity, Equity, and Inclusion (DEI) practices within organizations. Despite their prominence, a reductive approach to identity, often resulting in tokenism, remains a key critique, potentially undermining DEI efforts. This study aims to overcome such limitation by deploying an intersectional approach. This approach focuses on the interplay of different sources of inequality. It provides organizations with actionable strategies to avoid group labeling in DEI.

Methodology: This study adopted an inductive, qualitative approach using Gioia's methodology. It examines the DEI strategies of five top-ranking MNCs and, through intersectional analysis, identifies key dimensions that form a model of intersectional integration.

Findings: The findings illustrate how organizations shape and adopt their DEI practices, showing how intersectional dimensions can be identified in current DEI efforts and further drawn into a coherent organizational strategy. Building on this, an intersectional model was proposed to inform actionable DEI strategies by organizations.

Managerial Implications: This research presents a structured, empirically grounded model for integrating intersectionality into DEI practices. It encourages organizations to address systemic inequalities by embedding of intersectionality as a core business function.

Originality: The study contributes by critically assessing DEI practices through an intersectional lens, showing how traditional approaches fall short in reducing structural inequalities. It also offers methodological innovation, proposing a qualitative model to operationalize intersectionality within organizational research

Keywords: Diversity Equity Inclusion, Intersectionality, Business Ethics, Group Labelling, Marginalized Groups, Structural Barriers, Organizational Change, Social Identities, Social responsibility, Discrimination

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INTRODUCTION

Originally introduced by Kimberlé Crenshaw in 1989, intersectionality highlights that systems of power -such as racism, sexism, classism, etc.- are interconnected and cannot be studied separately (Fotaki and Pullen, 2024; Luiz and Terziev, 2024). By this way, intersectionality emerged as a framework for understanding how different aspects of a person's identity—such as race, gender, class, sexuality, ability, and more—interact and overlap to shape one's own experiences of privilege, discrimination, and oppression. Recently, this framework has been introduced within the management and organization studies field (Kaufmann and Derry, 2023; Collins, 2019), aiming to provide organizations with a suitable framework to address how different forms of discrimination are interrelated within a single workplace structure (Yuval-Davis, 2006). The latter is of peculiar interest for those organizations engaging in their ethical and social responsibility to acknowledge their role in potentially enhance or reduce social structural inequalities (Amis *et al.* 2021; Fioravante and Del Baldo 2021; Amis *et al*. 2020).

Resorting to intersectionality as a theoretical framework has followed to several decades of debates on organizational efforts to provide opportunities and resources to marginalized stakeholders and underrepresented social groups; such initiatives have been usually framed under the Diversity Equity and Inclusion umbrella (Bernstein *et al*., 2020; Derry, 2012; Shore *et al*., 2011)

In the recent decades, organizations have vastly deployed DEI practices, policies and initiatives to engage with identity-based inequalities and meet the expectations from their stakeholders about social responsibility (Kim and Meister, 2023; Palazzo and Richter, 2005). The growing adoption of DEI initiatives has been paired with growing debates on their effectiveness and widely discussed critiques. Literature has underlined how DEI approaches are often rooted in reputational and business-oriented goals, rather than ethical commitment (Gjesdal, 2024; Thomason *et al.*, 2023; Ely and Thomas, 2020).

Others have criticized how DEI efforts may lead to decreased perceived meritocracy in organizations (Nohria, 2025; Praslova, 2025). Furthermore, DEI initiatives are often subject to unintended consequences, among which tokenism is vastly debated (Burnett and Aguinis, 2024; DiTomaso, 2024; Leslie, 2019; Torchia *et al*., 2011; King *et al*., 2010).

Against this background, intersectionality offers a suitable framework to address current DEI failures in at least two domains: first, DEI failures are often associated to perception of "unfair" treatment between different social groups, thus organizations would benefit from a framework able to guide them into overcoming strict group labelling and consequent differentiated treatment; Intersectionality

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does not focus on a certain social group, but rather it focuses on the interplay of sources of inequalities, thus offering a dynamic understanding of personal experiences (Sirola, 2024; De los Reyes, 2017). Second, DEI failures are often associated with being only limited to certain social groups or limited to niche stakeholders, while leaving untacked the systemic social inequalities fueling unfair disadvantage and disparity. Intersectionality stems from an interpretative acknowledgment, by the actor deploying it, of existing systemic inequalities, thus fostering enhanced sensibility towards it (Walby and Armstrong, 2012; Winker and Degele, 2011). By this way, intersectionality offers an ideal framework to enquire into how to overcome current DEI failures by focusing on ethical injustice of privilege and oppression (Atewologun *et al*., 2016, Castro and Holvino, 2016).

Although intersectionality holds significant potential for application in organization studies (Rodriguez, 2018), it remains a relatively recent and less explored framework within this field (Kaufmann and Derry, 2023; Atewologun, 2018; Holvino, 2010), with its use in empirical research being particularly scarce. Such scarcity of research is particularly striking, among the wider spectrum of organization studies, within the field of business ethics, where dynamics of power, inequalities and marginalization have been at the core of major field contributions (Grosser *et al*. 2017; Derry, 2012).

Given the limited investigation of intersectionality within organizational studies, and particularly within the business ethics literature, we argue that current literature engaged with DEI and, specially, DEI failings, could largely benefit from insights gathered from intersectionality-informed research.

The objective of this study is to: first, discuss current DEI limits and provide new insights into how intersectionality can be used by organizations to overcome such limitations. Second, originally novel the current literature landscape on intersectionality in organizational research by providing empirical qualitative research. Third, provide an Intersectional DEI model to inform business organization's strategies seeking to overcoming group labelling.

To provide novel insights into this topic, this study examines the current methodological landscape of intersectional theorizing. It does so by offering a methodological innovation: operationalizing intersectionality within qualitative research through structured use of the Gioia methodology, providing a practical and replicable framework (Gioia, 2021; Gioia *et al.,* 2013). Furthermore, it advances DEI literature by applying an intersectional lens to reveal how organizations can transition from group-based labeling to more nuanced and ethically grounded inclusion strategies that acknowledge the interplay of various forms of disadvantage (Luiz and Tersiev, 2024; Holvino, 2010). Lastly, it contributes to business ethics debates on moving beyond the "business case" for DEI (Ely and Thomas, 2020) by showing how intersectionality can help organizations examine and change their

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practices to address systemic social inequalities (Kaufmann, 2022; Grosser *et al*., 2017; Gotsis and Kortezi, 2013; Van Dijk *et al*., 2012).

DEI FAILINGS AND INTERSECTIONAL THEORIZING

Recently, DEI practices have become a crucial part of organizations structures (Gjesdal, 2024), and is understood as a set of practices, policies and strategies, aimed at reducing inequalities in the workplace by ensuring equal opportunities for individuals from different social backgrounds (Amis *et al*, 2020; Leslie, 2019). This growing emphasis on DEI reflects the growing pressure from stakeholders who expect organizations to actively drive social change and make a positive contribution to society (Kim and Meister, 2023; Palazzo and Richter, 2005). Management has a responsible towards society and is expected to balance their non-financial and financial objectives to meet these demands (Ardhaoui *et al*., 2024).

According to Rawls's Theory of Justice (1999), institutions, including corporations, have an ethical obligation to ensure a fair distribution of rights and responsibilities and to promote social cooperation that benefits all members of society. This ethical framework underscores the responsibility of organizations to promote social justice and address inequalities within their operations to ensure the fair representation of all workers apart from their social identities (Vassou *et al.*, 2025; Mousa *et al.*, 2021; Braithwaite and Drahos, 2000). In response, social responsibility and DEI practices have gained relevance as companies seek to meet stakeholder demands for social impact while recognizing that inclusivity can improve their business outcomes (Hassan, 2025). Indeed, research suggests that DEI initiatives are associated with higher productivity, higher efficiency and greater employee satisfaction (Gjesdal, 2024; Aguilera *et al*., 2004). Scholars such as Brennan (2023) identify this dual motivation-ethical responsibility and business benefit as a key rationale for embracing diversity in organizations.

However, some scholars have challenged the 'business case' for DEI, arguing there is no clear causal link between diversity and improved performance (Ely and Thomas, 2020). Moreover, when diversity initiatives are pursued solely to achieve financial gains or social legitimacy, they risk overlooking the essential ethical and humanistic goals that should drive these initiatives (das Neves and Melé, 2013).

This perspective explains why the true impact of these initiatives remains contested, as organizations frequently face unintended negative consequences - like tokenism - arising from the way these practices are implemented (Vassou *et al.*, 2025; Burnett and Aguinis, 2024; DiTomaso, 2024; Leslie, 2019). Indeed, many scholars believe that such approaches often fail to confront deeper systemic issues within organizations, resulting in superficial practices that do not genuinely foster inclusion or

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benefit marginalized groups (Hellerstedt *et al*., 2024; Gjesdal, 2024; Prasad, 2023; Leslie 2019; Aguilera *et al*., 2007). Traditional DEI practices often focus on increasing representation without fundamentally changing decision-making structures, hiring processes or pay systems (Gjesdal, 2024; Hellerstedt *et al*., 2024; Amis *et al*., 2020), ignoring the bias and institutional boundaries that marginalized employees often have to deal with. As a result, they often reinforce existing inequalities rather than reduce them (Prasad, 2023; Grosser and Moon, 2019).

To understand how inequality persists within organizations, Joan Acker's (2006) concept of inequality regimes provides a valuable framework. Acker (2006) describes inequality as a fluid system of practices closely tied to traditional structures, making them very difficult to dismantle – largely due to the result of a system that privileges white male-dominated sectors, perpetuated by the persistent segregation of social categories across multiple fields (Barrero and Delgado-García, 2025; Prasad, 2023; S.M. Nkomo et al., 2019; Bozzon *et al*., 2019). Similarly, Amis, Munir & Mair (2020) identify three dominant institutional myths that perpetuate inequality within organizations: efficiency, meritocracy, and positive globalization. These myths serve as rationalized but often unconscious belief that shape corporate practices and, consequently, perpetuate unequal hierarchy within the organizations (Amis *et al*., 2020).

Building on these ideas, managers tend to prioritize the demands of groups that are most important to them to achieve better outcomes (Prasad, 2023; Wasserman and Frenkel, 2015; Derry, 2012), adopting one-size-fits-all approaches to all employees (Dennissen *et al*., 2020; Grosser, 2009; Grosser and Moon, 2005) which contribute to greater inequality within the workplace (Meliou *et al*., 2024).

To better understand these dynamics, intersectional theory provides a crucial lens. Originally introduced by Kimberlé Crenshaw in 1989 to highlight the marginalization faced by black women, this framework has since expanded to emphasize how power structures operate across multiple, intersecting dimensions, shaping experiences within both private and public institutions (Fotaki and Pullen, 2024; Luiz and Terziev, 2024). What distinguishes intersectionality from other frameworks is its ability to frame systemic (social) sources of inequality while also understanding how they interplay in personal experiences (Kaufmann and Derry, 2023; Acker, 1990). As Kaufmann and Derry (2023) define it, intersectionality examines "how multiple forms of social inequality interact to produce individuals' unique experiences of marginalization, as well as the systemic practices that perpetuate these inequities."

However, literature continues to focus on the accomplishment of singular demands of specific groups, privileging some social categories over others (McCarthy, 2023; Castro and Holvino, 2016). That's why

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some scholars argue that intersectionality requires acknowledging power differences both within and among diverse groups (Holvino, 2010; Acker, 2006). By adopting an intersectional approach, organizations can begin to recognize how social categories are interconnected, ensuring that diversity practices are inclusive for all social groups, rather than focusing on a single category in isolation (DiTomaso, 2024; Amis *et al*., 2020). Intersectional theory urges businesses to critically evaluate their internal power structures, shedding light on how systems of privilege and oppression influence key areas such as recruitment, career progression, and leadership roles (Atewologun *et al*., 2016).

There is still a lack of inclusion of feminist theory in diversity and inclusion analysis. Mainly due to the marginalization of social-related issues and the exclusion of minorities' voices and perspectives as well as the failure to apply the feminist theory to foster more inclusive practices (Grosser and Moon, 2019). Furthermore, there is still scarce empirical research that applies this theorizing in organizations and how it is applied. (Luiz and Terziev, 2024; Wasserman and Frenkel, 2015).

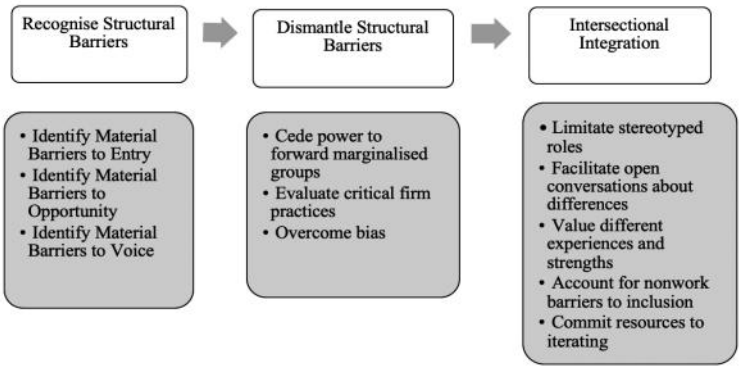
Research Design and Methodology

This study seeks to enhance our knowledge of how companies can apply intersectional theory to avoid group labelling in their DEI practices. To address the research question, the study presents an in-depth examination of the DEI practices of five companies recognized as part of the top-10 DEI performers by the World's Best Employees 2024 by Forbes (Peachman, 2024): Microsoft, Samsung Electronics, Adobe, Airbus, and IKEA. These companies were specifically selected to ensure the dataset captured leading DEI approaches, recognized as current best practices. In this way, by analyzing the limits and the perks of current best DEI programs, the study originally tackles shortcomings that can be found also in renowned and established best practices.

The research followed an inductive, qualitative approach rooted in grounded theory (Strauss and Corbin, 2004). All the patterns and themes identified emerged directly from the data, relying on a qualitative methodology for data analysis (Naeem *et al*., 2023). This approach was deemed appropriate because it supports theory development from data rather than imposing a priori assumptions. However, it is worth noticing that we soon introduced theory within the data analysis. Intersectionality is a complex and context-dependent construct that captures how multiple sources of inequality interact. As such, an inductive method was particularly appropriate, as it enables the development of theory grounded in empirical data rather than testing pre-existing hypotheses. The Gioia methodology, with its emphasis on moving from first-order concepts to second-order themes, provides a structured way to theorize from qualitative data, while also being well-suited to intersectional research, which demands sensitivity to nuanced, intersecting social identities

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Additionally, intersectionality has often been approached normatively in organizational studies. Our use of Gioia's methodology allows us to contribute a methodological innovation by showing how intersectionality can be systematically integrated into empirical research (see Kaufmann and Derry, 2023). This positions our work as a bridge between conceptual discussions of intersectionality and its practical implementation within DEI theorizing.



Data gathering relied on a vast database populated by publicly accessible secondary data. The dataset includes fifty items, including nine company annual activity reports, forty company articles, and one video that outlines the different practices of the selected companies.

The methodology deployed relies on Gioia's thematic analysis process, a method designed to identify and report patterns within a dataset, enabling the development of new frameworks and uncovering fresh insights and understandings (Gioia, 2021; Gioia *et al*., 2013).

The design process of the database began by reviewing the data sources, systematically organized by company. Initial coding was refined by merging similar codes and removing irrelevant data, leading to the formulation of final first-order codes based on identified patterns. Secondly, the first-order concepts were clustered on second-order themes. In this phase, codes were clustered iteratively using the intersectional variables from Kaufmann and Derry (2023), and the resulting patterns were categorized according to the same variables. Finally, aggregate dimensions emerged, supporting the following structure and communication of theoretical contributions.

FINDINGS

The findings illustrate how organizations shape and adopt their DEI practices, showing how intersectional dimensions can be identified in current DEI efforts and further drawn into a coherent organizational strategy. In total, 31 first-order concepts were identified and represented by synthesized summaries to ensure the findings were grounded in the evidence provided by the data.

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These concepts were then categorized into 11 second-order themes, which were finally aggregated into 3 aggregated dimensions, based on the intersectional variables grounded in the framework proposed by Kaufmann and Derry (2023).

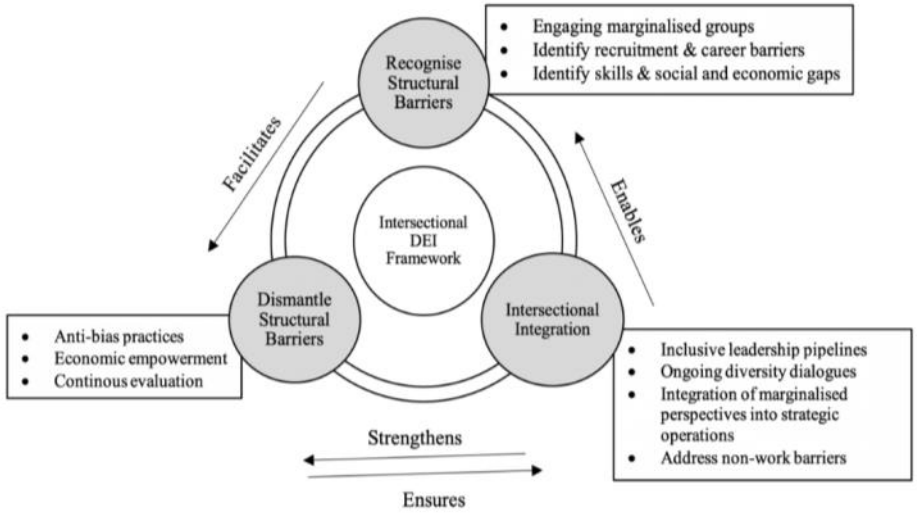
DISCUSSION

The findings of this study show how companies have started to consider a broader range of social categories when implementing DEI practices. Although the best practices analysed reflect an understanding and application of key intersectional dimensions, they do not adopt a holistic intersectional-based approach. In fact, while companies' DEI practices are beginning to address the challenges faced by specific social identities, they still tend to treat these identities in isolation rather than recognizing how multiple forms of discrimination intersect and compound one another. For instance, building on the key intersectional dimensions emerged from the findings and combining their insights, we can draw such missing holistic model in current DEI efforts and design a model that tackle multiple identities all together to avoid group labelling.

The model developed in this study comprises three interdependent dimensions: Recognizing Structural Barriers, Dismantling Structural Barriers, and Intersectional Integration (Kaufmann and Derry, 2023), which together provide organizations with a structured approach to implement intersectionality in their operational and strategic process.

These dimensions are interrelated and contribute to an iterative process that leads to intersectional integration. Identifying structural barriers serves as the starting point, facilitating the removal of these barriers and paving the way for meaningful intersectional integration. Simultaneously, intersectional integration reinforces the ongoing recognition and dismantling of the structural obstacles, ensuring that organizations maintain an adaptive and sustainable approach to inclusivity.

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The first key aggregate dimension – Recognize Structural Barriers is defined upon the companies' need to recognize the underrepresented people experiences and not apply standardized solutions that fail to recognize the intersection nature of social identities to achieve a true intersectional integration (Luiz and Terziev, 2024; Kaufmman and Derry, 2023; Prasad, 2023; Leslie, 2019). However, the analysis of the current best DEI practices reveals how organizations, even though are beginning to acknowledge the barries faced by marginalized people, it continue to redirect their efforts to specific minority groups.

The second key aggregate dimension – Dismantle Structural Barriers emphasizes the need for a proactive approach by the organizations to, after recognizing, dismantle the limitations marginalized people are suffering. Although companies are starting to taking measures to make a change on group labelling, their DEI practices continue to rely on single-axis identity categories, which reinforces the exclusions they seek to address (Luiz and Terziev, 2024; Kaufmann and Derry, 2023; Castro and Holvino, 2016).

The third key aggregate dimension – Intersectional Integration concerns the integration of previously excluded individuals as equal organizational peers after structural barriers have been recognized and dismantled (Kaufmann and Derry, 2023). Nevertheless, our findings indicate that companies continue to focus mainly on recognizing and compensating equally individuals from certain groups (Kaufmann and Derry, 2023; Castro and Holvino, 2016).

Overall, our findings support critiques that current DEI initiatives often reduce identity to single-axis categories, contributing to tokenism (Burnett and Aguinis, 2024; Leslie, 2019; Castro and Holvino, 2016). We also build on calls by Collins (2019) and Fotaki and Pullen (2024) for intersectionality to be

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embedded into systemic organizational change, rather than treated as a rhetorical add-on (Gjesdal, 2024; Ely and Thomas, 2020).

Nonetheless, This study enhances our understanding of how organizations can overcome limitations by applying an intersectional DEI model. This model tackles multiple intersecting identities simultaneously and avoids reductive group labeling. Top-performing organizations can reduce bias and stereotypes for marginalized groups across entry, opportunity, and voice levels by engaging with intersecting social categories and combining best practices to create more inclusive, intersectional organizational strategies.

Expected Contributions

Our work is expected to contribute to the literature on business ethics, diversity and inclusion, and intersectionality in organization studies in at least three significant ways.

First, we expect to contribute to the literature on Diversity, Equity, and Inclusion (DEI) in organizations by addressing a widely acknowledged limitation of existing DEI practices: their frequent reliance on reductive, single-axis identity categories that lead to tokenism and superficial inclusion. By applying an intersectional lens, our study reveals how organizations can move beyond group-based labeling to develop more nuanced and ethically grounded inclusion strategies that recognize the complex interplay of multiple forms of disadvantage (Luiz and Tersiev, 2024; Wasserman and Frenkel, 2015; Holvino, 2010).

Second**,** we expect to contribute to the literature on intersectionality in organization and management studies (Kaufmann and Derry 2023**)** by offering a methodological innovation: we operationalize intersectionality within empirical qualitative research through a structured application of the Gioia methodology. While intersectionality has often been discussed normatively or conceptually, few studies have successfully integrated it into organizational data collection and analysis. Our study provides a practical, replicable framework for doing so, thus extending intersectional theorizing into empirical enquiry.

Third, this study expects to contribute to current debates, within the field of business ethics, on how to overcome the "business case" for DEI (Ely and Thomas, 2020; Van Dijk *et al*., 2012), by pivoting on intersectionality as a theoretical framework able to embed to examine and reconstruct their practices, considering the interplay between cultural and social identities and systems of difference (Castro and Holvino, 2016).

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MANAGERIAL IMPLICATIONS

Organizations face serious consequences when their DEI practices fail. DEI efforts that rely on reductive, group-based approaches may be perceived as tokenistic, creating feelings of exclusion among employees instead of inclusion (Burnett and Aguinis, 2024; Gjesdal, 2024; Leslie, 2019). These failures undermine firms' ethical and social responsibility and can also weaken their ability to attract and retain diverse talent in an increasingly competitive labor market.

This study offers managers a clear path to avoid these shortcomings: adopt an intersectional approach to DEI. Specifically, managers should shift their focus away from isolated identity categories and consider how multiple dimensions of social identity intersect to shape employee experiences. This means designing DEI initiatives that account for overlapping forms of disadvantage. For example, managers can assess how gender and ethnicity interact in recruitment, promotion, and pay equity processes rather than treating each factor in isolation. Managers can implement the model proposed in this study to integrate intersectionality structurally within their DEI strategies. This includes conducting intersectional audits of existing policies to identify unintended exclusionary effects, incorporating intersectionality training into leadership development programs, and including diverse employee perspectives in designing and evaluating DEI initiatives to ensure they reflect lived experiences rather than abstract categories.

By embedding intersectionality as a core business function, managers, HR teams, and decision-makers can create inclusive environments where all employees feel recognized and supported. This helps organizations meet diversity targets and drives ethical, systemic transformation, positioning them as socially responsible leaders.

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BIG DATA ANALYSIS FOR EARLY DETECTION OF COMMUNITY ACQUIRED PRESSURE INJURIES REDUCING HOSPITALIZATIONS, COSTS AND MORBISITY

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ABSTRACT

Pressure injuries (PIs), a preventable condition. PIs negatively impact quality of life, increase treatment costs, hospitalizations, length of stays, and readmissions and cause about 60,000 deaths each year. Being the second most common lawsuit claim after wrongful deaths each year; PIs cost is estimated as $9.1-$11.6 B per year in the US. This research project utilized big data to investigate community-acquired pressure injuries (CAPIs), to improve the early detection of PIs in the community, avoiding hospitalization, deaths, and costs. Retrospective data of inpatients was curated and analyzed from two general medical centers between January 1, 2016, and December 31, 2018. Nursing assessments from 44,449 electronic medical records of patients admitted to internal medicine departments were retrieved, organized, coded, and analyzed. CAPIs identified within 36 hours of admission were in the buttocks (56.9%), the sacrum (11.8%), ankle (10.8%), trochanter (5.1%), and leg (3.9%) limiting mobility. There were 31% first degree CAPIs, 41% second degree, and 18% third degree CAPIs. Previously unacknowledged patient characteristics associated with CAPIs were revealed: oxygen use, intestinal function, touching senses of heat and pain, albumin, red cell distribution width, and systolic blood pressure. These newly identified indicators for CAPIs can be used to detect and prevent PIs in the community, particularly among the elderly, and underscore the importance of data-driven approaches for enhancing safety and quality of care. Managements are called upon to assimilate the insights from this study, integrate the newly discovered indicators into clinical practice, enhancing elder patient safety and quality of care.

Keywords: Big data; Community care; Elderly; Expenditures; Informatics; Hospitals; Pressure Injuries; Preventive algorithm.

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INTRODUCTION

Pressure injuries (PIs) are localized damage to the skin and/or underlying soft tissue due to intense and/or prolonged pressure, possibly in combination with shearing, or from the use of a medical device. They are a frequent preventable complication in elderly patients with comorbidities and are associated with a higher risk of mortality of about 60,000 deaths each year (Agency for Healthcare Research and Quality, 2024). PIs are acknowledged to be one of the most significant signs of mistreatment, low quality care, and insufficient safety, (Corbett et a., 2017; Haesler et al., 2019; Yon et al., 2017). PIs in nursing homes are a common consequence of lack of mobility support, insufficient methods of prevention, or poor understanding of skin breakdown, and its consequences (Haesler et al., 2019; Jackson et al.,2017). Utilizing the digital transformation in healthcare, this research project used a big data analysis approach to examine the prevalence of CAPIs and identify predisposing characteristics among elderly patients admitted to hospital from community nursing homes. While a previous study performed in the European Mediterranean healthcare sector introduced big data as evidence-based data, that improves preventive measures, decision making, and performance while reducing operational costs and saving lives (El Samad et al., 2022), to the best of our knowledge, this is the first project to use big data to identify risk factors for CAPIs based on clinical hospital data, connecting hospital and community care.

PIs are associated with morbidity, low quality of life, mortality, psychological distress, and vast annual expenses due to hospital care (Coyer et al., 2022; Fernando-Canavan et al., 2020; Hauck et al., 2017; Kim, Lee & Lee, 2022; Nghiem et al., 2022; Jaul et al., 2024; Nunley, 2024). PIs increase treatment costs, hospitalizations, length of stays, and readmissions and cause about 60,000 deaths each year. Being the second most common lawsuit claim after wrongful deaths each year; PIs cost is estimated as $9.1-$11.6 B per year in the US. Since PIs are a preventable condition, this research project utilized big data to investigate community-acquired pressure injuries (CAPIs), to improve the early detection of PIs in the community, avoiding hospitalization, deaths, and costs.

LITERATURE REVIEW

As life expectancy rises, the high prevalence of PIs in older adults continues to be disturbingly high (Jaul et al., 2024; Nunley, 2024). PIs, the second most common lawsuit claim after wrongful death, negatively impact quality of life, resulting in adverse health outcomes, rising treatment costs, hospitalizations, length of stays, and readmissions, estimated to cost $9.1-$11.6 B per year in the US (Agency for Healthcare Research and Quality, 2024).

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PIs on admission refer to PIs that are acquired in the community (CAPIs) and are identified on hospitalization (Rodgers et al., 2021). CAPIs events are very common (Haesler et al., 2019; Haesler et al., 2018; Haesler, 2018; 2017), with 77% of patients admitted to the hospital presenting with community acquired pressure injuries, even though only 21.4% were receiving homecare services for these PIs prior to their admission (Corbett et al., 2017). Studies reported the prevalence of CAPIs as 7.4%, of which 76.1% were admitted from the community and 23.9% were admitted from long-term care institutions (Kayser et al., 2018; Kirkland-Khyn et al., 2019). Accumulated data from long-term care, nursing homes, and rehabilitation facilities indicate a value ranging between 0.40 and 0.77 per 1000 adults (Corbett et al., 2017; Kayser et al., 2018; Kirkland-Khyn et al., 2019).

Most CAPIs (58%) are superficial (Stage 1 or 2), 15% are deep-tissue PIs, and 22% are full-thickness PIs (Stage 3, 4, or unstageable). The most common anatomic locations for PIs are reported to be the ears (29%) and the feet (12%) (Kayser et al., 2018). A recent meta-analysis described the difficulty of prevention and treatment of PIs, whose continuous impact on clinical outcomes has a considerable cost (Walker et al., 2020). A review of the literature from the last decade indicates that the development of CAPIs is associated with a complex interplay of unknown factors and there is a lack of understanding of the components and outcomes associated with effective care of CAPIs in the community (Aloweni et al., 2024).

(Aloweni et al., 2024). This has led to growing efforts to prevent and treat PIs in hospitals. Several advisory panels have concluded that addressing PIs is a high priority (Haesler et al., 2019; Haesler et al, 2018).

Theoretical Anchor - Value Based Healthcare

The value-based healthcare (VBHC) concept moves the shift from providing high volume health services with fees for the services to providing care that increases value for patients in terms of health outcomes while optimizing value per dollar spent (Gray, 2017; Porter & Lee, 2013; Porter & Lee, 2016). The implementation of VBHC, however, requires transformations by systems at national level, providers and patients (Lee et al., 2020). As an integrative health management strategy, beyond changing methods of payments and incentives, VBHC calls for expanding health information technology, reshaping policies, strengthening community health, better integrating hospital medicine with community care and providing and measuring patient-focused care (van Staalduinen et al., 2022). Barriers to VBHC are conceptual ambiguity, fragmentation of VBHC into components, and lack of empirical knowledge on effective practices to implement VBHC (van Staalduinen et al., 2022).

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It is possible, however, to deliver a value chain for medical conditions by focusing on prevention through monitoring of conditions, for example CAPIs among the elderly (2) share an infrastructure by distributing and integrating delivery across sites (3) align delivery with external societal (4) and design systems to optimize community development (Kim, Farmer & Porter, 2013).

Gaps in the State of the Art

Most efforts to prevent PIs relate to events in acute care settings and no study on CAPIs in the last decade has included socioeconomic factors (Aloweni et al., 2024). While risk assessments for PIs are performed in hospitals, the community lacks valid decision support tools for PIs detection and there is a paucity of research on the prevention of PIs in the community (Elli et al., 2022; Nakagami et al., 2021). Similarly, there is little information about patient characteristics that are associated with CAPI that could be used for prevention and for avoiding the deteriorations and hospitalizations due to CAPIs (Corbett et al., 2017; Jackson et al., 2017; Kayser et al., 2018; Kirkland-Khyn et al., 2019; Nakagami et al., 2021; Nghiem et al., 2022; Padula et al., 2024; Tayyib et al., 2021; Walker et al., 2020). There is a consensus that developing comprehensive strategies to mitigate the occurrence and impact of CAPIs are of immense importance (Aloweni et al., 2024; Elli et al., 2022; Nakagami et al., 2021). Utilizing the digital transformation in healthcare, this research project used a big data analysis approach to examine the prevalence of CAPIs and identify predisposing characteristics among elderly patients admitted to hospital from community nursing homes and demonstrate VBHC in the context of CAPI (Kim, Farmer & Porter, 2013). As mentioned, to the best of our knowledge, this is the first project to use big data to identify risk factors for CAPIs based on clinical hospital data, connecting hospital and community care, within the strategy of VBHC.

METHODS

Design

A retrospective study of elderly hospitalized adults discharged from internal medicine wards. Data were collected from 44,495 electronic medical records from various departments in two general Israeli medical centers (900; 350 beds) over 3 years (January 1, 2016 to December 31, 2018). Data were anonymized to satisfy regulations of patient privacy protection, and to reduce the ethical challenges, making it impossible to analyze CAPI by socioeconomic status (Howe & Elenberg, 2020). Patients with a comorbidity known to be associated with the indicated diagnosis (e.g., metastatic cancer) were excluded. The database of hospital records provided a diverse and large collection of mostly

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structured patient clinical data including prior disease information, blood test results, descriptions of procedures, and patients' assessment by nurses upon admission.

Study Variables

Patients arrived at the medical centers from community nursing facilities or nursing homes. A dataset was created for this study by using a predetermined code for PIs to identify patients with CAPIs at admission. The presence of CAPIs was ascertained by the first skin assessment after hospitalization from the emergency department and/or within 36 hours of admission to an internal medicine department, according to the standard timeframe for CAPI identification. Potential explanatory variables included: Demographics (Gender and age); Clinical indicators (Oxygen use, intestinal function, sensory impairments (e.g., heat and pain perception), and vital signs; Laboratory results (Albumin levels, red cell distribution width (RDW), and systolic blood pressure).

Patients with readmissions within seven days of discharge (n = 2,831, 6.3%) were excluded to avoid confounding hospital-acquired pressure injuries with CAPIs. This exclusion criterion was implemented because patients with recent hospitalizations have an altered risk profile due to their recent exposure to the hospital environment, and any PIs identified upon readmission may have originated during their previous hospital stay rather than in the community setting. Additionally, incomplete skin assessments (46.6% of records) were excluded. Potential selection bias was examined by comparing the demographic and clinical characteristics (age, gender, and admission indicators) of the included and excluded cases. Comparisons of cases (included and excluded) showed no significant differences in demographic or clinical characteristics, suggesting random missingness.

Data Analysis

This study employed state-of-the art big data analysis of patients with CAPIs upon admission to hospital and during their hospitalization in internal medicine, cardiology, hematology, and oncology departments. Data were retrieved, organized and coded by data engineers to a data cloud dedicated for this study. They were then analyzed by data scientists. to identify indicators for CAPIs that could be used for prevention and early treatment in the community, thereby avoiding hospitalization. Categorical variables were presented by frequencies and percentages, with medians and interquartile ranges (IQR) used for continuous variables. Chi-squared tests were conducted on categorical variables with Kruskal-Wallis tests used for continuous variables. Logistic regression was used to calculate the unadjusted odds ratio (OR), with 95% confidence interval (CI) for CAPIs.

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A multivariate model for estimating the adjusted ORs of the clinical variables for CAPIs was assessed using logistic regression with a 95% CI. Data were collected and analyzed using Python software (version 3.6) and Stats Models package (version 0.12.1). The categorical variables were recorded using dummy coding, since one category for each was used as a reference category. For polytomous variables with greater than two categories, levels were contrasted in the logistic regression model to ensure proper inclusion and interpretation of these variables in the multivariate model. Multivariate logistic regression was used to assess the relationship between explanatory variables and CAPIs. Variables with clinical relevance and statistical significance in univariate analysis were included in the final model. Adjusted odds ratios (ORs) with 95% confidence intervals (CIs) quantified the strength of associations. The final model included pseudo-R^2 (0.3244) as a measure of goodness-of-fit. Pseudo-R^2 is used in logistic regression to assess the explanatory power of the model. While it is not directly comparable to R^2 in linear regression, it provides a relative measure of how well the model explains the variability in the outcome. Analyses were performed using Python (version 3.6) and the StatsModels library (version 0.12.1).

RESULTS

A total of 44,495 medical records of hospitalized patients admitted to the hospitals in the 3-year period were analyzed. We excluded 2,831 (6.3%) for readmissions and 20,745 (46.6.%), for lacking full skin assessment. In the process of admission to the emergency department, 2,448 (5.5%) patients were diagnosed with CAPIs of whom 1,178 were female (48%), and 1270 male (52%), with an age range between 71 and 80 years. Nearly half (49.8%) of the patients. were hospitalized for 7 or more days. Table 1 presents the demographics, admission indicators, nursing assessments, vital signs, and lab tests results within 36 hours of admission.

Sub Population	**Events**	**%**
Positive Skin Assessment (Within 36 h)	2448	5.5%
Negative Skin Assessment (Within 36 h)	18,471	41.5%
Readmission	2831	6.3%
Missing Skin Assessment	20,745	46.6%

Table 1. Study population (Total Population 44,495)

The prevalence of CAPIs was analyzed by considering the location, attributes, and degree/stage. Most CAPIs were in buttocks (56.9%), sacrum (11.8%), ankle (10.8%), trochanter (5.1%), and leg (3.9%). Tissue associated with CAPIs was described as necrotic, serotic, bloody, granolithic, epithelial, and

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infected. The most common grade of CAPIs (41%) was second degree, with 31% rated first degree, and 18% as third degree, all demonstrating the extent of negative impact on pain, mobility and quality of life. Figure 1 presents the type, degree, and location of the observed CAPIs.

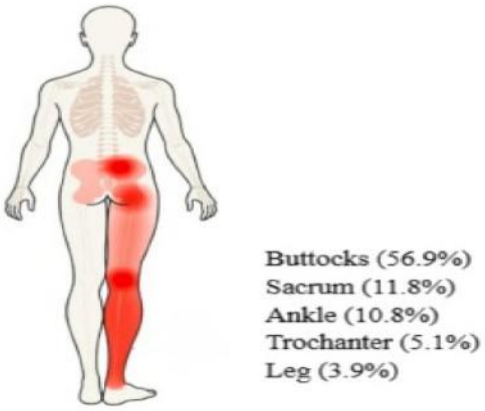


Figure 1 presents the type, degree, and location of the observed CAPIs.

The results of the regression analyses designed to identify indicators of CAPI are presented after adjustment for extreme and missing values. Most variables were categorical, except for individual continuous variables (e.g., age, number of CAPIs). Multivariate logistic regression was used to estimate the adjusted OR of the clinical variables for CAPIs. Table 2 presents variables that were significantly associated with CAPIs. These results reveal significant variability in the effect sizes of different predictors. For example, mobility exhibited the highest adjusted OR (6.263), indicating a very strong association with CAPIs. Conversely, variables like age and systolic blood pressure had smaller adjusted ORs, suggesting weaker, though significant, relationships. Table 3 presents patient characteristics associated with CAPI.

* Number of Patients and %	Missing		Variable
Less than 15 patients	174		
126 (5.1)		Trochanter	
Less than 15		Ear	
Less than 15		Abdomen	
15 (0.6)		Back	
Less than 15		Chest	
Less than 15		Arm	
19 (0.8)		Foot	
Less than 15		Shoulder	Ulcer area
Less than 15		Face	
Less than 15		Genitalia	
290 (11.8)		Sacrum	
1393 (56.9)		Buttock	
Less than 15		Spine	
265 (10.8)		Ankle	
Less than 15		Neck	

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96 (3.9)		Leg	
681 (31.0)	254	1	Degree of pressure injury
901 (41.1)		2	
396 (18.0)		3	
216 (9.8)		4	
2253 (92.0)		No	Necrotic Tissue
195 (8.0)		Yes	
2222 (90.8)		No	Serotic Tissue
226 (9.2)		Yes	
2383 (97.3)		No	Bloody Tissue
65 (2.7)		Yes	
2266 (92.6)		No	Granolithic Tissue
182 (7.4)		Yes	
1996 (81.5)		No	Epithelial Tissue
452 (18.5)		Yes	
2285 (93.3)		No	Infected Tissue
163 (6.7)		Yes	

Table 2. Distribution of CAPIs by assessment upon admission (n = 2448). (* In big data analysis less than 15 is considered marginal and is not reported).

Characteristics	Adjusted OR	Adjusted OR CI	Adjusted p-Value	Unadjusted OR	Unadjusted OR CI
Age on admission	1.0102	[1.01, 1.01]	0.0000	1.039	[1.04, 1.04]
Multi-pharmacy	1.0132	[1.01, 1.02]	0.0001	1.0224	[1.02, 1.03]
Albumin level (lab)	0.9459	[0.94, 0.95]	0.0000	0.9167	[0.91, 0.92]
Red cell Distribution Width	1.0623	[1.04, 1.09]	0.0000	1.1141	[1.1, 1.13]
Systolic blood pressure	0.9952	[0.99, 1.0]	0.0008	0.9871	[0.99, 0.99]
Intestinal functions	1.9262	[1.62, 2.29]	0.0000	10.1404	[9.2, 11.17]
Eating habits	1.6759	[1.41, 1.99]	0.0000	9.0266	[8.23, 9.9]
Mobility	6.263	[5.0, 7.84]	0.0000	20.3565	[17.71, 23.4]
Conscious state	1.1814	[1.0, 1.39]	0.0477	6.6144	[5.97, 7.33]
Assessment of Senses	1.8584	[1.56, 2.21]	0.0000	3.6194	[3.23, 4.05]

Table 3 presents patient characteristics associated with CAPI (Notes: Pseudo R^2 = 0.3244)

DISCUSSION

Theoretically, the project demonstrates Kim, Farmer and Porter's (2013) model of VBHC in the context of CAPIs, suggesting that clinical health innovations can facilitate the overcoming of existing barriers to implementing VBHC, as previously demonstrated in other health conditions (Bauer, 2018; Crowson, & Chan, 2020; Ramsdal & Bjørkquist, 2020). Our development of algorithms to prevent CAPIs by their early detection and treatment in the community demonstrates VBHC through innovation. Developing algorithms for prevention and monitoring of CAPIs, connects hospital and community care, potentially aligns care with educating elders, their families and the public regarding diagnosis and care for CAPIs and delivers effective care for CAPIs while reducing costs in the long

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run through a clinical innovation (Kim, Farmer & Porter, 2013). Methodologically, this research project utilized big data to identify unknown risk factors for CAPIs based on hospital clinical data and nurse assessments. The contribution of this big data research project to practice is that sheds light on the characteristics and risks associated with CAPIs among elderly patients who arrived at the hospital from nursing homes. The findings represent valuable insights that can be used to guide practice in the community, avoid readmissions, mortality and the vast expenditures of PI care.

Findings emphasize the multifactorial nature of CAPIs and highlight potential actionable interventions. For example, improving mobility and monitoring albumin levels in at-risk patients. Since CAPIs are often underreported in the community and there is consequently inadequate follow-up, (Hamdan and Hamdan-Mansour, 2020), our identification of new risk factors that are associated with CAPIs, provides an essential foundation for the development of preventive measures for early treatment of PIs in community care (Corbett et al., 2017; Elli et al., 2022 Kayser et al., 2018; Kirkland-Khyn et al., 2019; Nakagami et al., 2021; Nghiem et al., 2022; Padula et al., 2024; Tayyib et al., 2021).

The risk factors previously considered associated with CAPIs include older age, impaired mobility, multiple comorbidities, and malnutrition (Masnoon et al., 2017; Moda et al., 2020). A piezoelectric motion sensor, which provides a movement score based on the mean number of movements per hour, was used to assess patient mobility (Galvão and Püschel, 2012). Interestingly, our findings identify polypharmacy, the use of multiple medicines, as a key contributor to CAPIs. Polypharmacy is a common practice in elders and is associated with multimorbidity and adverse outcomes including mortality, falls, adverse drug reactions, increased length of stay in hospital and readmission to hospital soon after discharge (Galvão and Püschel, 2012). Additional newly revealed risk factors that contribute to CAPIs are poor albumin levels, RDW, systolic blood pressure, and poor intestinal function. Our results also suggest new locations for the development of CAPIS, namely in the buttocks (56.9%), sacrum (11.8%), ankle (10.8%), trochanter (5.1%), and leg (3.9%), limiting mobility. Findings support a previous study that found a strong negative relationship between low scores for daily activities and high rate of CAPIs (Friedman et al., 2019).

New tissue descriptions associated with CAPIs in this study were necrotic, serotic, bloody, granolithic, epithelial, and infected. This new information can facilitate the ability of nurses to detect and manage PIs in the community. The increase in life expectancy and the expected growth of the elderly population calls for exploiting data from various sources and healthcare facilities, as performed in this research project, to improve the quality of care for the elderly in long-term care settings, while reducing costs.

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Nursing informatics, which integrates nursing science with analytical science, can identify patients at risk, and manage and communicate data in evolving healthcare systems. This project demonstrated that information about patients from nursing homes, gathered during hospital admissions, can prevent morbidity and complications in elderly people. The integration of data between hospital and community settings becomes ever more crucial, especially with the trend to shorter hospitalizations and the provision of more care in the community. Without targeted efforts to prevent CAPIs, there is a risk of repeated cycles of deterioration and readmission.

We recommend informing clinical practice in community care, based on this big data analysis of high-quality evidence from hospitals, which prioritize the prevention of CAPIs in the elderly. Community settings for the elderly have long been alerted to the need to provide safer care to patients through proactive diagnosis and treatment (Galvão and Püschel, 2012). The exclusion of 46.6% of records due to incomplete skin assessments represents a potential limitation. While baseline comparisons suggest that the missing data were random, future studies should emphasize complete documentation to minimize data loss and reduce potential biases. Although big data offers powerful tools for identifying patterns and generating insights, challenges such as data quality, missing data, and computational complexities must be addressed.

Study Limitations

The big data utilized in this study were obtained from two Israeli medical centers limiting generalizations and calls for repetition. Also, patterns of CAPIs may differ across geographic areas (rural/urban) as well as across healthcare facilities that differ in size, resources and patient populations. The exclusion of 46.6% of records due to incomplete skin assessments also represents a potential limitation. While our analysis of baseline characteristics suggests that the missing data was random, we cannot completely rule out selection bias. Future studies should emphasize complete documentation of skin assessments to minimize missing data and should consider employing multiple imputation methods when appropriate

Future Studies

Future research should incorporate multi-center studies incorporating a broader range of hospital types and geographical locations to validate our findings across different settings and patient populations, to improve generalizability and reduce biases stemming from single-institution studies. As the healthcare landscape evolves, the insights from this study underscore the pivotal role of data-driven strategies to implement VBHC by preventing CAPIs, enhancing patient care, minimizing

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complications, saving costs and optimizing resource utilization in hospitals and community care (Deckro et al., 2021; Jull et al., 2016). Future studies should emphasize complete documentation of skin assessments to minimize missing data and should consider employing multiple imputation methods when appropriate.

Future studies can investigate the implementation of VBHC in other health contexts. Armed with data, nurses can record, manage, and integrate effective preventive innovations, enhancing patient safety and overall care quality while reducing costs (Güler et al., 2012; Gray, 2017).

Results from this project can inform future research and implementation strategies. For example, employing predictive algorithms to identify high-risk situations can reduce readmissions and improve elderly patient outcomes. Results of this project can promote quality care and make an essential contribution to the economic and administrative aspects of community healthcare (Walker et al., 2020). Since PIs are more common at home and in nursing homes (Corbett et al., 2017; Jackson et al., 2017). Facilitated by the digital transformation, our results identify a strong hospital-community linkage, which introduces the potential for data-driven preventive measures aligning with the trend of informatics and evidence-based practices that translate data analysis to improving patient outcomes. Future studies may test the transformation of the informatics from this study into an AI based App for community care of PIs (Benevides et al., 2016; Flaks-Manov et al., 2019; Peltonen et al., 2019).

Future studies may introduced various applications (Apps) for the prevention and treatment of PIs in nursing homes classifying PIs through image processing on mobile devices (Shortliffe and Sepúlveda, 2018). The user uploads a photograph of the PI into the App, and the image will then be processed to evaluate the probable stage of the PI based on an implemented algorithm, which will then suggest cleaning procedures and provides the recommended treatment for the tissue type (Salomé and Ferreira, 2018).

CONCLUSIONS

As health systems endeavor to enhance care quality while reducing costs, addressing and preventing CAPIs becomes ever more imperative. This study raises awareness of data-intensive analysis and knowledge-based management in both hospital and community settings. The shifting landscape of patient care, with a trend towards shorter hospitalizations and increased community care, emphasizes the need to integrate information seamlessly between these settings. Our study advocates for the development of proactive measures to prevent CAPIs and encourages routine PI assessments in the community. The identification of new indicators associated with CAPIs provides a foundation for

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targeted interventions. Managers are encouraged to prioritize the integration of these indicators into routine assessments, leveraging continuous data quantification for timely identification and prediction of PIs. Our findings align with those of other studies on PIs in hospitals, thereby emphasizing the value of routinely collecting and assessing data, identifying patients at high-risk of PIs, and providing information for performance improvement.

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UNLOCKING THE POTENTIAL OF THE DIGITAL TRANSFORMATION FOR IMPROVING PATIENT SATISFACTION IN EMERGENCY DEPARTMENTS WITHIN THE PATIENT CENTERED CARE STRATEGY

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ABSTRACT

Pay-for-performance health plans monitor patient satisfaction, making it a crucial factor in the competition among hospitals providing value-based care (VBHC). Communication between providers and patients in the emergency department (ED) remains a significant barrier to patient satisfaction. Several factors contribute to decreased patient satisfaction in the ED, including a lack of human connection, limited control over the situation, low health literacy, insufficient information, and inadequate support during uncertainty which all impact the perceived quality of care. Poor communication in the ED jeopardizes hospital reputations but also reduces financial incentives. The study sample included 112 individuals from the greater New York area who had visited an ED within the past year. A conjoint-based experimental design was employed, with satisfaction as the dependent variable. The independent variables consisted of six categories, each with six messages reflecting recognized aspects of provider communication. Respondents rated the extent to which messages would influence their satisfaction. Regression analyses revealed no significant differences across the total sample. However, k-means clustering, used to identify response pattern similarities, uncovered three distinct patient mindsets. ANOVA and post hoc Tukey tests confirmed significant differences among these mindsets. Notably, strong drivers of satisfaction for one group were irrelevant to others. To bridge research and practice, we developed a predictive algorithm—enabled by digital transformation—that allows providers to detect a patient's mindset and tailor communication accordingly. By using mindset-specific messaging, ED providers can enhance patient satisfaction and ED experience.

Keywords: Communication; Conjoint; Emergency department; Experimental design; Health providers; Mindset segmentation; Patient satisfaction; Ordinary least regression; Algorithms

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INTRODUCTION

Pay-for-performance health plans monitor patient satisfaction, making the subjective measure of patient satisfaction an increasingly important component of competition among hospitals by the value-based strategy (Teisberg et al., 2020). It is, therefore, essential to consider the patients' perspectives regarding drivers of satisfaction with communication (Bagnasco et al., 2020). This study sought to better understand the preferences of patients regarding communication with providers in the emergency department (ED) to identify verbal messages that meet patient preferences, as a necessary step in promoting patient satisfaction with communication of ED providers.

Patient satisfaction is associated with benefits of patient collaboration, adherence and improved clinical outcomes (Gabay, 2019). Patients arriving at the ED experience a sudden change in their routine perhaps evoking anxiety and fear (Blackburn et al. 2019). Communication with patients is an overarching category of patient satisfaction in the ED. Improvement in satisfaction scores of patients yields significant financial incentives and reimbursements for the hospitals (Oh, 2022; Abidova et al., 2024). Positive interpersonal communication that encourages questions and health literacy, creates a human connection, demonstrated by respect in non-verbal language, confidentiality, honesty, compassion, reliability and accountability (Gabay, 2019). Poor interpersonal exchanges between patients and ED providers entails a bad bedside manner, lack of listening, provoking anxiety, condescending and lacking empathy, creating negative feelings and experiences of objectification, all negatively affecting perceived quality of care, lengthening the hospitalization and exceling costs. (AwadAllah et al., 2024; Toumbs et al., 2019).

Studies associated poor communication with lack of human connection, lack of control over the situation, low health literacy, deficient information, lack of support at a time of uncertainty, frustration, and dissatisfaction of patients with ED care (Al Owad et al., 2022; Lawrence et al., 2018). Research indicates that a third of the complaints regarding visits to the ED involved poor communication of providers with patients, regardless of socio demographics (Al Owad et al., 2022; Lawrence et al., 2018). Dissatisfaction with communication of ED providers may increase the risk for adverse health outcomes and therefore, communication at the ED remains an acknowledged barrier to optimal patient care at the ED (Blackburn et al., 2019; Janerka et al., 2024; Orcajada et al., 2020).

Overcoming the communication barrier at the ED will lead to better patient understanding, trust, satisfaction, and improved outcomes (Lee et al., 2020). Effective communication alleviates the frustration patients experience due to long waiting times (Lee et al., 2020). Although ED providers spend more than two thirds of the time on patient-provider encounters, only a minority of them

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communicate in a manner that meets the emotional and psychological needs of patients (Altamirano et al., 2021). Despite much evidence regarding the centrality of communication to patient experience, health outcomes, and providers' wellness, to date, communication is an underutilized asset (Fosnot et al., 2021).

Known drivers of patient satisfaction with communication of ED providers are: Interpersonal skills, comfort, bedside manner, encouragement to ask questions, avoiding jargon-free language, sufficient information provided to patients, and clarity about the role of different providers (Abolfotouh et al., 2017; Blackburn et al., 2019; Kazimi et al., 2020; Oh, 2022). In virtual communication of patients and providers, motivation, ability, and market opportunity were the strongest antecedents of satisfaction (Matysiewicz & Smyczek, 2013). Despite the knowledge on these drivers of patient satisfaction with communication, to date, their implementation in communication at the ED is challenging and unsuccessful (Musey et al., 2018; Musso et al., 2015). The theoretical anchor of the study is the patient-centered care strategy.

Patient-Centered Care

Patient-centered care (PCC) strategy is the preferred approach for delivery of care (Iyamu et al., 2023; National Health Council, 2019). PCC is defined as care that fundamentally responds to individual patient preferences, wishes, needs, and values, ensuring that patient values direct decisions (Tieu & Matthews, 2024). This strategy was proven to reduce costs while improving clinical outcomes, patient experiences, and provider experiences (Iyamu et al., 2023; National Health Council, 2019). Delivery of the PCC stresses the patient-provider relationship and achieves the outcomes that are most important to patients engaging them in managing their health (Biddle Gibson, & Evans, 2021; Carman et al.,2015). Providers are encouraged to facilitate PCC when interacting with patients by helping them become knowledgeable regarding their illnesses, express their expectations, and share decision-making (Zhao et al., 2024). PCC is fully consistent with population health management, which improves the health of the whole population (Hemphill et al., 2020; Kelders et al., 2020). Therefore, implementing PCC is a high priority for hospitals but hospitals are far from achieving PCC (Gabay et al., 2022). Acknowledged barriers to achieving PCC are lack of knowledge on integrating PCC into practice, deficient skills of providers, and professional burnout (Gabay et al., 2022; Gabay, 2024; Locatelli et al., 2015).

The current study

This study sought to better understand the preferences of patients regarding communication with ED

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providers to identify verbal messages that meet patient preferences, as a necessary step in promoting patient satisfaction with communication of ED providers and PCC implementation (Chang et al., 2016). Studies on specific verbal messages that providers may use when communicating with patients at the ED to promote their satisfaction, are scant (Abolfotouh et al., 2017; Oh, 2022). Responding to previous calls, this study demonstrates the implementation of PCC by focusing on patients' perspectives regarding drivers of satisfaction with communication with ED providers focusing on personal, emotional and psychological needs in addition to clinical care (Patil, 2024; Wang et al., 2024). This study sought to start to fill the gap in the state-of-the-art by testing specific messages that ED providers may use in their interactions with patients to promote patient satisfaction with communication of ED providers (Blackburn et al, 2019; Gabay, 2019; Wang et al., 2024). The research question was: "Which verbal messages drive patient satisfaction with the communication of ED providers?"

MATERIALS AND METHODS

Upon participation in this online study participants signed an informed-consent form for both participation and publication. Participants were informed that they could stop their participation in this online study at any time.

Sample and Setting

The sample comprised 112 American respondents, ages 18–80 with 58 females and 54 males from the New York greater area. This sample size is consistent with the suggested sample size in conjoint analysis studies, particularly when aiming at stability of coefficients rather than stability of means and standard deviations (Green et al., 1988; Green, & Rao, 1971; Moskowitz, 1997). Inclusion criteria were people 18 and over who visited the ED in a tertiary hospital at least once in the past year. Visits to the ED in a tertiary ED are memorable and people relate to them with specificity (Gabay, 2019). However, we limited the range of time so memories from the visit are still fresh and there is a potential of exploring variances by visit frequency. Luc.id, Inc., a panel provider, invited respondents who met the inclusion criteria to participate, incentivized them and rerouted them to an online study on communication in ED. Table 1 presents the sample demographics.

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Total Sample (n)		112
Gender	Male	48%
	Female	52%
Age	18-29	19%
	30-39	18%
	40-49	17%
	50-59	16%
	60-69	23%
	70-79	6%
	80+	1%
Race	White	81%
	Black/African American	9%
	Hispanic	5%
	Native American	1%
	Asian	4%
Marital status	Married	47%
	Divorced	21%
	Never Married	27%
	Widow/Widower	5%
	High school or equivalent	32%
	Some college	21%
	Associate Degree	13%
	Bachelor's degree	24%
	Graduate Degree	11%
How many people in your household including yourself?	1	30%
	2	33%
	3	10%
	4	16%
	5 or more	11%
What is the setting of where you live?	City/Urban	35%
	Suburban/Rural	65%
Approximately how many visits to an Emergency Department have you had in the past year?	1-2	49%
	3-4	27%
	5-6	14%
	>6	10%

Table 1. Demographics of the Sample

Procedure

Since our reality is complex, encompassing many stimuli that may interact with one another, we

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utilized a conjoint-based experimental design well acknowledged in both academia and industry for uncovering the power of messages in a great variety of topics (Kirk, 2012; Gere et al., 2019; Gere et al., 2021). A computerized platform for this experimental design allocated participants to different groups using repeated measures, where the same participants took part in each condition of each of the independent variables (within groups, or within-subjects design) (Gere et al., 2019; Gere et al., 2012; Kirk, 2012). Participants rated a series of different combinations of messages with the same rating question. Participants were repeatedly exposed to the same question, in relation to different aspects of communication with ED providers (Kirk, 2012). The experimental design enabled, compared to typical observational studies, higher variation, randomization, analysis of co-variance and control reducing biases (Kirk, 2012). The conjoint-based experimental design uncovered the power of specific messages as drivers of patient satisfaction with communication exchanges with ED providers. Numerous messages were tested with no limitation of degrees of freedom (Gofman & Moskowitz, 2010).

Instrument

The dependent variable was 'satisfaction with provider-patient communication at the ED'. The independent variables were six categories of acknowledged communication elements of patient-centered care that drive patient satisfaction with communication of providers (Gabay et al., 2019a; Shankar et al., 2014). The independent variables, categories in the conjoint analysis, were empathy, comfort, and bedside manner; providing sufficient information to patients; interpersonal skills of providers; encouragement to ask questions, avoiding use of jargon-free language and presenting the different roles and responsibilities of different providers (Limbourn, & Celenza, 2011; McCarthy et al., 2011; Kazimi et al., 2020). Each category contained six messages, strictly one from each category, for a total of thirty-six different messages. Messages were identified by a thorough literature search on independent variables from previously published studies on patient expectations from communication with providers (Gabay, 2019; Gabay, 2021; Gabay et al., 2019b). Participants were instructed to rate the combination as a unity (Green, & Rao, 1971; Gofman, & Moskowitz, 2010). The rating question was: "To what extent would the following combination of messages drive your satisfaction with communication of ED providers?" The dependent variable was rated on a scale ranging from 1 (Does not at all drive my satisfaction) to 9 (Strongly drives my satisfaction). The order of the combinations of messages was dictated by the well-crafted mathematical method underlying the conjoint-experimental design, which structured the 48 combinations to ensure statistical independence of the predictor variables for subsequent regression at both the group level and the individual level (Green et al., 1988; Green, & Rao, 1971; Gofman, & Moskowitz, 2010). Table 2 presents the study instrument.

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Category A: Empathy		Category D: Comfort	
A1	Providers care about me as a person	D1	Providers make efforts to minimize my wait
A2	Providers are concerned about my comfort	D2	Providers allow family & friends to sit with me
A3	Providers ask about my condition	D3	Providers move me through the process as quickly as possible
A4	Providers are courteous when they take my information	D4	Providers move me quickly to the treatment area
A5	Providers monitor my condition	D5	Providers ensure that I am comfortable while waiting area
A6	Providers are empathic	D6	Providers see me quickly after my arrival
Category B: Provide Information		Category E: Encouraging questions, Avoiding Jargon and Role Clarity	
B1	Providers keep me informed	E1	Providers refrain from using medical jargon
B2	Providers are clear	E2	Providers maintain a calm and quiet setting
B3	Providers explain things to me	E3	Even from the start...I always know the role of the Provider
B4	Providers keep my family informed	E4	Providers treat me gently during exam
B5	Providers keep me informed about delays	E5	Providers are experienced making me comfortable about procedures
B6	Providers provide me with concise written discharge instructions	E6	Providers encourage me to ask questions
Category C: Interpersonal skills		Category F: Bedside Manner	
C1	Providers carefully listen to me	F1	Providers are courteous to my family and friends
C2	Providers addresses my needs	F2	Providers are attentive even in long waiting times
C3	Providers are discreet...respect my privacy	F3	Providers address my physical AND mental states
C4	Providers show interest in me as a person	F4	Providers guarantee the privacy of my personal information
C5	Providers pay attention to pain control	F5	Providers are compassionate
C6	Providers respond patiently and promptly	F6	Providers are there to help me

Table 2. Six categories and six messages in each comprising the instrument

Data Analysis

The experimental design enabled the deconstruction of responses to the messages by ordinary least-squares regression (OLS) (Green, & Rao, 1971; Gofman, & Moskowitz, 2010). With 112 respondents each rating 48 vignettes, we created 4032 models for satisfaction with communication were created using OLS, one for each respondent, each with both an additive constant and 48 coefficients, one coefficient for each message. OLS was run for the entire panel, incorporating all relevant data into one model for the sample. Messages with positive coefficients drive satisfaction and negative coefficients mean either that the message is neutral (irrelevant for satisfaction) or counterproductive, driving dissatisfaction. The high additive constant (85) suggests that patients view the topic of satisfaction with communication of ED providers as important. Table 2 indicates no significant coefficients across all messages, and no variability by demographics or number of ED visits. Table 3 presents analysis results.

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Message By Descending Part Worth Contribution	Coefficient	Standard Error	T statistic	p-Value
Additive constant	85	4.0	21	0.0
Experienced clinicians so you are comfortable	2.5	1.9	1.3	0.2
Clinicians reframe from using medical jargon	2.3	1.9	1.2	0.2
clinicians ask about your condition	2.3	1.9	1.2	0.2
Clinicians see me quickly after my arrival	2.2	1.9	1.1	0.3
Clinicians explain things to me	2.1	1.0	1.1	0.3
Clinicians guarantee privacy of personal information	2.0	1.0	1.0	0.3
Clinicians treat me gently during exam	1.9	1.2	1.0	0.3
Clinicians are concerned about my comfort	1.3	2.0	0.6	0.5
Clinicians assure I am comfortable	1.1	2.0	0.6	0.6
Clinicians are compassionate	1.1	2.0	0.6	0.6
Clinicians allow family and friends to sit with me	1.1	1.9	0.6	0.6
Clinicians move me quickly to the treatment area	1.0	1.9	0.5	0.6
Clinicians are clear	0.9	2.0	0.5	0.6
Clinicians care about me as a person	0.9	2.0	0.5	0.7
Clinicians make efforts to minimize my wait	0.6	1.9	0.3	0.8
Clinicians are empathic	0.6	2.0	0.3	0.8
Clinicians keep me informed about delays	0.5	2.0	0.2	0.8
Clinicians carefully listen...show interest in me	0.4	2.0	0.2	0.8
Clinicians maintain a calm and quiet setting	0.1	2.0	0.1	1.0
Clinicians encourage me to ask questions	-0.3	1.9	-0.2	0.9
Clinicians are helpful	-0.3	2.0	-0.2	0.9
Clinicians are clear	-0.4	2.0	-0.2	0.9
Clinician addresses both my physical & mental states	-0.4	2.0	-0.2	0.8
Clinicians keep me informed	-0.5	2.0	-0.3	0.8
Clinicians address my needs	-0.5	2.0	-0.3	0.8
Family and friends are kept informed of the care plan	-0.7	2.0	-0.3	0.7
Clinicians are courteous	-0.8	2.0	-0.4	0.7
Even from the start... I always know the role of the clinician in my room	-1.1	2.0	-0.5	0.6
Clinicians carefully attend to pain control	-1.1	2.0	-0.5	0.6
I know clinicians are there to help me	-1.4	2.0	-0.7	0.5
Clinicians are courteous with my family and friends	-1.5	1.9	-0.8	0.4
Clinicians are discreet...respect my privacy	-1.5	2.0	-0.8	0.4
Clinicians provide me with clear and concise written discharge instructions	-1.6	2.0	-0.8	0.4
Clinicians are courteous when taking my personal information	-2.1	2.0	-1.1	0.3
Clinicians respond patiently and promptly	-2.7	2.0	-1.4	0.2
Clinicians are attentive even in cases of long waiting times	-3.2	2.0	-1.6	0.1

Table 3. The Power of all 36 Messages Driving Patient Satisfaction in the Total Sample

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K-means mathematical clustering was applied on the 48 coefficients to create clusters (Hastie, Tibshirani, & Friedman, 2001). Three mindsets emerged from the commonality in response patterns to each message (Milligan, 1981). ANOVA coupled with Tukey post-hoc test indicated that differences among the mindsets are significant, highlighting the different messages that drive satisfaction with communication for patients in each mindset. The pattern of positive high coefficients across mindsets guided the assignment of respondents to mindsets. The three distinct mindsets transcend socioeconomics and visit frequency. Table 4 presents strong drivers of satisfaction with communication of ED providers for each mindset.

	MMS 1	MM S2	MS 3
Base size	38	38	36
Additive constant	44	56	29
Segment 1 – They pay attention to me and make me feel comfortable			
Clinicians carefully listen...show interest in me as a person	8	0	5
Clinicians allow family and friends to sit with me	6	-7	-1
Segment 2 They control my pain and respect my privacy			
Clinicians carefully attend to pain control	0	0	8
Clinicians are discreet...respect my privacy	-1	-2	7
Segment 3 – They know what they are doing, and are professional about it			
Clinicians explain things to me	2	6	-3
Even from the start... I always know the role of the clinician in my room	-7	9	0
Clinicians are compassionate	1	6	-4
Clinicians keep me informed	2	6	-4
Clinicians are concerned about my comfort	4	6	-6

Table 4. Mindset-segmentation (MS) for Satisfaction with communication of ED Providers ($p<0.05$)

Next, since the three mindsets are distributed across the population, to link the research to practice, a predictive algorithm was required to identify the mindset-belonging of individuals in the population to a mindset in the sample. Figure 1 presents the algorithm.

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DRIVERS OF SATISFACTION WITH COMUNICATION of ED PROVIDERS		
Question 1: The provider carefully listens, treats me as a person	o	Agree
	o	Disagree
Question 3: The clinician is compassionate	o	Agree
	o	Disagree
Question 4: The clinician attends to my pain	o	Agree
	o	Disagree
Question 5: From the start I know the role of the clinician in my room	o	Agree
	o	Disagree
Question 6: Clinician is discreet, respects my privacy	o	Agree
	o	Disagree

Figure 1. Personal Viewpoint Identifier Tool to Assign Patients at the ED to Mindset

DISCUSSION

This study tested drivers of patient satisfaction with verbal communication of ED providers making several contributions. Theoretically, clustering by the similarity in patients' patterns of response to messages is a novel strategy which revealed three distinct mindsets representing what drives patient satisfaction by mindset-belonging. Methodologically, this study used a conjoint-based experimental design, overcoming the typical biases of surveys, simultaneously testing various messages to reflect the complexity in our reality. The contribution to practice is its link to research presenting PCC implementation. The web-based predictive algorithm we developed enables ED providers to quickly detect the mindset-belonging of each ED patient and communicate using mindset-tailored messaging underscoring the power of digital transformations in removing barriers to patient satisfaction. Communicating by patient mindset can enable ED providers to implement PCC, despite existing barriers (Biddle Gibson, & Evans, 2021; Iyamu et al., 2023; National Health Council, 2019; Tieu & Matthews, 2024; Zhao et al., 2024).

Findings indicate that patients have different response patterns to different communication messages of ED providers, contradicting findings of prior studies where patient satisfaction was viewed as influenced by patient sociocultural, psychosocial, and disease-related characteristics. Our findings suggest that the traditional segmentation by 'who people are' is insufficient for an in-depth understanding of drivers of patient satisfaction. Thus, using the same messages for all patients doesn't promote satisfaction. To promote patient satisfaction, communication should be accorded to mindset-

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belonging, highlighting a few messages with each patient throughout the ED visit (Patil, 2024; Wang et al., 2024). This study sought to start to fill the gap in the state-of-the-art by testing specific messages that ED providers may use in their interactions with patients to promote patient satisfaction with communication of ED providers (Blackburn et al, 2019; Gabay, 2019; Wang et al., 2024).

Patients belonging to mindset 1 (34%) seek an acknowledgement that they are experiencing a crisis, by active listening of providers. Patients belonging to mindset 2 (34%) need information and explanations about their illness and the treatment process, they also need privacy regarding personal information and seek physical privacy. These patients need providers to carefully listen to them, acknowledge them as individuals and enable them to feel comfortable. This finding supports previous findings on the importance of acknowledging the patient visiting the ED as experiencing a time of uncertainty, perhaps a crisis, and communication should aim at enhancing patient wellbeing (Oh, 2022; Johnsson et al., 2018; Gabay, 2015; 2021).

Patients belonging to mindset 3 (32%) seek empathy and anxiety alleviation. Ineffective messages fall under the category of 'what patients should know (e.g., "we are here for you"; "waiting times are long") rather than reflect the experience of the patient ("acknowledgment of crisis", understanding patients' emotional needs"). These patients need providers to alleviate their anxiety, clarify their role and responsibility, allow family or friends to sit with them, and respect their physical privacy. Messages that were strong drivers of satisfaction were: "The providers carefully listened, showed interest in me as a person"; "From the start I knew what the role of the provider in my room was"; and "providers attended to pain control." This finding echoes a previous study claiming that content-oriented messages do not promote satisfaction, compared to process-oriented messages that were found to be a 'make or break' in patient satisfaction (Gabay, 2015; 2016).

Using communication by mindsets, providers may improve patient satisfaction regardless of the setting, the diagnosis, or the demographics (Abidova et al., 2024; Hemphill et al., 2020; Kelders et al., 2020; Oh, 2022). Using a few targeted mindset-tailored messages, may improve the perceived quality of ED care in a chaotic work environment for providers who find communication as challenging (Lawrence et al., 2018; Nilsson, Edvardsson, & Rushton, 2019). The web-based predictive algorithm connects research and ED practice, assigning patients into a mindset and communicating through targeted mindset-tailored messages to promote patient satisfaction (Silvera-Tawil et al., 2018). This innovative approach calls upon leaders to adopt an empowering leadership style, provide job autonomy and establish an organizational climate that spurs initiative in work processes (Hassi, Rohlfer & Jebsen, 2022). Healthcare leaders are therefore called upon to invest in middle managers

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who will build and cultivate an organizational climate that supports innovative methods (Hassi, Rohlfer & Jebsen, 2022).

Limitations

The novelty of this study is not without limitations. Responses may carry a self-selected bias and the geographic area from which respondents were recruited may limit the generalization to other countries. Last, it is also possible that the association between satisfaction and communication messaging is affected by other aspects of respondents' visits to the ED.

Future Studies

Future studies may explore the fit of messages as culturally grounded for shaping communication with patients by distinct chronic illnesses and replicate this research illuminating opportunities for VBHC implementation.

CONCLUSIONS

This study demonstrates that targeted communication messaging by mindset is a means to implement PCC and raise patient satisfaction with communication with ED providers. Understanding the drivers of satisfaction and the different preferences of patient in each mindset regarding communication with ED providers is essential to promoting patient satisfaction. Providers are called upon to use the algorithm by asking the right few questions, identifying the mindset-belonging of each patient in the sample, and accord the appropriate communication messages with patients of each mindset in their ED visits. This novel approach of mindset-tailored messaging is made possible by the current digital transformation, as algorithms can facilitate improved, scalable communication, bridging the gap between bio-clinical care and psycho-social care.

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BIBLIOMETRIC ANALYSIS: THE ENVIRONMENTAL PERFORMANCE OF THE ORGANIZATION AND THE GREEN BEHAVIOR OF EMPLOYEES

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ABSTRACT

This paper contains the results of a bibliometric analysis of references and literature correlations in order to conduct a detailed, systematic analysis of the literature on the role of human resource management in shaping green behavior and green consciousness of employees and the environmental performance of an organization. The results of this analysis led to the identification of a sample of 105 publications. Their initial selection from the Scopus database and their processing using the VOSviewer algorithm, Bibliometrix and then content analysis led to the establishment of key distinct areas of research and the identification of directions for future research.

The results of the bibliometric analysis show a growing interest in green HRM and environmental performance, with a significant increase in publications between 2009 and 2024. Six key thematic areas were identified, including environmental management, sustainable development and innovative practices. The data highlights the importance of collaboration between authors and institutions, with a high proportion of international collaborations in publications. Green employee behavior emerges as a central factor in improving the environmental performance of organizations. Keyword analysis demonstrates the increasing importance of terms such as "green behavior" and "green consciousness" in the relevant literature. The thematic clusters reveal the need to shape responsible attitudes and actions through educational initiatives and organizational culture, highlighting prospects for further research.

Keywords: human resource, Green Behavior, Green Consciousness, Environmental Performance; bibliometric analysis

INTRODUCTION

The purpose of this article is to organize and synthesize knowledge about the role of human resource management (HRM) in shaping green employee behavior and environmental awareness, as well as its impact on the environmental performance of organizations. To achieve this, the study conducts a

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comprehensive bibliometric analysis of relevant literature, aiming to identify key trends, influential publications, and future research directions.

Green human resource management (GHRM) is a component of sustainable management, incorporating practices related to environmental protection (Bangwal & Tiwari, 2015; Howard-Grenville et al., 2014; Ansari et al., 2020; Gilal & Channa, 2019). Although this concept is relatively new, there is a growing body of research on the subject worldwide (Renwick et al., 2013; Ren et al., 2018; Jackson et al., 2011). Recent developments—such as climate change and the COVID-19 pandemic—suggest that green initiatives will become essential for businesses (Mishra et al., 2011; Yong et al., 2019; Alqudah et al., 2021; European Commission, 2022). GHRM combines elements from the social, physical, and technical sciences (Geetha & Sammanasu, 2020; Taamneh, 2019). It plays an important role in strategic management and the integration of sustainable practices into organizational processes (Ren et al., 2018; Saeed et al., 2019). These approaches formulate a technological, environmental, and strategic framework that promotes sustainability and environmental responsibility (Yong et al., 2020).

According to the literature, GHRM refers to systematic, planned adaptations of HR practices to support an organization's environmental goals (Alqudah et al., 2021). Wangs et al. (2019) emphasize that these practices reinforce pro-environmental behavior from the individual to the organizational level. Moreover, employee participation, awareness, and skills are critical for the success of green initiatives (Chaudhary, 2020; Elrehail, 2024).

Implementing GHRM can provide organizations with several benefits, including cost savings and talent retention (Fartza et al., 2021). In this context, green HRM is the process through which organizations adopt environmentally friendly practices in collaboration with their people (Mayeed et al., 2019). Organizations undertake such initiatives both to achieve internal HR goals and to contribute to the broader goal of environmental sustainability (Patil & Sarode, 2018; Nawangsari & Sutawidjaya, 2018). Among the various research trends in GHRM, one prominent focus is on individual employees, aiming to shape their ecological sensitivity, create green work environments, and promote sustainable behaviors—often extending into their private lives (Zoogah, 2011; Renwick et al., 2013; Cherian & Jacob, 2012). Employee behavior, knowledge, and awareness play a decisive role in shaping an organization's environmental performance (Gonzalez-Benito, 2004; Alghamdi, 2021).

However, despite growing interest, the field remains fragmented, with previous reviews often focusing broadly on GHRM rather than specifically on its role in shaping green behavior and performance (Jackson et al., 2011; Taamneh, 2018; Pham et al., 2019). Many of these reviews are qualitative and potentially biased in terms of sample and journal selection (Briner & Denyer, 2012).

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This study addresses that limitation by using a bibliometric approach, which minimizes subjectivity and ensures greater objectivity in identifying key patterns in the literature.

The following research questions guide the present study:

1. What are the key publications, journals, and authors in research on HRM, green behavior and awareness, and environmental performance?
2. What is the structure of the recent literature on the role of HRM in shaping green behavior and environmental performance?
3. What future research directions are suggested in the literature regarding HRM's role in green employee behavior and organizational sustainability?

2. METHODOLOGY OF BIBLIOMETRIC ANALYSIS

The literature review is a key tool used to manage the diversity of knowledge on a particular scientific subject. The literature review aims to allow the researcher to both map and evaluate existing research and to identify research questions in the specific scientific subject (Chaudhuri, 2023). Five main methods of bibliometric analysis can be distinguished: citation analysis, collaborative citation analysis, bibliographic coupling, word co-occurrence analysis, and author collaboration analysis (Zupic and Kater , 2015) (Millidonis, 2024). Citation analysis is often presented in the form of a list of the most influential authors, journals, articles, institutions, etc. It provides information about influence but is not able to identify relationship networks. Relationship networks can be identified through collaborative citation analysis and literature coupling. These methods are used to illustrate the foundations of a research field and detect future trends. More specifically, the process starts with the selection of the database which goes through a common workflow to search and export bibliographic collections. The procedure concerns three steps. The first is to write and submit a query, the next one refine search results and the last one export search results.

2.1 Procedure

In the data sample selection process, the analysis for the review started from a broad set, which was then gradually narrowed down. The main data source was the Scopus database, an online database containing the most important reputable international journals and other publications in various scientific disciplines around the world. The search was conducted in August 2024 and the final date of data collection from the Scopus database is 8/9/2024. A key stage of the systematic search is the formulation of conceptual boundaries to be used for searching studies in the database. The search process was based on a binary data type and logical operations: AND which returns True only if both conditions are true, OR which returns True if at least one of the conditions is true.

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2.2 Data

Table 1 details the keyword search process using logical operations.

Database (Data source)	Scopus
Search within	Article Title, Abstract, Keywords
Search documents* Query	"HUMAN RESOURCES" AND "ENVIRONMENTAL PERFORMANCE" AND "BEHAVIOUR"
Document Type	Exclude "Review" "Conference Paper"
Source Type	Journal, Book, Book Series
Publication Phase	Final, Article in Press
Language	Exclude "Portuguese" "Spanish" "French"
Time span	None

Table 1. Selection criteria applied to the database

The search results were saved in various formats to be compatible with bibliometric programs and include all relevant information about the article, such as the title, authors names and affiliations, abstract, keywords and bibliographies. It is worth noting that the bibliometrics algorithm requires a minimum set of mandatory metadata and the algorithm creators recommend all option metadata fields to be sure you can perform all the analysis implemented in bibliometrics.

3. RESULTS AND DISCUSSION

It is worth noting that no filter has been applied to the search regarding the time period (Timespan). However, the database created includes the 2009 publication as the first research. So the period of coverage period is longer than a decade and corresponds to a period where the importance of sustainability and environmental performance is constantly increasing and in particular with the Copenhagen conference (COP 15) in 2009 a critical moment for climate negotiations, which although not leading to a binding agreement, brought climate change to the center of international policy and business strategies. The final point of the search is linked to the effort to include the most recent academic publications to enhance the value of the study.

3.1 Evolution over time and trend

An analysis of the evolution of research over time shows increasing research interest. The first research appeared in 2009. Until 2014, the subject shows no significant increase in research. Only from 2019 the number rises to 7 publications in the Scopus database, in 2020 - 10 publications, 2021 - 11, 2022 - 18, 2023 - 27 and in the eight months of 2024 - 25 publications. According to the publication trend during the period 2009-2024, after an initial phase of relative stagnation from 2009 to 2016, the trend of interest in the subject started to increase. In the aforementioned period, the increase amounts to 23.94% annual growth rate. Document Average Age is 2.24 which confirms that most articles were published in the most recent period. This indicates increased interest in the topic in recent years, which justifies the

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performance of a bibliographic correlation analysis. Between 2009 and 2024 a total of 104 articles, books and book chapters were published out of a total number of 69 sources. The total number of authors is 327 and most publications are collaborative efforts since only 10 articles have authors of single-authored docs. Co-authors per doc are 3.45 and 47.12% are international co-authorships. The average citation per doc amounts to 57.54 citations per publication on average. These results were obtained by applying the Bibliometrix algorithm of RStudio. Of the total records, 94% are journal articles. More articles were published in the Journal of Cleaner Production, Sustainability Switzerland and Corporate Social Responsibility and Environmental Management.

3.2 Citations analysis

Table 2 shows the annual citations of published research in total and citable years, respectively.

Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2009	56.00	1	3.50	16
2011	255.00	1	18.21	14
2014	604.00	1	54.91	11
2015	230.00	1	23.00	10
2016	283.00	1	31.44	9
2017	64.00	1	8.00	8
2019	172.43	7	28.74	6
2020	130.70	10	26.14	5
2021	77.18	11	19.30	4
2022	35.72	18	11.91	3
2023	14.56	27	7.28	2
2024	3.72	25	3.72	1

Table 2. Annual Total Citation per Year

Nisar, Q. A., Paille, P. and Yusliza, M. are the most prolific authors. The second is also the one who has the most citations to his article published in 2014 with a total number of 604 citations and in terms of years 54.91 per year.

3.3 Analysis of key terms and topics

The following Figure 1 and Table 3 show the key terms used in the selected articles for the subject under analysis. The analysis was supported by the VOSviewer application, which creates links between the key terms. In Figure 1, lines connect different terms, and their strength indicates the number of publications in which the two terms appear together. Thicker lines indicate a stronger connection. The VOSviewer algorithm generated five significant sets of keywords, each of which represented a group of research activities and subsequent publications. The results showed that green-oriented human resource management is a generic term, allowing the identification of relevant research areas, such as environmental management and environmental sustainability.

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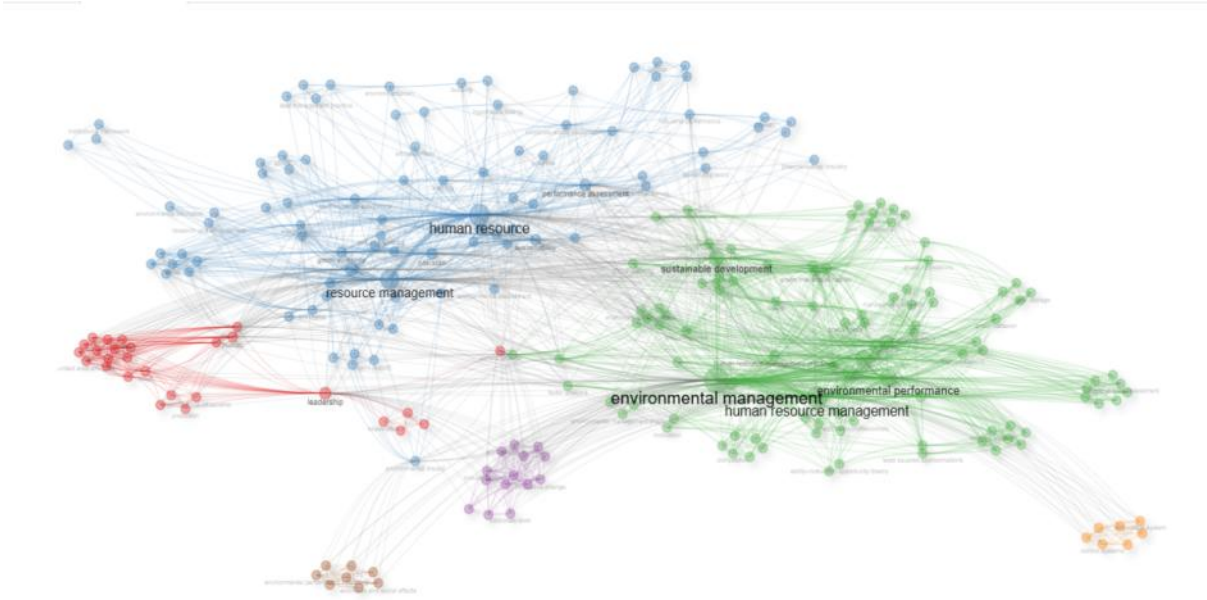


Figure 1. *Key terms network*

Term	Frequency	Year (Q1)	Year (Median)	Year (Q3)
performance assessment	7	2018	2021	2024
natural resources management	6	2020	2021	2022
personnel training	5	2021	2021	2023
environmental performance	12	2021	2022	2023
behavioral research	8	2020	2022	2023
human resources	23	2022	2023	2024
environmental management	21	2021	2023	2023
resource management	17	2023	2023	2024
green economy	7	2023	2024	2024

Table 3 Main topics

According to the results of Table 3 we distinguish older topics with consistent research, namely "Performance assessment" has a Q1 of 2018, suggesting that research on this topic started earlier compared to others, and it is still relevant, as its Q3 extends to 2024. This indicates a consistent interest over the years. The second topic is " Behavioural research" has a Q1 of 2020, showing it gained interest around that time, with a steady rise up to 2023 (Q3). This indicates recent but sustained research. Next we distinguish emerging topics with recent focus: Resource management" and "green economy" both have a Q1 of 2023, meaning these topics are very recent in the dataset. Their median and Q3 years extending into 2024 suggest that these areas are currently growing and likely to be important in the near future and “environmental management" shows consistent research starting from 2021, and its median and Q3 (both 2023) suggest it is a topic currently in its peak period. The Most Popular Topics are "Human resource" has the highest frequency (23), indicating it is the most commonly studied topic

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among those listed. Its median and Q3 extending into 2024 also suggest ongoing interest and potential for future research and "environmental management" (21 occurrences) and "resource management" (17 occurrences) are also among the top terms, reflecting significant research focus in these areas. Finally, topics with Declining or Specialized Focus: Natural resources management" has a Q1 in 2020 and a Q3 in 2022, which might suggest that it was a focal point earlier but has seen less research activity recently compared to others and "Personnel training" appears less frequently (5 times) and has its median in 2021, with activity decreasing by Q3 in 2023, which could indicate a more specialized or niche interest. Concluding, the data suggests a growing trend in research related to "human resources," "environmental management," and "green economy," reflecting contemporary concerns about sustainability and organizational efficiency. Emerging topics like "green economy" indicate increasing focus on sustainable practices, while established areas such as "performance assessment" and "human resource" continue to attract attention. The spread of the years also shows how certain topics are becoming more or less relevant over time, highlighting shifts in research priorities.

According to the analysis the network shows two major thematic clusters: one focused on sustainability, green innovations, and environmental performance and another centred around organizational practices, training, and resource management, with links to environmental practices. The blue cluster appears to be centred around sustainability and environmental topics. Keywords like "circular economy," "behavioural research," and "environmental performance" suggest a focus on sustainable practices, the evaluation of environmental impacts, and the management of resources in an eco-friendly manner. Terms such as "green innovations" and "sustainable development" also indicate that this cluster deals with strategies and innovations aimed at improving environmental management. Red cluster is focused more on human resources and organizational management. Terms like "training," "workplace," and "resource management" suggest a focus on how resources (both human and material) are managed within organizations. Connections to terms like "green economy," "climate change," and "corporate social responsibility" indicate that these topics are being approached from an organizational or business perspective, possibly exploring how companies can contribute to sustainable practices and address climate-related challenges. The network reveals that there are cross-links between environmental and management topics, suggesting an intersection between sustainability and corporate practices. For example, "environmental management" and "resource management" are connected to both environmental and organizational clusters, reflecting research that focuses on integrating sustainable practices within corporate structures. The connections between the clusters suggest that the field is moving towards a holistic approach where sustainability and organizational management are intertwined. This indicates a growing interest in integrating sustainable practices into

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traditional business and resource management frameworks, reflecting global trends in green economy and corporate responsibility.

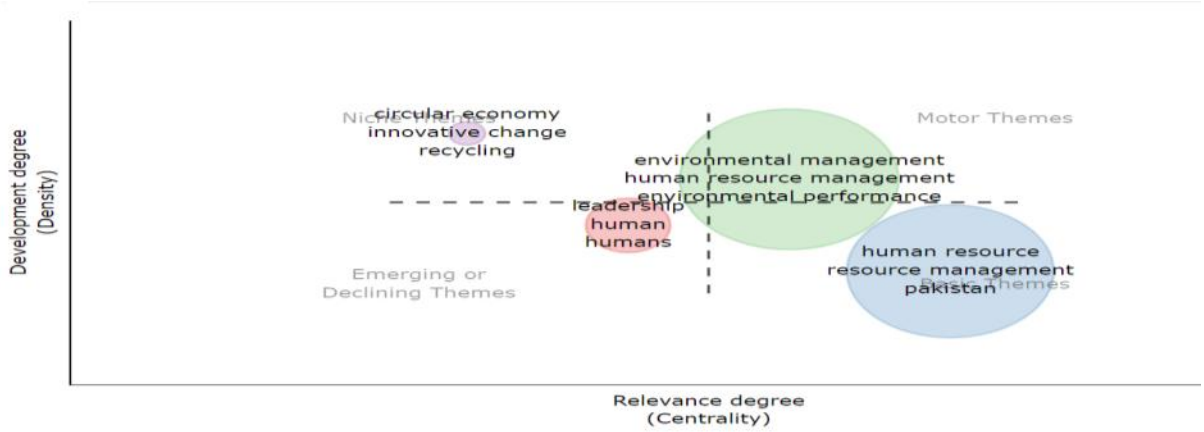


Figure 2. *Thematic Map*

Figure 2 represents a Thematic Map from bibliometric analysis that provides a clear visualization of how different research topics are positioned in terms of development (density) and relevance (centrality) and helps in understanding the structure and importance of different research themes. based on their development (density) and relevance (centrality).

1/. Themes in the upper right quadrant are motor themes which are well-developed and highly relevant. They are essential and central to the research field, and they have a strong internal structure. Green cluster includes terms like "environmental management," "human resource management," and "environmental performance" are located here, indicating that these are core themes in the research with robust development. This suggests a strong focus on integrating sustainability into management practices, particularly in organizational and resource-related contexts. Terms like "environmental performance" indicate an interest in assessing how these practices are implemented and their effectiveness. This suggests that there is extensive research focusing on how environmental practices integrate with resource and human resource management, making it a vital area of study.

2/. In the lower Right Quadrant themes are important but less developed. They are fundamental to the research area but need further exploration and development. Blue cluster with terms like "human resource," "resource management," suggests research in the area of human capital management, possibly exploring how human resources are managed, evaluated, and optimized within different organizational settings. The inclusion of "Pakistan" might indicate region-specific studies or a focus on human resources in particular geographical contexts.

3/. The themes on the upper Left Quadrant can be considered niche or focused areas of study. Purple cluster terms like "circular economy," "innovative change," and "recycling" are present here, suggesting

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specialized research on sustainable practices, innovation, and recycling. While these topics have depth and internal coherence, they are more niche and not as widely connected to other themes.

4/. Lower Left Quadrant. Themes located here are either emerging (new and under development) or declining. They have not yet become central to the research field, or they may be losing relevance. Red cluster (Leadership & Human Elements): Terms like "leadership," "human," and "humans" are found here. This suggests that these themes could be in an early stage of integration into the broader research field or may not be the primary focus of recent studies. "Leadership" being in this area might indicate the need for more exploration on how leadership integrates with other established themes.

Concluding we can note that Environmental and Resource Management are currently central and robustly developed, indicating a mature, vital area of research. This reflects a strong integration of sustainability within organizational frameworks. Topics related to human resources are essential but could benefit from further in-depth exploration to enhance their internal coherence. Circular economy, recycling, and innovation are well-developed but are treated as niche subjects, perhaps focusing on specialized studies within broader sustainability frameworks. Leadership and human elements show potential as emerging themes that could evolve and become more central with further research.

4. CONCLUSIONS

This article presents a comprehensive bibliometric analysis of the role of human resource management (HRM) in shaping employees' green behaviors and environmental awareness, as well as their impact on organizational environmental performance. The authors conducted an in-depth literature analysis using advanced tools such as VOSviewer and Bibliometrix, which allowed for the identification of key research trends and themes over the period 2009–2024.

According to the main conclusions, there is growing interest in this topic. Since 2009, the number of publications related to human resources, employee behavior, and environmental performance has increased significantly. Six main thematic clusters were identified, including including areas such as environmental management, sustainable development, and green innovations. A large proportion of the publications result from international collaborations, highlighting the global nature of the issue.

Environmentally oriented human resource management plays a crucial role in improving environmental performance and in shaping responsible attitudes among employees.

Taking into account the gaps highlighted in the bibliometric analysis, such as the lack of specific regional data or in-depth analysis of specific topics (e.g. leadership), the frequently mentioned areas of interest, such as educational initiatives and the impact on economic performance, as well as the current research trends highlighted in the analysis, future research is suggested to address:

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1. Further delving into regional differences. It would be interesting to analyze how green human resource management varies between different geographical regions, with an emphasis on cultural and economic conditions.

2. Analyzing the role of leadership. Studying the link between green leadership and environmental performance could reveal critical strategies for implementing green initiatives.

3. Determining financial impacts. Future research could examine how implementing green practices affects the financial performance of organizations.

4. Relationship between technology and green management. The use of technology and artificial intelligence for environmentally oriented human resource management is a promising field of research.

5. Evaluation of educational initiatives. Studying the effectiveness of educational programs to enhance employee green awareness and behavior could provide practical guidance to organizations.

These directions will help to further understand and enhance the contribution of HRM to sustainable development and environmental performance

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DESIGNING CURRICULA FOR THE AI-DRIVEN COMMUNICATION ERA: INDUSTRY INSIGHTS INTO COMPETENCIES, ETHICS, AND COMMUNICATION PRACTICES

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ABSTRACT

This paper explores the perceived impact of large language models (LLMs), such as ChatGPT, on professional and business communication, with a focus on the evolving competencies required in AI-supported environments. In light of rapid technological developments and the growing integration of generative AI tools, the study examines how industry professionals view the role of LLMs in reshaping communication practices and what implications this holds for higher education. Using a mixed-methods approach, the research combines data from an online survey and semi-structured interviews with experts from sectors such as IT, marketing, education, and public administration. Participants were selected based on their practical experience with AI in communication-related roles, ensuring the study is grounded in real-world perspectives. The findings highlight a set of technical, interpersonal, and ethical competencies regarded as essential for future professionals. The study also identifies sectors with high employment potential in AI-related communication and discusses ways education and industry could work together more effectively, including mentorships and applied learning opportunities. By integrating insights from both quantitative and qualitative sources, the paper contributes to current discussions on aligning academic programmes with the evolving demands of an AI-driven labour market.

Keywords: AI in Communication, Higher Education, Curriculum Design, Industry Perspectives, Professional Competencies.

INTRODUCTION

We are witnessing a digital transformation that is fundamentally reshaping the ways we live, work, and communicate. To respond to these changes, we need a skilled workforce and an education system that can adapt to new demands. Higher education should take the lead in adopting and applying new technologies. Throughout history, education has evolved alongside societal and technological changes, driven by new ideas, progress, and a commitment to inclusivity. The industrial revolution enabled wider access to knowledge through mass book production. Later, educators integrated audiovisual

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tools into teaching, followed by the introduction of computers into classrooms. In recent years, mobile learning has become increasingly relevant, making education more accessible than ever. It is clear that technology will continue to play a central role in shaping the future of education. To build an educational system that keeps pace with digital transformation and labour market needs, it is essential to design and implement innovative study programmes. In this context, generative artificial intelligence is emerging as one of the most significant drivers of change, particularly in the field of communication.

As generative AI becomes more deeply integrated into communication practices, higher education must respond by equipping students with the interdisciplinary competencies required for new, AI-supported professional roles. This study contributes to that goal by examining how emerging AI technologies are transforming the set of skills expected in communication-related fields and what implications this has for curriculum development. The main objective is to identify core technical, interpersonal, and ethical competencies relevant to these roles, based on insights from industry professionals actively engaged with AI in practice.

In the process of developing a new study programme, the goal is to align it with qualification standards and to incorporate the needs of the labour market. The initial step involves profiling the relevant sector and conducting employer surveys, followed by an analysis of labour market supply and demand. This is followed by the development of occupational standards, which define the key competencies required for a profession and form the basis of the qualification. Once the occupational standard is established, a qualification standard is created, listing the learning outcomes necessary for performing specific tasks. Finally, the study programme is developed, incorporating both programme-level learning outcomes and those related to specific qualifications. During the development of the programme proposal, it is necessary to assess its relevance in relation to labour market demands in both the public and private sectors.

In Croatia, the process of developing these standards is carried out through the Croatian Qualifications Framework (CROQF). The CROQF is a reform instrument that regulates the entire system of qualifications across all levels of education in the Republic of Croatia, based on learning outcome–oriented standards that are aligned with the needs of the labour market, individuals, and society as a whole. According to the CROQF register accessed on 27 April 2025, there were 23 occupational standards and 149 competence units listed for the Information and Communication sector, along with 4 qualification standards and 223 learning outcome sets. One additional occupational standard was under review, and six more were pending revision. Of the registered standards, only three were directly related to the Communication subsector. (CROQF, 2025)

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New educational programmes must integrate the latest knowledge and skills in the field of artificial intelligence. This paper identifies relevant sets of competencies and learning outcomes for future study programmes. It also offers guidance for updating occupational and qualification standards within the Communication subsector.

While technical faculties educate students to create future technologies, AI is also reshaping how education is delivered and how knowledge is acquired. Emerging trends point to personalized learning systems tailored to cognitive styles, learning speeds, and individual interests. Though current AI systems are not yet capable of full personalization, educators can already use AI to support task automation and lesson planning. Technology has already transformed and improved teaching methods through e-learning, flipped classroom concepts, and active learning. Today, particularly in higher education, the teaching process is enhanced by the use of on-demand webinars and customized digital textbooks. The most important factor is motivating educators to adopt and effectively use new technologies.

According to national labour market data published by the Croatian Ministry of Labour, Pension System, Family and Social Policy (accessed in April 2025), the Information and Communication sector accounts for 0.76% of the national labour force. The unemployment rate in this sector is 4.4%, significantly lower than the national average. In the Communication subsector, the rate stands at 4.93%. Employment levels are almost equal between men and women, with an overall employment rate of 95.6%. Most of the workforce in this sector is concentrated at qualification level 7 (57.36%), while the national average for the same level is only 19.72%. In terms of occupational categories, 79.97% of employees are classified as professionals and 16.54% as associate professionals. This suggests that the sector is well-positioned to absorb highly educated individuals and is aligned with the qualifications required to perform complex and knowledge-intensive roles. Further analysis shows that the Communication subsector now represents 22.88% of the overall Information and Communication sector. Since 2019, the share of Communication has increased by 10.56%. However, the education system has been slow to update its occupational and qualification standards to match these labour market trends. (MRMS, 2025)

As Nadrljanski (2024) notes, “The future of education depends on the readiness of educators to integrate artificial intelligence, beginning with an evaluation of their self-perceived knowledge, skills, and vision, and whether they feel threatened by AI.” Building on this idea, Nadrljanski states that the development of education should focus on encouraging creativity, critical thinking, and emotional intelligence. These elements are key to empowering the learning process to reach its full potential, bridging educational gaps, and contributing to a more equitable and prosperous future. (Nadrljanski, 2024).

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In short, while AI holds great promise for improving education, its successful integration depends on more than just adopting new technologies. It requires a shift in how teaching is approached, with strong support from institutions and a willingness to innovate. Only then can AI truly enhance learning and help create a more inclusive and effective educational system.

THE ROLE AND APPLICATIONS OF GENERATIVE AI ACROSS SECTORS

Generative AI, particularly large language models (LLMs) like ChatGPT, has quickly gained global attention and became widely recognized for its transformative potential in communication and education. The launch of ChatGPT sparked significant interest from both the tech community and the wider public. The innovative chatbot gained over one million users within a week of its release and reached 100 million active users within just two months (Taecharungroj, 2023; Makridakis et al., 2023). ChatGPT is trained on massive datasets using advanced AI techniques to generate human-like responses. Its ability to produce natural-sounding language, combined with its scalability, adaptability, and efficiency, makes it a valuable asset for businesses and organizations, particularly for enhancing user experience and satisfaction, improving productivity, and boosting profitability (Kalla and Kuraku, 2023). Despite its strengths, ChatGPT has notable limitations, including response bias, so-called "hallucinations" (confident but factually incorrect answers), and a lack of emotional intelligence (Kalla and Kuraku, 2023; Makridakis et al., 2023; Van Dis et al., 2023). Since its release, ChatGPT and similar generative models have been at the center of discussions within both business and academic communities.

Sector-specific applications

In examining the potential impact of generative AI technologies such as ChatGPT on society, business, and education, Dwivedi et al. (2023) conclude that these tools can improve productivity in sectors like banking, hospitality, tourism, and information technology. However, they also point to several limitations and risks, including misinformation, privacy and security concerns, and a lack of transparency. The authors call for further research focused on identifying the skills and resources needed for effective AI use, understanding its limitations, determining appropriate use cases, and developing methods to assess credibility and address ethical and legal challenges.

ChatGPT is already being used in diverse fields. In healthcare, its potential includes providing real-time access to medical information, managing appointments, and supporting remote patient monitoring (Sun and Zhou, 2023). In education, it assists with content creation and task development (Lo, 2023), while in academic settings, it contributes to data analysis and literature review (Lund and Wang, 2023). Batubara et al. (2024) highlight the significant role of ChatGPT in improving the efficiency

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and effectiveness of communication processes in education, healthcare, marketing, and other domains. These findings are further supported by research from Mirek-Rogowska et al. (2024), who also observe enhanced communication performance through content generation, real-time message customization, and targeting specific audiences. However, they emphasize the importance of addressing ethical concerns and risks related to privacy, security, and bias. According to Batubara et al. (2024), in the context of communication, the use of ChatGPT has been most extensively explored in areas such as education, healthcare, academic research, ethical considerations, and marketing studies.

Communication and business perspectives

Research shows that communication professionals increasingly recognize artificial intelligence as a vital component of communication in the digital age. They particularly highlight its application in areas such as text generation, analysis, translation, customer support, social media management, and the overall improvement of communication processes. The reported benefits include speed, cost-efficiency, 24/7 availability, the ability to analyze large datasets, and personalized communication. (Dolunay, 2024).

George et al. (2023) emphasize ChatGPT's revolutionary potential in business communication. Their research into the corporate use of GPT-4 reveals improved internal and external communication, enhanced customer experiences, and support for decision-making and collaboration. Still, they underline ethical concerns and risks, calling for responsible and ethical AI use.

Paul et al. (2023) analyze ChatGPT's advantages and disadvantages from a consumer perspective. Benefits include more dynamic and personalized interactions, efficient communication, and novel approaches to market research. They also point out the challenges that include misinformation, contextual inaccuracy, and data security issues.

Content creation and workforce productivity

Generative AI models such as ChatGPT, DALL-E2, and Whisper open up new possibilities in content creation, including automatic generation, enhancement of human-produced content, variation across formats, and personalization (Davenport, 2022).

In a study conducted by Cardon et al. (2023) on employee attitudes in the United States toward generative artificial intelligence tools like ChatGPT in the workplace, it was found that most respondents used ChatGPT for content creation and communication. The majority believed that the tool could help them become better communicators, particularly those in leadership and managerial positions. Since the study was carried out in March 2023, only a few months after ChatGPT's release, it revealed significant differences in perceptions of AI's impact on society, workplace productivity, ethical implications, and potential job displacement between early adopters and non-users. Early users tended

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to have a more positive view of AI's societal and productivity benefits, but at the same time, they were more aware of ethical concerns and more worried about the risk of job loss.

Brynjolfsson et al. (2025) examined the impact of generative artificial intelligence on employee experience and productivity within the customer support industry by analyzing the introduction of a chat assistant. Their findings show that AI assistance increased worker productivity by an average of 15%, measured by the number of issues resolved per hour. Notably, the effect was significantly greater among less qualified and less experienced employees, reaching around 30%, while the impact was smaller for highly skilled and more experienced workers.

Labour market outlook and competency gaps

The World Economic Forum (2025) report, based on a survey of one thousand employers representing over 14 million workers across various global economies, provides insight into emerging jobs expected to shape the labour market between 2025 and 2030. Among the key drivers of change, 86% of respondents identified artificial intelligence and information processing technologies as having the most significant impact on their business transformation, followed by robotics, autonomous systems, and energy storage and production technologies. Data from Coursera highlighted a strong increase in demand for training in generative AI tools. However, the focus of skill development differs depending on the user: individual learners tend to prioritize acquiring basic knowledge, while employer-sponsored users focus on improving workplace productivity. Employers anticipate that over the next five years, the development of technological skills will surpass other skill categories in importance. Within this domain, artificial intelligence and big data lead the way, followed by networking, cybersecurity, and digital literacy. In addition to technical competencies, the report also emphasizes the growing need for creativity, resilience, adaptability, curiosity, and lifelong learning.

Educational and ethical implications

According to Mirek-Rogowska et al. (2024), it is necessary to reassess which digital competencies are essential in the evolving landscape. The authors emphasize the need to develop skills for working with AI systems, such as digital literacy, critical thinking, and ethical reasoning. They particularly highlight the importance of cultivating these abilities in communication-driven professions like journalism, marketing, and education, arguing that such competencies should become an integral part of communication study programmes.

Employers and students alike are increasingly aware of the importance of equipping students with the skills and knowledge necessary to work with AI systems. Some governments have also recognized the value of AI literacy, which goes beyond the ability to use AI tools. It includes understanding how AI works, evaluating its outputs, applying it critically, and grasping the broader implications of its use,

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from social to ethical. Despite growing support from employers and student interest, there is still hesitation within education systems to fully integrate AI. This reluctance stems from concerns about privacy, security, and plagiarism, as well as from a lack of expertise in how to effectively implement AI technologies in teaching and learning processes (Zhou and Schofield, 2024).

The importance of integrating AI into information and communication technology curricula is underscored by the study conducted by Revesai and Ruvinga (2024), which covered institutions across six continents. Their findings reveal that traditional, static curricula are struggling to keep pace with the rapid development of AI technologies. They also highlight a lack of qualified instructors and limited access to necessary resources. A significant gap between educational offerings and industry needs was identified, particularly the necessity for students to acquire not only technical knowledge and skills but also a deeper understanding of the ethical and social implications of AI use. To address these challenges, the authors recommend adopting interdisciplinary approaches, enhancing collaboration with industry, promoting ethical literacy, and using AI-powered learning platforms as key strategies for successful AI integration in education.

An experiment conducted at a private university in Mexico found that the integration of ChatGPT into an undergraduate course not only helped students learn how to use a new digital tool, but also strengthened their soft skills, such as communication, logical reasoning, and critical thinking (Michalon and Camacho-Zuñiga, 2023).

Generative AI is increasingly shaping how we communicate and learn, offering new tools for efficiency and creativity. Its influence is visible across sectors, from personalized education to automated business communication. To make the most of these technologies, it is essential to adapt education systems, promote ethical use, and support thoughtful integration into professional and academic settings. In doing so, both education and industry can unlock the full potential of AI while minimizing its risks.

RESEARCH METHODOLOGY

Despite growing literature, there is limited empirical research on how higher education curricula are adapting to the industry shifts in communication practices. This study employed a mixed methods approach, combining quantitative and qualitative data collection and analysis to explore the competencies required for professionals working with artificial intelligence in communication-intensive roles. The integration of survey results and expert interviews enabled the research to capture both broader patterns and in-depth perspectives across the field.

The quantitative phase consisted of an online survey shared via LinkedIn, targeting professionals who indicated experience with AI in their job roles. The survey included a range of multiple-choice questions with the option to select multiple answers, as well as open-ended prompts allowing

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respondents to provide additional suggestions. The questions focused on several key areas, including the technical skills students should develop, the interpersonal and communication abilities needed for effective teamwork and client collaboration, and the core competencies expected of future professionals working in AI-supported communication roles. Respondents were also asked to identify industries where the application of AI in communication holds the greatest potential for employment, and to reflect on the importance of ethical awareness and understanding the broader social impact of AI.

The qualitative phase involved semi-structured interviews with professionals selected through purposive sampling. Selection was based on publicly available information on their LinkedIn profiles, which confirmed their extensive, hands-on experience with AI across various industries. The interviews were conducted online or in person, recorded with informed consent, and subsequently transcribed. Participants discussed how AI is used in their organizations, what technical and communication skills are most relevant, which ethical issues arise in practice, and how they view the current readiness of higher education to meet industry demands. They also shared suggestions for improving collaboration between universities and the professional sector.

The survey results were analyzed using basic descriptive statistics, while the interview transcripts and open-ended answers were examined through thematic analysis. This helped identify key topics such as technical and interpersonal skills, AI tool use, ethical concerns, gaps in education, and trends in specific industries. Ethical guidelines were followed throughout the research. All participants were informed about the study's purpose, guaranteed anonymity, and their data was stored securely. Combining both methods provides a well-rounded basis for informing educational and professional development in the context of AI and communication.

RESEARCH RESULTS

The next two subsections present the results of the quantitative and qualitative parts of the research, based on the survey responses and expert interviews. These findings are later brought together and discussed in the conclusion, where key themes and implications are summarized.

Survey results

A total of 45 participants completed the questionnaire, most of whom were employed in the private sector across industries such as IT, finance, education, digital marketing, and data science. The survey aimed to gather expert insights into the knowledge, skills, and tools considered essential for students preparing to work with artificial intelligence in the field of communication. The questions focused on technical abilities, interpersonal competencies, ethical considerations, and professional experiences relevant to AI-supported communication roles.

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In response to the question of which technical skills are most important for students working with AI in business communication, participants provided clear preferences. Content creation using generative AI tools (e.g., ChatGPT, Jasper, Midjourney) was the most frequently selected skill, chosen by 33 respondents (73.3%). This highlights the central role these tools play in producing written and visual content efficiently. Basic programming knowledge, such as Python or pseudocode, was noted by 31 respondents (68.9%), reflecting its growing importance even in non-technical roles. Data analysis and visualization tools like Excel, Google Sheets, Tableau, or Power BI were chosen by 28 participants (62.2%). Tools for project management and collaboration (e.g., Trello, Slack, Microsoft Teams) were selected by 27 respondents (60%). Additionally, 26 respondents (57.8%) highlighted task automation skills using tools like Zapier or IFTTT. Ethical competence, particularly in relation to data privacy and GDPR, was identified by 24 participants (53.3%), while 20 respondents (44.4%) pointed to the value of using user-friendly platforms for basic AI model development. Other less frequent but notable responses included sentiment analysis (37.8%), digital marketing fundamentals (31.1%), and social media content management (17.8%). A few participants suggested additional skills such as legal literacy around AI, familiarity with AI frameworks like LangChain, and basic mathematical principles relevant to machine learning.

Regarding interpersonal and communication skills, respondents emphasized the need for strong team collaboration and client interaction abilities. Active listening and empathy were the top choice, selected by 36 respondents (80%). This was closely followed by clear and concise verbal communication (77.8%) and remote teamwork (71.1%). Presentation skills were also highly valued (68.9%), along with conflict resolution and negotiation (57.8%), adaptability to different communication styles (53.3%), and meeting facilitation (53.3%). Writing professional emails and reports was noted by 23 respondents (51.1%). Intercultural communication skills were selected by 13 respondents (28.9%). Additional suggestions included knowledge of technical vocabulary and language skills, underlining the importance of clear and context-specific communication.

On the topic of key competencies for future professionals working with AI in communication, critical evaluation of AI models and outputs was the most frequently chosen (75.6%), followed by understanding AI fundamentals such as machine learning and NLP (71.1%). The ability to collaborate across technical and non-technical teams was also highlighted (71.1%). Creative use of AI tools for content development was identified by 68.9%, while 66.7% of respondents emphasized the importance of using AI for data analysis, automation, and implementation in communication strategies. Adapting communication styles with AI support (46.7%) and ethical responsibility (44.4%) were also recognized. A few respondents noted the relevance of natural language understanding, interdisciplinary thinking, and a foundational technical skill set.

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When asked about the industries with the highest employment potential for AI-driven communication roles, 36 respondents (80%) selected digital marketing and advertising, followed by social media (64.4%) and e-commerce (60%). Other key sectors included finance (51.1%), public relations (46.7%), education (40%), and media/journalism (37.8%). Sectors perceived as having lower potential included real estate (22.2%), fashion/luxury goods (24.4%), and sustainability (28.9%).

On the importance of ethics and understanding the broader social impact of AI in communication, most respondents showed strong support for these concerns. Out of 44 participants, 15 (34.1%) rated ethical awareness and social responsibility as crucial, recognizing the significant influence AI can have on user privacy, information accuracy, and decision-making processes. Another 12 respondents (27.3%) viewed it as important for the responsible use of AI tools, while 11 (25%) considered it desirable, even if not essential for every communication role. Only a small portion felt ethics were less relevant depending on the specific job (11.4%), and just one respondent (2.3%) did not consider it important at all. These results reflect a clear consensus that ethics should be an integral part of AI-supported communication, particularly as professionals increasingly rely on automated systems to interact with audiences, shape public messages, and manage sensitive information. The findings also highlight the need for education and training programmes to go beyond technical instruction and include modules that foster critical thinking, ethical reasoning, and awareness of potential biases and social implications in the use of AI.

Finally, in terms of practical experiences that would boost student employability, the most highly valued option was participation in real-world projects (86.7%), followed by internships in AI-related organizations (68.9%), AI competitions and hackathons (62.2%), and maintaining a personal portfolio (55.6%). AI certifications (40%), networking through seminars (35.6%), and attending tech conferences (28.9%) were also seen as beneficial. A few respondents highlighted ethics training, project-based AI use, and professional development opportunities.

In summary, the results of the survey provide a clear view of the key skills and knowledge students need to succeed in communication roles influenced by artificial intelligence. They also highlight the need for study programmes to stay closely connected to the real needs of the job market.

Interview insights

In addition to the survey, the qualitative part of the study involved semi-structured interviews with eight professionals actively working with artificial intelligence in different contexts. Participants were selected based on their documented experience in roles such as AI development, machine learning, data science, digital strategy, and education. Some are startup founders, team leaders, or consultants, while others are engaged in academic research and AI-driven business solutions. The interviews aimed to explore how AI is applied in practice, which technical and interpersonal skills are considered essential, what ethical concerns are encountered, and how professionals perceive the role of education

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and university–industry collaboration. Structured around nine core questions and follow-ups, the interviews encouraged reflection on real-world experience and practical suggestions. Despite their different industries, participants expressed similar views, highlighting the growing need for interdisciplinary skills, ethical awareness, and updated educational approaches in the era of AI-supported communication.

When it comes to technical skills, most of the participants highlighted the importance of conceptual thinking, problem-solving, and knowing how to apply AI in real-world communication tasks. As one interviewee said, it's less about knowing specific tools and more about understanding "how to leverage AI to create a specific solution." Another emphasized the need to be able to "communicate your query in simple and clear terms," explaining that what's most valuable now is the ability to adapt and learn quickly. While some mentioned specific tools and platforms, they agreed that the real challenge lies in keeping up with rapid changes in technology. As one expert put it, "More than tools, we need people who know what they want to achieve with communication and how AI can help get them there."

Communication skills were also seen as crucial, especially in teams where technical and non-technical professionals work together. Empathy, clear expression, and the ability to adjust to different communication styles were mentioned as essential. One participant explained that team members should be able to recognize communication barriers and translate between technical and domain-specific language. Several interviewees highlighted that being able to understand how others think and feel is essential for building trust and effective communication within a team. These soft skills were seen as especially important in digital or hybrid work settings, where communication often happens online and needs to be very clear.

When asked about the use of AI tools like ChatGPT in their daily work, all participants shared practical examples. Some use AI for content creation, editing, or answering customer questions. One person explained that they use AI "to automatically respond to frequently asked questions," while another said AI helps "tailor marketing content to specific audiences." These tools were mostly seen as helpful and timesaving, but participants also stressed the importance of realistic expectations. As one expert said, "LLMs are not magic wands. You still need people who understand what they want to do with them."

Ethical concerns came up often in interviews. Almost all participants talked about the need to double-check AI-generated content and take responsibility for its quality. "You have to supervise every answer, like you would with a junior colleague," one interviewee said. Privacy, transparency, and the handling of sensitive data were also highlighted. Several interviewees expressed concerns about data privacy when interacting with large language models, emphasizing the risks of unintentionally sharing sensitive or confidential information during prompts. One expert warned that these systems can store

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or process inputs in ways that are not always transparent, which raises ethical and practical concerns, particularly in client communication or regulated industries. Another interviewee, who leads a successful AI startup, explained that they have introduced internal agreements to clearly define how client data can be used in combination with AI tools. Overall, they agreed that ethical use of AI is not just a technical issue but also a matter of professional responsibility.

Regarding education, almost all of the participants felt that universities are not keeping up with the fast pace of technological change. Several pointed out that current curricula are outdated and do not prepare students well for the real-world use of AI. One participant said students should have "more opportunities to work on real projects" to see how AI functions in practice. Another suggested involving professionals from the industry in teaching, to keep course content relevant and up to date. There was general agreement that students need more training in critical thinking, problem-solving, and the ability to evaluate AI-generated content.

In terms of industry application, the fields of digital marketing, public relations, customer support, and e-commerce were most frequently mentioned as offering strong job prospects for communication professionals familiar with AI. As one interviewee explained, these are areas where professionals must be able to "manage user experience with the support of AI and make communication decisions based on data." Although sectors like healthcare and public services are slower to adopt AI, participants believe they also hold long-term potential.

When asked about the main challenges in applying AI, interviewees mentioned lack of knowledge, resistance to change, and weak infrastructure. One participant stated, "The biggest obstacle is mindset – if someone sees AI as a threat, no tool will help them." Others pointed out that many organizations still don't recognize the need to invest in staff training and building digital competencies.

Finally, the interviewees expressed a strong willingness to collaborate with universities through mentorship, guest lectures, and joint projects. However, they also noted that such partnerships often rely more on personal initiative and mutual interest, rather than being part of a structured system. One participant emphasized that successful cooperation depends on both sides being equally motivated to engage.

Ultimately, these interviews demonstrate that working with AI in communication is not only a technical matter but also one that relies heavily on human-centered skills. Critical thinking, ethical awareness, and strong interpersonal abilities were consistently highlighted as essential for meaningful and responsible use of AI. Professionals agreed that successful integration of AI depends on open collaboration, a willingness to adapt, and a shared understanding of both the opportunities and risks these technologies bring. They also stressed the importance of staying informed and continuously

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developing skills, noting that curiosity and a proactive learning mindset are crucial to staying relevant and effective in evolving AI-supported communication roles.

CONCLUSION

This paper examined the role of artificial intelligence in communication and education, focusing on the skills, applications, and implications that come with integrating tools like ChatGPT into professional practice. Both the literature review and empirical findings highlight the growing influence of generative AI on how communication is created, managed, and delivered across sectors.

Professionals across industries described large language models as valuable tools for improving productivity, streamlining content generation, and supporting decision-making. However, they also underlined that such tools require careful oversight, clear goals, and human input in order to be used effectively and ethically. These findings suggest that while AI offers strong support for routine and creative communication tasks, it cannot replace the need for human judgment, especially in complex or sensitive contexts.

The study also identified a set of key competencies that are considered essential for professionals working with AI in communication. These include not only technical skills, such as content creation using generative tools, data analysis, and basic programming, but also interpersonal skills like clear communication, empathy, and the ability to work effectively in teams. Ethical awareness, especially in relation to data privacy, algorithmic bias, and responsible use of AI, was consistently emphasized as a crucial part of professional readiness.

Several sectors stood out as having strong potential for AI-supported communication roles, including digital marketing, e-commerce, social media, education, public relations, and customer support. Although some areas (e.g., real estate and fashion) were seen as slower to adopt AI, professionals believe that its use will expand across all sectors in the coming years. This highlights the need for graduates with a wide range of competencies who can adapt to different industries and their evolving digital needs.

Collaboration between education and industry was a recurring theme in the study. Professionals emphasized the value of initiatives like internships, joint projects, mentorships, and guest lectures that allow students to apply their skills in practice. However, they noted that such efforts often depend on individual initiative rather than formal structures. To strengthen these partnerships, educational institutions may need to take a more active role in building lasting connections with industry.

To conclude, the findings make it clear that communication education must go beyond teaching technical tools. It should also help students think critically about how AI is changing the way people interact, how information is shared, and what ethical challenges come with these changes. Integrating

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topics such as digital ethics, social responsibility, and the societal impact of AI into communication programmes can help future professionals navigate these changes more confidently.

Implications

As the role of AI continues to grow, education systems must prepare students not just to use technology, but to shape its use in ways that are ethical, thoughtful, and socially responsible. The findings of this study offer concrete recommendations for higher education institutions aiming to revise communication curricula in response to AI integration. Specifically, they highlight the need to incorporate interdisciplinary skill sets, ethical reasoning, and hands-on experience with generative AI tools. The results also indicate the need to update national qualification standards within the communication sector and to strengthen university–industry collaboration. By addressing current competency gaps, educational programmes can better equip graduates for future employment in AI-enhanced communication environments.

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UNPACKING THE PARADOX: THE EXCLUSIONARY NATURE OF ENTREPRENEURIAL ECOSYSTEMS

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ABSTRACT

Entrepreneurial ecosystems (EEs) are often celebrated as drivers of inclusive innovation and economic growth. Yet, beneath this rhetoric lies a paradox: EEs systematically reproduce and reinforce existing social and economic hierarchies. This conceptual paper integrates social capital, institutional, intersectionality, and political theories to develop a four-layer model of exclusion in EEs. Using the Israeli high-tech sector as a case study, the analysis demonstrates how exclusion operates through structural, institutional, identity-based, and discursive mechanisms. The findings challenge the myth of meritocracy in entrepreneurship, revealing that access and legitimacy are shaped by entrenched networks, cultural archetypes, and institutional practices. The paper concludes by highlighting the need for holistic interventions that address the multidimensional nature of exclusion in EEs, and calls for a redefinition of ecosystem success to prioritize inclusivity alongside innovation.

Keywords: Entrepreneurial ecosystems, Exclusion, Meritocracy, Inequality, Social capital

1. INTRODUCTION

Entrepreneurial ecosystems (EEs) have been widely celebrated as engines of innovation and economic growth. However, beneath this celebratory narrative lies a profound paradox: these ecosystems, despite their promise of opportunity, often function as inherently exclusive systems that primarily serve the interests of business elites concentrated in urban centers (Brush et al., 2019; McAdam et al., 2019). Rather than providing equal opportunity to all entrepreneurs, EEs frequently replicate and reinforce existing socioeconomic inequalities through complex mechanisms that are both visible and invisible (Donaldson et al., 2024). This contradiction between the rhetoric of meritocracy and the reality of systemic exclusion, forms the central focus of this conceptual paper.

The dominant entrepreneurship narrative portrays the field as open and meritocratic, where determination, innovation, and hard work determine success (Marwick, 2013). This "anyone can succeed" ethos has become emblematic of entrepreneurial culture, suggesting that entrepreneurship

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offers a universal pathway to economic mobility regardless of background (Baker & Powell, 2022). Yet this narrative fundamentally misrepresents the complex reality of entrepreneurial ecosystems by obscuring how uneven distributions of social, financial, and human capital systematically structure entrepreneurial opportunities and outcomes (Brush et al., 2018; Jayawarna et al., 2014; Harakati et.al. 2024).

At their core, entrepreneurship discourses function as "depositories of a neoliberal ideology" that camouflage the true relations between work and capital (Carmo et al., 2021, p. 18). This neoliberal ideology manifests as a "rationality capable of structuring not only the action of the governors but also the conduct of the governed" (Dardot & Laval, 2016, p. 22). Within this framework, entrepreneurship embodies several neoliberal principles: a concept of freedom that operates differently across socioeconomic strata (Gaulejac, 2007); competition where "each participant tries to overcome the other in an unremitting struggle to become a leader" (Dardot & Laval, 2016, p. 24); individual responsibility that transfers "responsibility for ensuring dignified survival conditions...from the political and social sphere to the individual level" (Silva & Bassani, 2007, p. 23); and an emphasis on "employability failures" rather than structural unemployment (Gaulejac, 2007, p. 25).

EEs exclusivity is entrenched by the structural conditions of neoliberal economic systems. As Piketty (2014) demonstrates in "Capital in the Twenty-First Century," when "the rate of return on capital exceeds the rate of growth of output and income...capitalism automatically generates arbitrary and unsustainable inequalities that radically undermine the meritocratic values on which democratic societies are based" (p. 1). Similarly, Stiglitz (2012) reveals in "The Price of Inequality" how concentrated economic power creates damaging feedback loops between wealth and political influence, noting that "at the top [of the income scale], a lot of the inequality arises out of efforts that people take to get a larger share of the pie rather than to increase the size of the pie" (p. 32). Mazzucato's (2013) work in "The Entrepreneurial State" challenges the prevailing narrative about private sector innovation by demonstrating how state investment underpins entrepreneurial success, revealing a system where "the rest of the world...should do as the United States actually did, not as they say they did" (p. 5). Similarly, the World Economic Forum's "Global Competitiveness Report" consistently highlights how "inequality of opportunity, inequality of income and economic growth form a circular nexus" that creates entrepreneurial ecosystems excluding significant portions of the population, especially in economies with minimal state intervention.

The exclusivity of EEs in neoliberal economies manifests in several interconnected mechanisms. First, financial capital creates significant barriers, as venture capital and other funding mechanisms

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disproportionately support entrepreneurs from privileged backgrounds (Piketty, 2014). Second, social and cultural capital establish exclusionary boundaries, as successful entrepreneurship frequently depends on networks and connections that provide mentorship, partnerships, and investor introductions, resources rarely accessible to all demographic groups equally (Stiglitz, 2012). Third, educational disparities reinforce exclusivity, as the knowledge and skills required for successful entrepreneurship are taught more effectively in institutions that are themselves often exclusive. Fourth, risk tolerance, a key factor in entrepreneurial success, is closely tied to socioeconomic status, allowing those with financial safety nets to take entrepreneurial risks while making entrepreneurship significantly more perilous for those without such security. Thus, evidence points to a fundamental contradiction: while entrepreneurial ecosystems are celebrated as meritocratic engines of opportunity, they systematically reproduce and reinforce existing socioeconomic hierarchies. This contradiction raises my central research question: What are the mechanisms of exclusion in entrepreneurial ecosystems that create and maintain the paradox between meritocratic rhetoric and exclusionary realities?

2. THEORETICAL FRAMING

To address our research question I draw upon several complementary theoretical perspectives that collectively illuminate how EEs function not as neutral spaces of opportunity but as socially constructed fields that reproduce existing power relations and inequalities.

Social capital theory offers a foundational lens for understanding the exclusionary dynamics of entrepreneurial ecosystems. Bourdieu (1986) conceptualizes social capital as resources embedded within social networks that individuals can mobilize to advance their interests. In entrepreneurial contexts, these networks determine access to crucial resources, information, opportunities, and legitimacy—all essential factors for entrepreneurial success (Anderson & Miller, 2003). Entrepreneurial ecosystems typically feature what McPherson et al. (2001) term "elite network closure," wherein dense, interconnected networks form among high-status actors, effectively limiting outsiders' access to valuable resources and opportunities. This network closure operates as an invisible barrier, maintaining the exclusivity of entrepreneurial spaces while appearing meritocratic.

Institutional theory provides another critical perspective on exclusion within entrepreneurial ecosystems. DiMaggio and Powell (1983) demonstrate how organizations within a field adopt similar structures and practices through isomorphic processes that establish legitimacy. Within entrepreneurial ecosystems, these isomorphic pressures create normative expectations about what

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constitutes "legitimate" entrepreneurship. These norms function as boundary-maintaining mechanisms that determine who belongs within the ecosystem and who remains excluded, often privileging actors who embody dominant cultural characteristics and practices.

The theoretical framework of intersectionality, pioneered by Crenshaw (1989) and expanded by Collins (2000), offers essential insights into how multiple dimensions of identity interact to create compounded experiences of exclusion. This perspective is particularly valuable for analyzing entrepreneurial ecosystems, where exclusion rarely operates along a single dimension but typically functions through intersecting axes of gender, race, class, age, and other social categories (Marlow & Martinez Dy, 2018). Intersectionality reveals how entrepreneurial ecosystems may simultaneously accommodate certain forms of difference while reinforcing exclusion along other dimensions, creating varied experiences of marginalization.

Finally, theories of power provide a crucial foundation for analyzing exclusionary mechanisms within entrepreneurial ecosystems. Foucault's (1982) conception of power as operating through systems of knowledge, discourse, and institutional practices illuminates how entrepreneurial ecosystems exert control over who can legitimately claim entrepreneurial identity and access entrepreneurial resources. This perspective helps reveal how power in entrepreneurial ecosystems operates not merely through visible gatekeeping but also through subtle discursive practices that naturalize certain entrepreneurial identities while marginalizing others.

Drawing together these complementary theoretical perspectives, I propose an integrated framework for analyzing exclusion in entrepreneurial ecosystems. This framework conceptualizes entrepreneurial ecosystems as socially constructed fields characterized by uneven distributions of multiple forms of capital (economic, social, cultural, symbolic) that determine access to entrepreneurial opportunities; elite network formation that restricts the flow of resources, information, and legitimation to privileged groups; institutional processes that define entrepreneurial legitimacy in ways that systematically advantage certain demographic groups; intersecting axes of exclusion that create compounded barriers for entrepreneurs with marginalized identities and multidimensional power dynamics that operate through both visible gatekeeping mechanisms and invisible discursive practices.

3. FOUR DIMENSIONS OF EXCLUSIVITY THAT CHARACTERIZE ENTREPRENEURIAL ECOSYSTEMS

Building upon our integrated theoretical framework, I identify four interconnected dimensions of exclusivity that characterize entrepreneurial ecosystems (EEs). These dimensions represent the specific

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mechanisms through which EEs maintain exclusionary boundaries while simultaneously projecting an ethos of meritocratic opportunity.

3.1 The Paradox of Meritocratic Entrepreneurship: Examining the Rhetoric-Reality Gap

The first dimension, the paradox of meritocratic entrepreneurship, captures the fundamental contradiction between entrepreneurial rhetoric and reality. While entrepreneurial discourse celebrates values of openness, meritocracy, and equal opportunity, the empirical reality reveals systematic patterns of exclusion that reinforce existing social stratifications.

This paradox is illuminated through Bourdieu's (1986) theory of capital forms, which provides a framework for analyzing how various forms of capital economic, social, cultural, and symbolic serve to reproduce social hierarchies within seemingly open systems. The rhetoric of meritocracy suggests that entrepreneurial success is determined primarily by individual effort, talent, and innovation. However, Bourdieu's framework reveals how these different forms of capital are unevenly distributed and collectively determine access to entrepreneurial opportunities and resources.

Foucault's (1982) perspective on power further elucidates this paradox by highlighting how discourses of meritocracy function as systems of knowledge that legitimize certain entrepreneurial identities while delegitimizing others. The power dynamics embedded in entrepreneurial ecosystems shape not only who succeeds but also who is recognized as a legitimate entrepreneurial actor. Thus, the paradox of meritocratic entrepreneurship represents not merely a gap between rhetoric and reality but a fundamental mechanism through which power operates and is maintained within entrepreneurial ecosystems.

The tension between these competing narratives, one celebrating individual agency and equal opportunity, the other revealing structural determinants of entrepreneurial outcomes, constitutes the central paradox that defines entrepreneurial ecosystems as exclusive spaces despite their inclusive rhetoric.

3.2 The Myth of the Level Playing Field: Unpacking Resource Disparities in Entrepreneurial Participation

The second dimension, the myth of the level playing field, critically examines how entrepreneurial ecosystems present themselves as open and accessible while obscuring the unequal distribution of critical resources that determines who can meaningfully participate. A persistent narrative within entrepreneurial discourse posits that entrepreneurship represents a level playing field where

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determination, innovation, and hard work are the primary determinants of success. This "anyone can succeed" ethos has become emblematic of entrepreneurial culture, perpetuating the belief that entrepreneurship offers a meritocratic pathway to economic mobility regardless of background.

This dimension draws heavily on intersectionality theory (Crenshaw, 1989; Collins, 2000), which reveals how multiple dimensions of identity interact to create compounded experiences of exclusion within entrepreneurial ecosystems. The supposed neutrality of the "playing field" is contradicted by the reality that entrepreneurial opportunities and outcomes are structured by intersecting axes of privilege and marginalization.

Social capital theory further enriches our understanding of this dimension by highlighting how differential access to networks and relationships structures entrepreneurial participation. McPherson et al.'s (2001) concept of homophily explains how the tendency for individuals to associate with similar others reinforces patterns of exclusion in seemingly open entrepreneurial spaces. This creates systemic bias that favors entrepreneurs who already possess significant advantages in terms of social connections, financial resources, educational background, and cultural alignment with dominant entrepreneurial norms.

The level playing field myth is thus understood as a social construction that obscures the structural inequalities that determine access to entrepreneurial resources and opportunities, making it a key mechanism of exclusion in entrepreneurial ecosystems.

3.3 The Illusion of Neutrality: Cultural Biases in Entrepreneurial Support Structures

The third dimension, the illusion of neutrality, focuses on how entrepreneurial support structures function as exclusionary gatekeepers despite their claims of objectivity. Incubators, accelerators, venture capital firms, and similar institutions occupy critical gatekeeping positions within entrepreneurial ecosystems, presenting themselves as neutral arbiters evaluating entrepreneurial ventures based on objective measures of quality, potential, and fit with market opportunities. This self-presentation perpetuates what can be termed "the illusion of neutrality": the notion that evaluation criteria and selection processes operate independently of cultural biases and social structures.

This dimension is theoretically grounded in institutional theory (DiMaggio & Powell, 1983), which explains how entrepreneurial support organizations adopt similar structures, practices, and evaluation criteria through isomorphic processes. These institutionalized practices establish norms

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and expectations about what constitutes "legitimate" entrepreneurship, creating boundaries that determine who belongs and who doesn't in entrepreneurial spaces.

Power theories further illuminate this dimension by revealing how institutional arrangements within entrepreneurial ecosystems reflect and reproduce broader power structures in society. The illusory neutrality of entrepreneurial support organizations masks how power operates through institutional processes to maintain patterns of privilege and exclusion, highlighting the systematic rather than incidental nature of exclusion in entrepreneurial ecosystems.

This dimension explores how seemingly objective evaluation criteria and selection processes often embed cultural biases that reproduce existing social hierarchies, functioning as a significant mechanism of exclusion despite claims of neutrality and objectivity.

3.4 The Mythology of the Entrepreneur: Archetypal Narratives and Belonging in Entrepreneurial Spaces

The fourth dimension, the mythology of the entrepreneur, examines how cultural narratives create exclusionary boundaries within entrepreneurial ecosystems. Entrepreneurial ecosystems operate not only through explicit structures and practices but also through powerful cultural narratives that shape perceptions of who embodies legitimate entrepreneurial identity. The celebrated archetype of the entrepreneur, frequently portrayed as young, male, tech-focused, and college-educated, functions as a cultural template that subtly communicates who "belongs" in entrepreneurial spaces.

This dimension is theoretically informed by Foucault's (1982) conception of discourse as a system of knowledge that shapes reality. The archetypal narratives that dominate entrepreneurial spaces function as discursive constructions that determine who can legitimately claim entrepreneurial identity. These narratives are not merely descriptive but prescriptive, establishing normative expectations about who can and should be an entrepreneur.

Intersectionality theory (Crenshaw, 1989) further enhances our understanding of this dimension by revealing how the dominant entrepreneurial archetype embodies specific demographic characteristics that reflect existing social hierarchies. The mythology of the entrepreneur operates at the intersection of multiple identity categories, privileging certain combinations (e.g., young, white, male, tech-focused) while marginalizing others. This theoretical perspective exposes how entrepreneurial mythology functions as a mechanism of exclusion by establishing cultural templates that determine belonging in entrepreneurial spaces. By examining how entrepreneurial mythology shapes

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perceptions of legitimacy and belonging, this dimension reveals another critical mechanism through which entrepreneurial ecosystems maintain exclusionary boundaries while projecting an ethos of openness and opportunity.

These four dimensions collectively reveal the multidimensional nature of exclusion in entrepreneurial ecosystems. Rather than operating through a single mechanism, exclusion in entrepreneurial ecosystems functions through an interconnected set of rhetorical, structural, institutional, and cultural processes that together maintain boundaries while projecting an ethos of openness and opportunity.

Understanding these dimensions through our integrated theoretical framework reveals that exclusion in entrepreneurial ecosystems is not incidental but systematic embedded in the very structures, practices, and narratives that constitute these ecosystems. This multidimensional perspective provides a foundation for identifying potential interventions that might address exclusion not merely at the surface level but at its deeper structural and cultural roots.

Table 1: Dimensions of Exclusivity in Entrepreneurial Ecosystems: Theoretical Framework

Dimension of Exclusivity	Primary Theoretical Foundations	Key Theoretical Concepts	Explanatory Contribution
1. The Paradox of Meritocratic Entrepreneurship	Bourdieu's theory of capital forms (1986 Foucauldian discourse analysis (1982)	Economic, social, cultural, and symbolic capital Power-knowledge systems Discursive legitimation Structural determinism vs. individual agency	Reveals how uneven distribution of capital forms contradicts meritocratic rhetoric Exposes how discourses of meritocracy function to legitimize certain entrepreneurial identities while delegitimizing others Demonstrates how power operates through the gap between entrepreneurial rhetoric and reality
2. The Myth of the Level Playing Field	Intersectionality theory (Crenshaw, 1989; Collins, 2000) Social capital theory (Bourdieu, 1986) Network theory (McPherson et al., 2001)	Compounded marginalization Intersecting axes of privilege Homophily in social networks Network closure Resource acquisition through social ties	Illuminates how multiple dimensions of identity create compounded experiences of exclusion Explains how networks determine differential access to entrepreneurial resources and opportunities Shows how homophily reinforces patterns of exclusion in seemingly open spaces Reveals the structural rather than individual nature of entrepreneurial barriers
3. The Illusion of Neutrality	Institutional theory (DiMaggio & Powell, 1983) Critical theory	Institutional isomorphism Normative legitimacy	Demonstrates how seemingly objective evaluation criteria embed cultural biases Reveals how entrepreneurial support organizations reproduce existing power structures

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Dimension of Exclusivity	Primary Theoretical Foundations	Key Theoretical Concepts	Explanatory Contribution
	Theories of poIr (Foucault, 1982)	Cultural reproduction Gatekeeping mechanisms Implicit bias in evaluation	Exposes the systematic rather than incidental nature of exclusion in institutional practices Shows how power operates through institutional arrangements to maintain patterns of privilege
4. The Mythology of the Entrepreneur	Foucauldian discourse analysis (1982) Intersectionality theory (Crenshaw, 1989) Cultural theory	Discursive construction of identity Archetypal narratives Cultural templates Symbolic representation Identity-based belonging	Reveals how entrepreneurial archetypes establish normative expectations about legitimate entrepreneurial identity Shows how cultural narratives function as mechanisms of inclusion and exclusion Exposes how entrepreneurial mythology reflects and reinforces existing social hierarchies Demonstrates how perceptions of belonging in entrepreneurial spaces are shaped through cultural representation

This table synthesizes the theoretical foundations underlying the four dimensions of exclusivity in entrepreneurial ecosystems, highlighting how they collectively maintain exclusionary boundaries while projecting an ethos of meritocratic opportunity. Together, the dimensions reveal the multifaceted nature of exclusion in entrepreneurial spaces and provide the foundation for the empirical investigation and potential interventions.

4. SOME EMPIRICAL EVIDENCE FROM THE ISRAELI ENTREPRENEURIAL ECOSYSTEM

The Israeli entrepreneurial ecosystem, often celebrated as the "Startup Nation," provides a compelling case study for examining the mechanisms of exclusion identified in our theoretical framework. Drawing on empirical evidence from *Dark Sides of the Startup Nation* (Heilbrunn, 2023), this section illustrates how Israel's high-tech sector exemplifies the four dimensions of exclusivity in entrepreneurial ecosystems[1].

4.1 The Paradox of Meritocratic Entrepreneurship

In the Israeli entrepreneurial ecosystem, the rhetoric of meritocracy is pervasive, yet empirical evidence reveals persistent exclusionary practices. Capital remains highly concentrated, with

[1] The data for the book were gathered in the years 2019 – 2021.

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approximately 85% of venture capital directed toward entrepreneurs in Tel Aviv and central Israel. In contrast, peripheral regions and marginalized groups, such as Arab-Palestinians and Ethiopian Israelis, experience significant resource scarcity. As highlighted by one Ethiopian entrepreneur, access to networks and capital-resources readily available to central entrepreneurs-remains elusive for those on the margins (Ch. 6, p. 89). Furthermore, elite military technology units, notably Unit 8200, act as critical gateways to high-tech success, privileging predominantly Ashkenazi Jewish men from affluent backgrounds. Arab citizens, ultra-Orthodox Jews, and Ethiopian Israelis are largely excluded from these units, resulting in systematic disadvantage. This dynamic perpetuates a self-replicating elite, with 75% of venture-backed founders being alumni of these military units (Ch. 5, p. 72; Ch. 13, p. 213). Additionally, the prevailing neoliberal narrative frames entrepreneurial success as a product of individual effort, while failure disproportionately burdens those lacking financial safety nets, turning setbacks into existential crises for entrepreneurs from marginalized backgrounds (Ch. 8, p. 134).

4.2 The Myth of the Level Playing Field

Israel's entrepreneurial ecosystem exemplifies the compounding effects of intersecting identity markers on exclusion. Arab-Palestinian entrepreneurs, for instance, confront a "double periphery"-experiencing both geographic marginalization due to residence outside central regions and national exclusion as non-Jewish citizens. One entrepreneur described the experience of being treated as outsiders in both the technology sector and the broader state, with their startups frequently dismissed as too niche, even when targeting regional markets (Ch. 11, pp. 178-185). Gendered network homophily further exacerbates exclusion, as women-particularly those from minority groups-are systematically excluded from male-dominated networks that control funding and mentorship. As one female entrepreneur observed, investors tend to favor founders who resemble themselves: male, secular, and from Tel Aviv (Ch. 9, p. 144). Barriers of cultural capital are also evident, with ultra-Orthodox Jewish entrepreneurs struggling to navigate secular norms and Ethiopian Israelis facing racialized stereotypes that question their legitimacy. An investor candidly admitted an unconscious preference for founders who fit the "Israeli tech bro" image (Ch. 13, p. 215).

4.3 The Illusion of Neutrality

Institutional practices in Israel's entrepreneurial ecosystem, despite claims of neutrality, embed significant cultural biases. Venture capital evaluation criteria, such as assessments of "market potential" and "team cohesion," tend to favor entrepreneurs from elite backgrounds, while Arab-Palestinian startups are often dismissed as too niche, even when addressing relevant regional markets (Ch. 11, p. 185). State-funded incubators, which purport to operate neutrally, commonly prioritize

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founders with prior high-tech experience or military backgrounds, thereby excluding entrepreneurs from peripheral regions (Ch. 4, p. 63; Ch. 13, p. 214). Additionally, the conduct of meetings in Hebrew, often with informal references to military service or secular culture, serves to marginalize non-native speakers and religious minorities (Ch. 10, p. 165).

4.4 The Mythology of the Entrepreneur

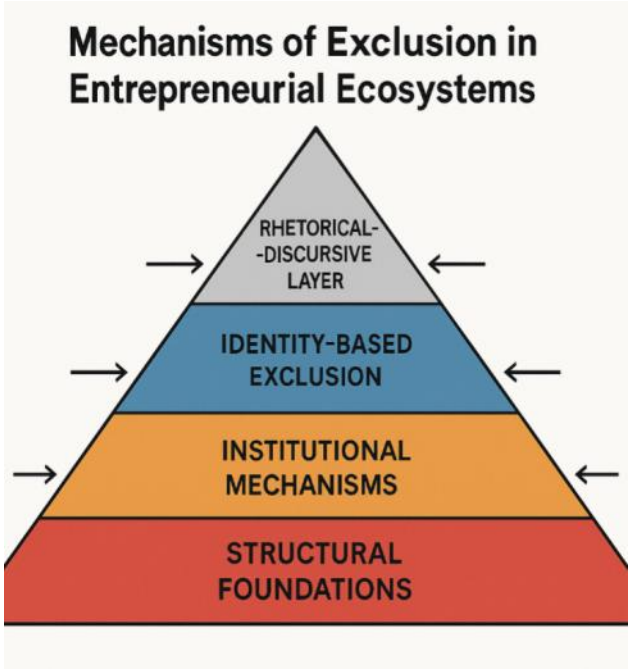
The prevailing archetype within Israel's entrepreneurial ecosystem reinforces exclusionary boundaries through a celebrated "techie-soldier" ideal. This narrative glorifies entrepreneurs with elite military technology backgrounds, positioning them as national heroes and, in doing so, excludes groups barred from such service, such as Arab citizens, while delegitimizing alternative entrepreneurial pathways (Ch. 13, p. 216). Gendered expectations further confine women to supporting roles, such as human resources or marketing, with leadership positions remaining predominantly male. As one investor remarked, female founders are expected to focus on "feminine" sectors like educational technology rather than deep technology (Ch. 9, p. 147). Ethnic hierarchies are also perpetuated, as Ethiopian and Mizrahi Jewish entrepreneurs are often stereotyped as "non-innovative," and Arab entrepreneurs are excluded from nationalist narratives that equate technological success with Zionist ideals (Ch. 6, p. 87; Ch. 11, p. 180).

The Israeli case demonstrates that exclusion within entrepreneurial ecosystems is deeply embedded in structures, narratives, and practices rather than being incidental or accidental. The concentration of resources in central regions, the prevalence of network homophily, and the reinforcement of cultural archetypes collectively reproduce inequalities, all while maintaining a façade of meritocracy. As one expert succinctly summarized, the system is not broken but rather designed to function in this exclusionary manner (Ch. 13, p. 217). These findings align with the theoretical framework presented, illustrating how exclusivity operates through interdependent mechanisms that are resistant to superficial reforms.

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5. DISCUSSION AND CONCLUSION

Figure 1:



The figure depicts four layers of exclusion in entrepreneurial ecosystems. The first layer, structural foundations, is anchored in Bourdieu's theory of capital forms and Foucault's analysis of power. It encompasses the uneven distribution of economic, social, cultural, and symbolic capital, as systemic power imbalances such as center-periphery dynamics and elite closure. This layer reveals the pervasive nature of uneven capital distribution, exposes systematic exclusion, and highlights the presence of structural barriers.

The second layer, institutional mechanisms, draws on institutional isomorphism and Foucault's concept of discursive power. It includes "neutral" criteria that embed cultural biases, homophilous networks, and support organizations that reproduce existing power structures. This layer elucidates how network-driven resource access and homophily operate within ostensibly open spaces, revealing the institutional privileges that underpin exclusion.

The third layer, identity-based exclusion, is informed by intersectionality and social capital theory. It addresses the compounded exclusion experienced by individuals based on ethnicity, gender, geography, and class, as Ill as the role of entrepreneurial mythology in delegitimizing marginalized identities. This layer illuminates the intersectional nature of exclusion, exposes the (de)legitimizing function of meritocracy, and demonstrates how archetypes reinforce social hierarchies.

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The fourth layer, the rhetorical-discursive layer, is rooted in Foucault's discourse analysis and critiques of neoliberalism. It involves the use of meritocratic rhetoric to mask exclusionary realities, the deployment of entrepreneurial mythology as a tool of exclusion, and the propagation of neoliberal narratives that shift responsibility to individuals. This layer demonstrates how power is exercised through the gap between rhetoric and reality, exposes the exclusionary role of entrepreneurial mythology, and links exclusion to broader neoliberal ideologies.

Our conceptual examination of entrepreneurial ecosystems (EEs) reveals how four interconnected layers of exclusion collectively maintain boundaries while projecting an ethos of meritocratic opportunities.

5.1 Theoretical Implications

The four-layer model of exclusion in entrepreneurial ecosystems advances theoretical understanding in several important ways. First, by integrating multiple theoretical perspectives Bourdieu's capital forms, Foucault's power analysis, institutional theory, and intersectionality, I offer a more comprehensive framework for understanding how exclusion operates through interconnected structural, institutional, identity-based, and discursive mechanisms. This integration moves beyond single-factor explanations to reveal the systemic nature of exclusion in entrepreneurial spaces.

Second, our analysis challenges the dominant narrative that portrays entrepreneurial ecosystems as meritocratic engines of opportunity. By exposing the gap between rhetoric and reality, I contribute to critical entrepreneurship scholarship that questions neoliberal assumptions about individual agency and equal opportunity. The Israeli case study vividly illustrates how seemingly neutral entrepreneurial systems can embed and reproduce existing social stratifications along lines of ethnicity, gender, class, and geography.

Third, our four-layer model reveals the mutually reinforcing nature of exclusionary mechanisms. Structural inequities in capital distribution (Layer 1) enable institutional practices that appear neutral while embedding cultural biases (Layer 2). These institutional mechanisms disproportionately impact entrepreneurs with marginalized identities (Layer 3), while the overarching rhetorical framework of meritocracy obscures and legitimizes these exclusionary patterns (Layer 4). This interconnectedness explains why efforts to address exclusion often fail when targeting only one dimension without addressing the systemic whole.

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5.2 Practical Implications

Our analysis has significant implications for policymakers, ecosystem builders, and entrepreneurs. First, recognizing the systemic nature of exclusion demands holistic approaches to intervention. Piecemeal efforts such as isolated diversity initiatives or targeted funding programs may prove insufficient when the underlying structural, institutional, and discursive foundations remain unchallenged. Effective interventions must address all four layers simultaneously.

Second, our framework provides a diagnostic tool for evaluating existing entrepreneurial ecosystems. By examining each layer of exclusion, structural foundations, institutional mechanisms, identity-based barriers, and rhetorical framings, stakeholders can identify specific exclusionary patterns within their contexts. This diagnostic approach enables more targeted and comprehensive interventions.

Third, the Israeli case study highlights how ostensibly successful entrepreneurial ecosystems may perpetuate significant inequalities. This suggests that ecosystem success should be evaluated not merely by aggregate innovation and growth metrics but also by indicators of inclusivity and equitable distribution of opportunities and outcomes. Redefining success criteria may incentivize more inclusive ecosystem development.

5.3 Future Research Directions

While our conceptual framework and illustrative case study provide important insights, several promising avenues for future research emerge. First, comparative studies across diverse national and regional contexts would test the generalizability of our four-layer model. Different sociopolitical and economic environments may manifest exclusionary mechanisms in distinct ways, offering valuable insights into both universal and context-specific patterns.

Second, longitudinal studies could examine how exclusionary mechanisms evolve over time, particularly in response to deliberate interventions. Such research would illuminate the dynamic nature of exclusion and identify factors that facilitate or impede progress toward more inclusive ecosystems.

Third, participatory research approaches that center the experiences and perspectives of marginalized entrepreneurs could deepen understanding of how exclusion is experienced and navigated. These voices are essential for developing more effective and responsive interventions.

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Fourth, future research should explore potential pathways toward more inclusive entrepreneurial ecosystems, examining cases where genuine progress has occurred. Identifying successful interventions, particularly those addressing multiple layers simultaneously, would provide valuable guidance for policymakers and ecosystem builders.

5.4 Concluding Reflections

Our analysis suggests that exclusion in entrepreneurial ecosystems is neither accidental nor incidental but systematic, embedded in the structures, practices, narratives, and power relations that constitute these ecosystems. This systematic exclusion creates a profound contradiction between entrepreneurial rhetoric and reality, undermining the potentially transformative potential of entrepreneurship.

However, recognizing the systematic nature of exclusion also reveals potential leverage points for intervention. By understanding how the four layers interact, stakeholders can develop more comprehensive approaches that address exclusion at its roots rather than merely addressing symptoms. Such approaches require not only targeted programs and policies but also critical reflection on the underlying assumptions and narratives that shape entrepreneurial ecosystems.

The persistence of exclusionary patterns despite decades of diversity initiatives suggests that fundamental transformation requires more than goodwill or incremental change. It demands a willingness to interrogate power structures, challenge cultural assumptions, and reimagine entrepreneurial ecosystems as genuinely inclusive spaces. Only then can entrepreneurship fulfill its promise as a pathway to opportunity for all, rather than a mechanism that reinforces existing privileges.

By providing a framework for understanding the multidimensional nature of exclusion, I hope to contribute to this reimagining process. The four-layer model offers both analytical insight and practical guidance for those seeking to create entrepreneurial ecosystems that match rhetoric with reality, systems that truly foster innovation and economic growth while extending opportunity to entrepreneurs across all demographic groups and geographic regions.

In conclusion, addressing exclusion in entrepreneurial ecosystems requires recognizing its systematic nature and adopting holistic approaches that target multiple layers simultaneously. As the entrepreneurship field continues to evolve, success should be measured not merely by innovation metrics but also by how effectively ecosystems extend genuine opportunity to all potential entrepreneurs regardless of background. This broader conception of success may ultimately produce

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not only more equitable systems but also more innovative and resilient ones that harness the full creative potential of diverse entrepreneurs across society.

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IMPACTS OF THE COVID19 AND ENERGY CRISES ON HOUSEHOLD FINAL CONSUMPTION AND GENERAL GOVERNMENT EXPENDITURE

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ABSTRACT

Each period of an economic crisis is always most pronounced in the growth of general government expenditure. This was also the case during the period of the Covid19 crisis as well as in the subsequent years of high inflation, caused mainly by high energy prices. A specific feature of the pandemic period was the reduction in household final consumption expenditure as a result of the closure of shops, service establishments, transport, and tourism. However, even after the pandemic, household consumption did not begin to grow due to fears of further economic decline in the face of high inflation and slowing economic growth. The present paper aims to respond not only to these facts having been reflected in the functioning of the economies, but above all it wants to answer the questions of the intensity of these qualitative changes; when the standard level of the analysed indicators returned to the pre-crisis level; and what lasting changes were subsequently reflected in the consumption levels. Our analysis makes use of publicly available national accounts data from 30 countries in the period 2013-2023. The indicators monitored are the proportions in GDP of household final consumption expenditure, and general government expenditure. Using an original method proposed by the authors, based on the evaluation of changes in the perceptual map, it has been possible to demonstrate significant changes in these proportion values in the years of Covid19 and the ensuing energy crisis, and in the period in which the economies were not burdened by these extreme factors. The procedure and method of our analysis can thus also serve as an indicator of the sensitivity for changes in economic development.

Keywords: Final consumption expenditure, general government expenditure, gross domestic product, test of significance of the changes.

INTRODUCTION

The development of the world economy has undergone quite dramatic changes in the last quarter of a century. While the first years of the new millennium were marked by positive elements of economic

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development, the years 2008-2010 plunged the world economy first into a financial crisis and then into recession. This period was typified by a strong cooling of investment activity, low inflation rates and falling interest rates on deposits and loans. The causes of this global crisis were economic, originating in the mortgage and fiscal crisis in the USA, which quickly spread to Europe and other parts of the world.

The next profound crisis was triggered by the arrival of the Covid19 pandemic in 2020. It affected the whole world in a short time. National governments reacted quickly and in a way that was probably the only possible response in such a situation: isolation of the infected, strict hygiene measures, and then restrictions on the movement and assembly of people. This logically entailed a reduction in economic activity – most shops and services were closed, transport and travel were severely curtailed, and schools were closed. All of this meant a fundamental change in the economic and social behaviour of households and significantly affected the economic performance of businesses. In an attempt to prevent losses to the latter, especially small producers, which in many cases (restaurants, hotels, and other services) had to stop their activities altogether, national governments introduced a number of measures in the form of exceptional subsidies and compensation. These were intended, among other things, to maintain employment and, together with a system of exceptional social benefits, to stabilise household incomes. This, with limited shopping opportunities in shops and the impossibility to travel, meant (despite the significant increase in internet shopping) a significant reduction in household consumption. In addition to economic insecurity and the inability to 'spend', household behaviour and motivation was also crippled by life and health insecurity. Therefore, household final consumption expenditure fell more than GDP in 2020 compared to 2019 in most EU countries (except Greece, Croatia, and Hungary).

With the gradual easing of health restrictions, 2022 marked the beginning of a return to normal conditions for households. However, the pandemic period had undoubtedly caused lasting changes in the economic behaviour of households that had not fully recovered their consumption habits. High rates of inflation, especially the rise in energy and food prices in 2023, forced households to once again curb their consumption, and to adopt a cautious approach in investment behaviour. On the other hand, a reduction in consumption, all other things being equal, means an increase in savings; in the case of households, an increase occurred in the (gross) savings rate (the average gross savings rate of EU countries increased by 5.6% in 2020 as compared to 2019).

In general, when an economic crisis occurs, non-financial enterprises are usually the first to be hit (by a fall in production and investment, reduced availability of credit, insolvency, etc.), as well as financial institutions (by a fall in revenues, losses on bad debts, etc.). The decline in output and investment of non-financial corporations and financial institutions also affects the levels of foreign exchange in goods and services. This also has a natural impact on the performance of general government, i.e., on the total

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volume of its revenue and expenditure. In its turn, general government's balance sheet and, consequently, its debt were affected. The years of Covid19 crisis meant not only a significant drop in government revenues due to a drastic weakening of productive activity (lower tax collection and social contributions), but also, and above all, an increase in expenditure related to dealing with the pandemic (increased social spending, subsidies, and compensations). The average proportion of government spending in EU countries' GDP values was increased by 6.3 pp in 2020 as compared to 2019; this proportion was the smallest (around 3 pp) in the Nordic countries (Denmark, Sweden, and Finland). This led to a sharp increase in the general government deficit and general government debt in all countries (on average, the deficit and the debt were increased by 5.2 pp and 12.1 pp y-o-y, respectively, in the EU countries). The situation from the perspective of general government was not significantly improved even after the pandemic threat was subsided. While 2022 marked a year-on-year decline in the proportion of government spending in GDP in all countries surveyed (with the exception of Hungary, Romania, and Luxembourg), the deterioration of the international political situation (in particular the war in Ukraine) and high inflation rates in a number of countries led to a resumption of growth in this proportion in 2023, above the level of the pre-forecast year 2019 (the Nordic countries – Denmark, Norway, Sweden, – were again the exceptions, along with Ireland). Overall, the Covid19 pandemic led to a significant increase in government spending in all EU countries, with individual countries responding in different ways depending on their specific needs and economic conditions.

We have used an exact statistical method to describe and detect these changes. Our method is able to demonstrate the significance and intensity of these changes from the viewpoints of both the households and general government. The starting point for our analysis is the publicly available national accounts data from 30 countries in the period 2013-2023 published by Eurostat (https://ec.europa.eu/eurostat/databrowser). The indicators monitored include the proportion in GDP of household final consumption expenditure, and of government expenditure. A method based on the assessment of changes in the perceptual map allows us to demonstrate significant changes in these proportions in the Covid19 and subsequent energy crisis years. As the comparison benchmark we have used a period when economies were not burdened by these extreme influences.

THEORETICAL BACKGROUND

Household final consumption expenditure and total government expenditure are among the most important indicators of the national economy performance; and their interrelationship plays a key role in the development of the economy. Both of these expenditure types contribute directly to GDP, and influence each other. If governments increase their spending on public services, they can stimulate economic activity and increase household incomes, which in its turn can lead to higher household

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consumption, albeit with a lag in times of crisis. Through its fiscal policy, the government can influence household disposable income; tax cuts for households can lead to higher consumption. Conversely, tax increases or reductions in government spending can reduce household final consumption. Similarly, during crises, governments increase their spending to stimulate the economy, which may boost household consumption, but households tend to respond to the negative changes by reducing their interest in consumption. Years of economic growth encourage households to consume, despite a possible decline (or stagnation) in non-investment spending by governments. During the pandemic, which was a crisis of a specific type, governments increased their spending to support households and keep the economy going. In contrast, household final consumption expenditure fell, not only as a result of reduced shopping and travel opportunities, but also reflecting lower consumer activity due to economic and health uncertainty and changes in consumer behaviour during the crisis.

The particular situation at the time of the Covid19 pandemic crisis introduced yet another element into the relationship between general government expenditura and household final consumption expenditure. First and foremost, there was increased spending on health and social security (on average in the EU, this component of government expenditure rose from 26.3% of GDP in 2019 to 29.9% of GDP in 2020 – see https://ec.europa.eu/eurostat). In each country, governments' efforts to maintain employment and prevent social crises led to a range of compensations for the benefit of employees or their employers (compensation for employers' wage costs, allowances for employees in case of quarantine, increased sick pay, etc.). Such compensations increased total government spending; by contrast, household final consumption expenditure fell (from 52.7% of GDP in 2019 to 50.7% of GDP in 2020 – see https://ec.europa.eu/eurostat).

Despite the relatively significant, both direct and indirect, relationship between household final consumption and total government expenditure, there are very few studies on this topic in the literature. On the contrary, there are a number of interesting texts on the evolution of these indicators, either alone or in relation to other phenomena (e.g., inflation rates, savings rates in the case of household consumption, and debt and deficit in the case of government experndiure). Particularly numerous are studies that analyse the evolution of these indicators' values in the period of the Covid19 pandemic. A specific feature of the studies on the economic consequences of the Covid-19 pandemic is their focus on the situation in one particular country. This is because the anti-epidemic and social measures taken by the government in each country were different, and, by analogy, household responses to the effects of the pandemic varied from country to country.

The paper by Christelis et al. (2020) referred to the results of a panel data analysis within a consumer expectations survey aimed at finding out whether and how household financial and health concerns due to Covid19 affect their final consumption expenditure. The authors did not show that health

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concerns due to the pandemic had a negative effect on their consumption. In contrast, they showed that such concerns were associated with increased household spending on health and housing-related items. The survey results also confirmed that compensation by the state to reduce immediate financial insecurity, particularly among the younger generation and the socially vulnerable parts of the population, would not only boost consumption by these household groups but would also make such government measures more effective in the future.

Finck and Tillmann (2022) examined the evolution of US household final consumption expenditure during the Covid19 crisis. They showed that this crisis exacerbated consumption inequality: the decrease in final consumption expenditure was significantly higher for low-income households than for high-income ones. The same conclusion was reached by, for example, Christelis et al. (2020) and Chetty et al. (2020). In their studies, the latter showed that higher-wage workers experienced only a short recession of a few weeks, while low-wage workers experienced more permanent job losses. In this context, the authors emphasised the role of government expenditure in favour of households, which can halt or slow down the decline in consumer spending and job losses. The opposite view on the impact of the Covid19 crisis on different income groups is taken by Chen et al. (2024) in their study based on data from the Chinese economy.

Hronová and Hindls (2024) compared the two crisis periods, the financial and fiscal crisis period 2009-2013 and the Covid19 crisis period 2020-2022, in terms of their impacts on household final consumption expenditure. They showed that the Covid19 period cannot be viewed as purely negative in terms of the Czech household sector's economic behaviour. The sharp reduction in consumption led to a quite extraordinary increase in their savings rate and financial savings rate, which made this period fundamentally different from the pure economic crisis, which was reflected in the 2009-2013 period. Moreover, with high government deficits in the Covid19 (but also post-Covid19) years, the high gross savings of households and the high positive balance of their economic activity is a positive factor. It reduced, among other things, the dependence of the Czech economy on foreign resources. A comparison of the effects between the 2008-2009 and the Covid19 crises was also discussed by Parket et al. (2022). According to these authors, the crucial difference lay in the fact that the pandemic measures reduced households' access to a range of goods and especially services. In other words, there was nothing to spend on. On the other hand, there were extraordinary support and compensation measures from the government – such as small business support programmes and wage compensation for employers to maintain employment – that managed to keep household income levels stable. This circumstance, together with the inability to spend, led to an increase in savings, especially by low-income households. These subsidies and compensations were a 'cure' for the crisis different from the years of 'classic' economic crises (e.g., in 2008-2009, when the main point was to restart the economy,

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the main 'cure' was a system of tax breaks). Crnkovic et al. (2022) added that an increase in the household savings rate could be a source of macroeconomic instability in the long run. On the other hand, this implies that households are still worried about the future and prefer not to increase their spending significantly.

A study by the Central Bank of Ireland (cf. Conefrey et al., 2021) shows that the growth in government expenditure in Ireland in 2020 was the second highest in the Eurozone. It acknowledges that the government's interventions and compensations, as well as ECB policy, alleviated the worst effects of the pandemic and protected the economy from its consequences. On the other hand, they warned that such a targeted increase in government expenditure must always be a short-term one; a long-term increase financed by debt would accelerate the risk to fiscal sustainability and create the conditions for the onset of a future crisis. The impact of government expenditure on aggregate productivity was discussed in Van Vu, H. et al. (2023). In their study, based on panel data from 158 countries, the authors showed that health spending raises total productivity (including during periods of Covid19 crisis), while armament spending lowers it. They deliberately contrasted these two components of government expenditure to highlight the need for optimizing the structure of government expenditure towards overall fiscal sustainability and economic growth. Himbergen (2023) showed in his study, using data from 27 EU countries in the period 1995-2021, that government social spending is countercyclical and that it contributed to economic stabilisation during the Covid19 crisis more than during other crises. Employment maintenance spending was a particularly strong factor in coping with the pandemic crisis. However, they pointed out differences among different parts of the EU. The responses differed depending on each country's economic development level; the arrival and course of the crisis were confirmed by the study of Ayala-Caon et al. (2022), using OECD countries as an example.

The authors, as follows from the above overview of selected studies, are dedicated to assessing the impact of the Covid19 pandemic in isolation for individual countries. In this context, they then focus on either the development of household final consumption expenditure or the development of government expenditure. The aim of our study is to analyse the impact of the Covid19 pandemic on the relationship between these two indicators, all in a set of 30 countries. To do so, we use a perceptual-map method to capture changes.

The proposed original method to analyse the evolution of final consumption expenditure in given years is both simple and easy to interpret. The test described below allows us to show in an integrated way (i.e., aggregated for 30 countries over a period of about 10 years) how economies (as a whole!) behave in times of recession (crisis) or, on the contrary, in times of economic growth. And the fact that this is an integrated test, simultaneously assessing several economies at once, is quite logical. In today's world,

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national economies do not operate separately, in isolation, but rather in an integrated and deeply interconnected way that is often difficult to grasp.

DATA AND METHODS USED

The aim of this paper is to examine the evolution of household final consumption expenditure in the context of the evolution of government expenditure for 30 countries over the period 2013-2023.The analysis is based on publicly available and internationally comparable (see ESA 2010) data from Eurostat (https://ec.europa.eu/eurostat) for the countries of the European Union and the three associated countries (Iceland, Norway, and Switzerland). As the national accounts data on which we rely are always reported in national currency units and current prices, we have to use relative, i.e., dimensionless, indicators whose values are comparable over time and space. To construct both relative indicators, we have used GDP in the denominator.

In the case of final consumption expenditure, only merged data for the household sector and the non-profit institutions serving households sector are available on the Eurostat website. The merging of the household sector and the non-profit institutions serving households sector does not significantly affect the values of the indicator for the proportion of final consumption expenditure in GDP. The distortion approximately equally affects all the countries under our comparison, and can therefore be considered negligible. For the sake of simplicity, we will continue to use only households as the subject of consumption in the title of the indicator.

The proportion of household final consumption expenditure in GDP was relatively stable over time in all countries under assessment. The only turning point occurred in 2020, when the onset of the Covid19 crisis led to a decline in this proportion for all of the countries under review (with the exception of Greece, Croatia, Hungary, and Iceland). Traditionally, Greece had the highest proportion of household final consumption expenditure in GDP (around 70 %), with Ireland the lowest (around 30 % since 2015), due to the year-on-year jump in GDP growth in 2015; the GDP high level in Ireland has remained valid since then (mainly due to revenues from the licensing of multinational companies, which were administratively transferred to Ireland in 2015 and thus significantly increased and continue to increase Irish GDP; this has also led to the use of specifically adjusted gross national income indicator rather than GDP to express the results of economic activity in Ireland - see Lequiller, 2017, for more detail). The averages for the EU27 and the 30-country dataset are almost identical (in the range of 50 to 55% of GDP; source: https://ec.europa.eu/eurostat). However, after the Covid19 pandemic subsided, the values of final consumption expenditure's proportion in GDP did not, in most of these countries, return to the pre-Covid19 levels; this phenomenon was caused by households' concerns about the future evolution of consumer prices, and energy prices in particular.

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Another indicator is that of general government expenditure, or rather, its proportion in GDP. The general government expenditure is defined (see ESA 2010, Chapter 20) by reference to a list of categories: intermediate consumption, compensation of employees, other taxes on production (payable), subsidies (payable), property income (payable), current taxes on income and wealth (payable), social benefits other than social transfers in kind, social transfers in kind - purchased market production, other current transfers (payable), capital transfers (payable), gross capital formation and acquisitions less disposals of non-financial non-produced assets.

In other words, it is a comprehensive expression of government expenditure based on national accounts data (i.e., on an accrual basis). If the government expenditure is defined in this way, it is internationally comparable and tells the story of non-investment (mainly social benefits, subsidies, and capital transfers) and investment (gross capital formation) expenditure incurred by governments. Similarly, government revenues can be defined on the basis of national accounts data. The differences between revenues and expenditures enter into the government balance (government deficit/surplus).

France, a country with a traditionally very strong welfare state and a high level of pension redistribution, has the highest proportion of government spending in GDP in the EU (around 30 %), and in the set of 30 countries we have studied. At the other end of the scale is Ireland, characterised by low levels of redistribution (low corporate taxes, higher taxation of the population, low social benefits), i.e., a low proportion of revenue and expenditure in GDP (less than 30% GDP since 2015). The significant decline in Ireland's expenditure-to-GDP ratio in 2015 is a consequence of the jump in annual GDP growth (see above). In addition to Ireland, others with low levels of government expenditure' proportions in GDP (below 40% of GDP) are Malta, Lithuania, Bulgaria, and Switzerland. Nonetheless, for all countries indiscriminately, the proportion of government expenditure in GDP rose significantly with the onset of the Covid19 pandemic and then declined slightly to pre-Covid19 levels (source: https://ec.europa.eu/eurostat).

The input variables into our model were the indicators we have just described, i.e., proportions in GDP of household's final consumption expenditure (denoted by FCEh below) and general government expenditure (GGE) in 30 countries in the period 2013–2023.

The method used to analyse the relationship between the values of the selected indicators is the evaluation of changes in a two-dimensional spatial map. This procedure, published in Hindls, Hronova (2012), consists of an original development of a measure *t* for the situation where the data is arranged in a two-dimensional spatial map; over a given time period (here 2013-2023), we then observe how the individual values of the dot plot shift over time (i.e., over the years of observation). Measure *t* is to express the Euclidean distances in the spatial map (see below). This allows us to assess how the phases

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of the economic cycle (in the years in question) have affected the indicators analysed. Let us now describe the procedure.

To simplify the notations, we denote the proportion of household final consumption expenditure (FCEh) in gross domestic product (GDP) in the i-th country as x_i, i = 1, 2, ..., n, where the symbol n denotes the number of countries. Analogously, the proportion of total general government expenditure (GGE) in GDP as y_i, i = 1, 2, ..., n. We denote the year of the first observation by the symbol "1" (for the illustration below, let us choose, e.g., 2013 as the beginning year), the year of the second observation by "2" (let us choose 2014 for the illustration). Later, we will analyse all pairs of individual years, i.e., successive pairs of years over the whole period 2013-2023.

Specifically:

- By x_{1i} we mean the ratio of FCEh/GDP in the i-th country, i = 1, 2, ..., n, (in our case n = 30) in period 1 (year 2013);
- By x_{2i} we mean the ratio of FCEh/GDP in the i-th country, i = 1, 2, ..., n, (n = 30) in period 2 (year 2014);
- By y_{1i} we mean the ratio of GGE/GDP in the i-th country, i = 1, 2, ..., n, in period 1 (year 2013); and
- By y_{2i} we mean the ratio of GGE/GDP in the i-th country, i = 1, 2, ..., n, in the 2nd period (year 2014).

Each of the n countries is thus considered in the light of two different percentages of FCEh/GDP (variable x) and GGE/GDP (variable y), in two different periods (years). The baseline values of the relative indicators, i.e., variables x_{1i}, x_{2i}, y_{1i}, y_{2i}, are calculated on the basis of the values of the absolute indicators from the Eurostat database (https://ec.europa.eu/eurostat/databrowser).

Next, let us denote:

- By K_1 the mean value (i.e., mean spatial localisation) of the two observed indices (i.e., FCEh/GDP and GGE/GDP ratios) in period 1 (here year 2013), i.e., the mean value of all points [x_{1i} ; y_{1i}] located in the Cartesian coordinate space (x, y), see formulae (1) and (2) below; and
- By K_2 the mean value (i.e., mean spatial localisation) of the two observed indicators (i.e., FCEh/GDP and GGE/GDP ratios) in period 2 (year 2014), i.e., the mean value of all points [x_{2i} ; y_{2i}] located in the Cartesian coordinate space (x, y), see formulae (1) and (2) below. As a summary evaluation of changes in indicators, we propose - see Hindls, Hronová (2012) - a measure t, for which

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$$t = \frac{\frac{\sum_{i=1}^{n} k_i}{n}}{\sqrt{\frac{\sum_{i=1}^{n}\left[k_i - \frac{\sum_{i=1}^{n} k_i}{n}\right]^2}{n(n-1)}}}, \quad (1)$$

where

$$k_i = \text{sign}\{y_{2i}^2 + x_{2i}^2 - y_{1i}^2 - x_{1i}^2\}\sqrt{(x_{2i} - x_{1i})^2 + (y_{2i} - y_{1i})^2}\,, \quad (2)$$

$\frac{\sum_{i=1}^{n} k_i}{n}$ is the estimate of the $K_2 - K_1$. (3)

The sign{...} operator above is used to determine the sign of the "aggregate spatial" change ("±") of the level of the two-indicator assessment in the second (later) period (here, in the illustration, 2014) compared with the first period (2013). The sign{...} operator thus expresses whether the *i*-th spatial location (i.e., the location of the *i*-th country) in period 2 (i.e., 2014) has moved closer to ("−") or farther away from ("+") the centre [0;0] of the coordinates than in period 1 (i.e., 2013). If, for example, the *i*-th spatial location has moved farther away from the centre of the [0;0] coordinates, then the "+" sign indicates that the aggregate (i.e., for the two relative indicators observed together) position of the indicators in the *i*-th country has moved farther away from the centre [0;0] of the coordinates (i.e., it is a kind of "geometric" aggregation of the observed indicators). The "−" sign then, of course, represents the opposite situation, i.e., an approach to the centre [0;0] of the coordinates.

Based on the values of measure *t*, we formulate a conclusion about the time changes in the values of the FCEh/GDP and GGE/GDP ratios for all *n* observed countries.

RESULTS AND DISCUSSION

We will now apply the complete procedure to the data (see https://ec.europa.eu/eurostat). We proceed to an integral analysis of the evolution of the FCEh/GDP and GGE/GDP proportions for the 30 countries (in general, there is no limit to the number of countries for such an analysis). In our analysis, we compare the period 2013 through 2023, whose segments have a very diverse composition in terms of economic stability. As noted above, the period 2013 through 2019 was characterised by economic growth, which was then replaced by a deep downturn in the period 2020 to 2023, reflecting the global economic crisis, whether caused by Covid19 or the subsequent energy crisis – all accompanied by significant price turbulences.

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If we calculate the presented test procedure for the FCEh/GDP and GGE/GDP indicators and the period 2013-2023, we obtain a table with the values of the test statistics determined according to (1), (2) and (3). Table 1 shows the relevant values only above the main diagonal – the test statistic is symmetric for each pair of years (i.e., it is the same for the pair of years 2013-2020 as for the "opposite" order of years, i.e., 2020-2013).

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
2013		0.7714	-3.1337	-3.9237	-4.1625	-4.3202	-4.5216	-0.2627	-2.7590	-3.1273	-2.8348
2014			-1.7541	-2.1496	-2.2563	-2.5945	-2.7808	-2.1406	-3.3827	-3.0608	-2.5081
2015				-2.8877	-4.6450	-5.4474	-5.4635	1.9916	-0.4656	-1.2919	-1.0343
2016					-1.3942	-2.3757	-4.3281	3.7944	0.5109	-0.1135	-0.0442
2017						0.1399	-2.1485	8.2779	2.1804	0.5976	1.5116
2018							-2.3090	7.6367	1.7814	0.6965	1.9454
2019								11.8526	2.4458	0,9870	3.1287
2020									-6.4942	-4.6046	-5.0036
2021										-1.4555	-1.7986
2022											1.0903
2023											

Table 1. *Test statistic t values for the years 2013-2023*

And then came years 2020 and later, when the values of the *t* statistic rose sharply into a positive territory, as is evident in Figure 1.

Our test procedure works on the principle of a kind of "bellows". It shows that in times of economic difficulties the values of the test criterion (1) on the perceptual map increase (up to positive values). A positive sign means that the values of the indicators are moving away from the centre of the perceptual map. In our case, this means a (relative) growth in household final consumption expenditure (which, given the economic difficulties, has to be reinforced by rising government expenditure). Relatively speaking, there is not much room for more investment activity. It can be viewed as a typical feature of the consequences of economic deprivation.

And vice versa: in times of rising economic performance, the values of the test criterion enter the negative range, so the relative indicators of total consumption expenditure with respect to GDP are retreating from the centre of the map. In other words, total relative final consumption expenditure moves to the centre of the perceptual map, in effect making room for investment activity by all actors, including governments.

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Just a glance at the graphical form of the obtained results clearly shows that the *t* statistic in the years 2013-2020 presents negative values. This fact proves that the values of the relative indicators FCEh/GDP and GGE/GDP are shifting towards the centre of the perceptual map as a result of increased economic activity, which somewhat weakens the relative position of total consumption in GDP and, on the contrary, stimulates other possibilities in the structure of GDP utilisation; in particular, it indicates higher investment activity (at relatively lower values of total consumption expenditure) as a manifestation of growing economic performance.

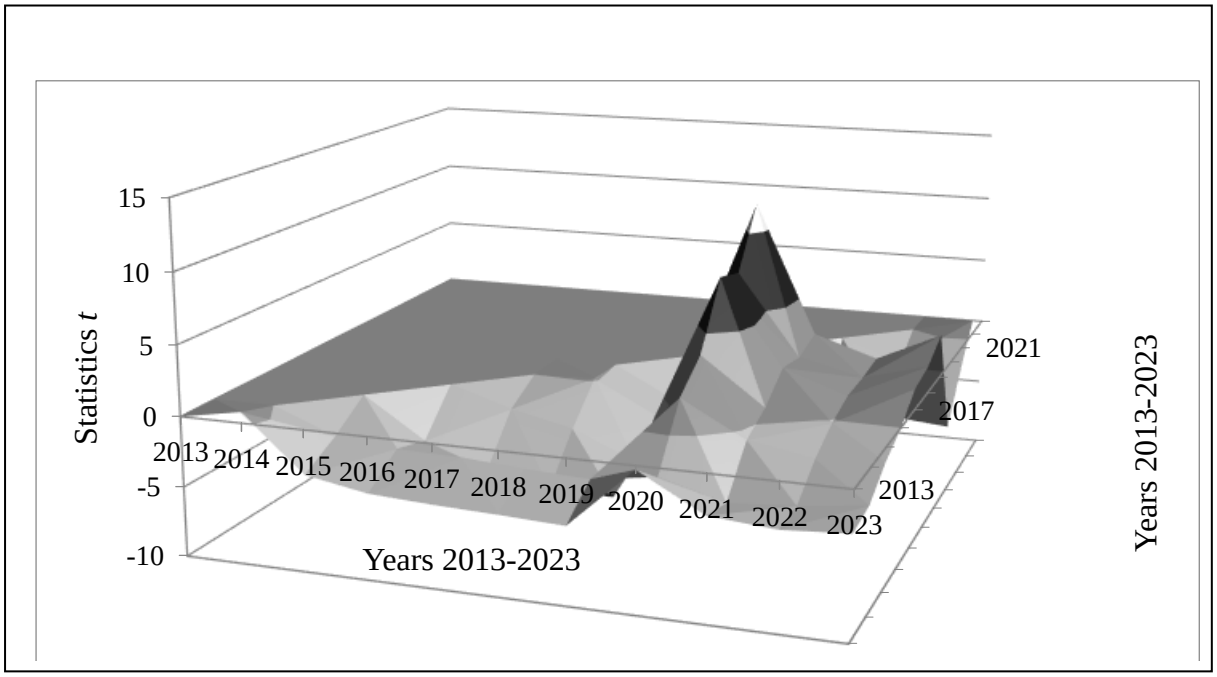


Figure 1. *Test statistic t values for the years 2013-2020*

This is a reflection of the fact that the severe crisis of 2020-2022 forced the government into increased spending to support employment, production, the health and social welfare system, etc. However, the scope for investment activity and higher economic output was shrunk considerably.

It is interesting to look at the right-hand area in Figure 1. At the 2022-2023 transition, the values of the *t* statistic start to decline again. Thus, reflecting the beginning of the economic recovery, the total proportion in GDP returns (very slowly) to the middle of the perceptual map. This is a signal of the waning of the covid19 and energy crises. Nevertheless, the slightly positive values persisted because the recovery, as we know, was fragile and this fragility may well have persisted to this date

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CONCLUSIONS

The results of our analytical procedure provide two rather important observations. The first one is that the proposed method can indeed be quite sensitive to the evolution of the substantive relationships between the FCEh/GDP and GGE/GDP relative indicators. In other words, our analysis can also serve as a partially predictive indicator of the stage of the economic cycle prevailing in the economies of certain interconnected economic units (i.e., national economies of different countries) as well as expectations of its future evolution. This observation is, in fact, indicated by the signs of the test: the shift of the FCEh/GDP and GGE/GDP relative indicator values towards the centre of the perceptual map (the sign "-") signals a decrease in the weight of total consumption expenditure with respect to total GDP (i.e., in favour of economic recovery, that is, in favour of investment). Conversely, a movement of the test values from the centre of the map outwards (the "+" sign) indicates the need to stimulate total consumption expenditure, thus logically reducing the scope for boosting investment within total GDP.

The second observation is that the complex relationship between the components of GDP utilisation (represented here by a somewhat antagonistic relationship between consumption and capital formation) must also be considered in terms of the intrinsic relationship between household final consumption expenditure and government expenditure. These relationships can also be very complex and fluid in periods of economic downturn. It is complex in terms of the extent to which households are still willing/able to incur expenses in a time of depression and the extent to which government budgetary stimulus is necessary to maintain at least a minimum of necessary household consumption (in the form of aid, subsidies, tax breaks, etc.). Moreover, this complex relationship can take quite different forms in different countries depending on their economic strength, fiscal responsibility, and commitment to sound governance. This complex relationship is also reflected in the proposed test, including its predictive power.

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DRIVING CHANGE: ESG, AI, AND FINANCIAL INNOVATION FOR A SUSTAINABLE FUTURE

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ABSTRACT

The need to tackle climate change, social issues, and the lack of resources has made sustainability a top priority for companies and financial practices. This study examines how environmental, social, and governance (ESG) measures, green bonds, and artificial intelligence (AI) technology can help connect sustainability with financial success. This study provides robust empirical validation for the positive relationship between a firm's ESG performance and its financial value. However, its primary contribution lies in revealing that this relationship is not straightforwardly amplified by general innovation spending. Our findings demonstrate that broad R&D investment, in isolation, is insufficient to drive sustainability outcomes or moderate the ESG-value link. This suggests the critical importance of strategic execution over budgetary inputs alone, highlighting that the *type* and *focus* of innovation are paramount. Ultimately, this research emphasize the need for targeted, governance-led strategies to convert sustainability commitments into defensible financial success. Ultimately, this study concludes that strategic intent, not budgetary input alone, is the definitive catalyst for converting sustainability commitments into corporate value.

Keywords: Sustainable finance, ESG metrics, Artificial intelligence (AI), Green bonds, Financial innovation, Corporate sustainability, Sectoral analysis, Sustainability benchmarks, Economic growth

1. INTRODUCTION

The contemporary corporate landscape is characterized by climate change, socio-economic disparities, and resource limitations. To bridge the gap between sustainability and financial performance, businesses and policymakers are increasingly integrating principles of environment, sustainability and governance (ESG); artificial intelligence (AI)-driven financial technologies; and innovative investment models (Whelan *et al.*, 2021).

"With the global sustainable finance market projected to surpass USD 22 trillion by 2030 (Allied Market Research, 2021), a paradigm shift is compelling businesses to integrate sustainability into their

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core strategies. The rise of sustainable finance is primarily driven by investor demand for transparency and accountability, making the integration of Environmental, Social, and Governance (ESG) metrics a cornerstone of modern corporate strategy. While the link between ESG and financial performance is well-established, the mechanisms through which this value is created, particularly the role of corporate innovation remain a complex and debated topic. This study investigates this critical nexus by asking: How does innovation interact with a firm's ESG strategy to influence its ultimate financial performance?" Financial innovations such as AI-powered investment platforms, green bonds, and ESG benchmarks are transforming corporate decision-making processes The rise of sustainable finance is primarily driven by investors' demand for increased transparency, ethical governance, and accountability (Flammer, 2021).

Sustainable finance has become a cornerstone of contemporary financial markets, enabling organizations to achieve long-term cost efficiencies, enhance corporate branding, and improve stakeholder trust . The integration of ESG metrics and AI in investment strategies aligns financial performance with environmental and social responsibilities. Furthermore, a data-driven culture has been shown to play a critical role in driving innovation and enhancing performance, enabling firms to make better, more informed sustainability decisions (Chatterjee *et al.*, 2024).

2. LITERATURE REVIEW

Financial innovation refers to the development of new financial products, services, and technologies that enhance risk management, market accessibility, and capital allocation. Sustainable finance mechanisms ensure investment flows align with long-term environmental, social, and economic objectives, surpassing short-term profitability considerations.

Green bonds

Green bonds are a vital financial instrument supporting environmentally sustainable projects, including renewable energy, climate change adaptation, and infrastructure development (Flammer, 2021). These bonds enable corporations and governments to secure lower-cost capital while aligning financial strategies with sustainability objectives (Tang and Zhang, 2020). Investor demand for green bonds has significantly lowered financing costs for issuers (Ehlers and Packer, 2017).

Research indicates that firms issuing green bonds often experience superior stock performance due to positive investor sentiment (Zerbib, 2019). Additionally, green bond issuance enhances corporate brand perception and reputation (Karpf and Mandel, 2018). Emerging studies highlight the resilience

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of firms with robust green financing mechanisms during economic downturns (Zhang *et al.*, 2024). The rise of Islamic finance, particularly Green Sukuk, further broadens access to green financial markets within ethical investment frameworks.

One study explored the role of green innovation in mediating the relationship between ESG practices and financial performance (Chouaibi et al., 2021). This study, covering UK and German companies, show that stronger ESG commitment enhances financial outcomes. The authors suggested further research in diverse regions to understand global applicability.

The role of innovation in this dynamic is critical. Green innovation, in particular, has been identified as a key mediator in the relationship between ESG practices and financial performance (Chouaibi, S. et al., 2022). This suggests that the positive financial outcomes of strong ESG performance are often delivered *through* specific, targeted innovations. At the same time, the effectiveness of any corporate strategy, including sustainability, is dependent on strong corporate governance. The commitment and structure of a company's board are seen as crucial moderating factors in translating sustainability policies into tangible actions and outcomes (Chouaibi, J. et al., 2021). This highlights a potential gap: while firms may allocate resources to innovation (e.g., R&D), these investments may not yield sustainability benefits without the proper governance and strategic focus to guide them.

Regulatory bodies such as the Climate Bonds Initiative (CBI) and the European Union's Green Bond Standard (EUGBS) have established stringent guidelines to enhance green bond credibility (Flammer, 2021). Governments worldwide are implementing tax incentives to encourage green bond adoption, further reinforcing their role in sustainable finance (Tang and Zhang, 2020).

AI-powered ESG analytics

ESG scores are increasingly utilized to assess corporate sustainability performance, influence investment strategies, and inform regulatory policies (Friede *et al.*, 2015). High ESG scores are correlated with long-term financial stability, reduced regulatory risks, and enhanced investor confidence (Eccles *et al.*, 2014). Firms demonstrating strong ESG commitments benefit from capital efficiency improvements and lower reputational risks (Khan *et al.*, 2016). Moreover, blockchain-enabled ESG reporting enhances transparency and mitigates greenwashing risks (Hossain and Hasan, 2024). AI-powered ESG analytics facilitate real-time risk assessments, optimizing sustainable investment decisions (Tse *et al.*, 2024).

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Artificial intelligence is revolutionizing financial risk management, investment decision-making, and ESG compliance (Baker and Dellaert, 2020). AI-driven algorithms automate ESG monitoring, detect financial fraud, and optimize portfolio management

AI also enables real-time climate risk assessments, allowing businesses to anticipate sustainability risks and avoid greenwashing (Tse et al., 2024). A recent study by Mardini (2022), analyzing 7,081 non-financial firms across 35 countries (2012-2020), revealed that ESG factors positively impact corporate financial performance, particularly market indicators like Tobin's Q and accounting metrics such as ROA and ROE. It emphasized the importance of balancing ESG considerations in financial decision-making.

Financial innovation and ESG integration

The transition from fossil fuels to renewable energy is being accelerated by stringent regulations and green finance initiatives (Deloitte, 2023).

. ESG compliance facilitates this shift, ensuring a balance between market demand and regulatory requirements. Investment in renewable energy projects leads to long-term cost efficiencies, government subsidies, and increased investor confidence (Flammer, 2021).

AI-driven energy models enhance operational efficiency by predicting consumption trends, optimizing emissions reductions, and improving grid management (ESG Analytics, 2022). AI plays a pivotal role in reducing environmental footprints, optimizing energy consumption, and improving operational efficiency within the technology sector. Corporations such as Microsoft and Alphabet employ AI-powered ESG analytics to track sustainability performance and maximize financial returns (Whelan *et al.*, 2021). AI applications in ESG reporting ensure greater accuracy and compliance with sustainability targets (Gamazaychikov, 2025) The automotive sector is undergoing a significant transformation with increased adoption of electric vehicles (EVs) and autonomous driving technologies. Firms like Tesla and General Motors incorporate ESG-focused strategies to enhance sustainability and attract environmentally conscious consumers (Tesla.com, 2023)

The automotive sector is also leveraging circular economy principles to align with ESG objectives by reducing waste, recycling materials, and improving energy efficiency (gm.com, 2023). The mining industry is integral to the clean energy transition, supplying critical raw materials such as lithium, cobalt, and nickel for renewable energy storage and EV batteries (Hirlekar *et al.*, 2025). ESG-linked financing supports sustainable mining practices, ensuring compliance with environmental

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regulations. Additionally, carbon credit systems aid in reducing mining-related carbon emissions, enhancing sustainability in resource extraction industries (Hirlekar *et al.*, 2025).

Corporate venture capital (CVC) has emerged as a crucial enabler of renewable energy financing, particularly in the Asia-Pacific region (Kolte *et al.*, 2023). CVC-backed renewable energy firms demonstrate higher investor confidence and accelerated technological advancements. Institutional investors are increasingly focusing on renewable energy companies, fostering the development of sustainable financial ecosystems. CVC investments in clean energy contribute to carbon-neutral economic growth and serve as a critical bridge between financial markets and sustainable technology innovation.

Hypotheses:

Based on the established literature and the identified research gaps, we formulate the following three hypotheses to guide our empirical investigation:

Building on the foundational literature, we first seek to validate the direct positive relationship between sustainable practices and firm value. Hypothesis 1 (H1): We hypothesize that "the adoption of sustainable practices, measured by higher corporate ESG scores, is positively associated with improved corporate financial performance."

To understand the mechanisms of sustainability, we test the role of innovation as a key enabler. Hypothesis 2 (H2): We hypothesize that, " financial innovations, proxied by R&D spending and high renewable energy usage, are positively associated with improved sustainability outcomes."

Finally, to explore the synergistic effects, we investigate if innovation acts as a "value amplifier Hypothesis 3 (H3): We hypothesize that, "investment in R&D positively moderates the relationship between ESG performance and market capitalization."

Conceptual Model

The conceptual framework of this study examines the interconnected relationship between financial innovation, sustainability outcomes, and financial performance. It is structured around three key linkages **(Figure 1).**

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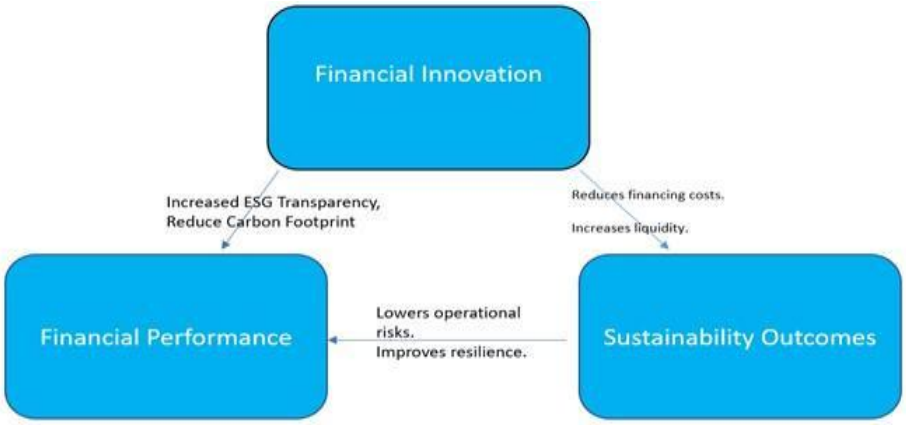


Figure 1. Conceptual framework (Author's presentation)

Financial innovations →Sustainability outcomes

Financial innovations such as green bonds, ESG frameworks, and AI-driven platforms directly contribute to sustainability outcomes by encouraging responsible investment practices, enhancing transparency in ESG reporting, and reducing carbon footprints through green finance mechanisms.

Financial innovations →Financial performance

Innovative financial instruments positively impact corporate profitability by reducing financing costs (e.g., green bonds attract low-cost capital), increasing liquidity (e.g., AI platforms optimize asset allocation), and enhancing risk management (e.g., ESG scores mitigate compliance risks).

Sustainability outcomes →financial performance

Firms with strong ESG performance experience higher market valuation and long-term stability, as they exhibit lower operational risks, attract more institutional investors and demonstrate greater resilience during financial downturns.

3. DATA AND METHODOLOGY:

Sample and Data Collection

The data for this study were sourced from the Bloomberg Terminal, a leading provider of comprehensive financial and non-financial corporate data. Our final sample is a panel dataset comprising **26 unique companies** aggregated across six key sectors: Banking & Finance, Consumer

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Discretionary, Industrial, Utilities, Technology, and Energy. These 26 firms provide a total of **358 firm-year observations** for our analysis, creating a robust dataset to test our hypotheses over time.

Variable	Observations	Mean	Std. Dev.	Min	Max
Return on Assets (ROA)	358	5.87	4.21	-15.3	25.6
Market Cap (Log)	358	9.85	1.52	6.45	13.7
ESG Score	358	55.4	12.8	20.1	89.5
R&D Spending (Millions)	358	1,520.00	3,450.00	0	25,600.00
Renewable Energy Usage (%)	358	22.5	28.7	0	100
CO_2 Emissions (CO_2e)	358	18,500.00	35,200.00	50	250,000.00
Revenue (Log)	358	9.55	1.48	6.12	13.5

Table 1: Descriptive Statistics

Measurement of Key Variables Our dependent variables capture both financial success (Return on Assets and Market Capitalization) and sustainability outcomes (ESG Scores and CO_2 Emissions). To test our hypotheses concerning innovation, this study utilizes corporate research and development (R&D) expenditure as the primary proxy. While R&D spending is a widely accepted proxy, we acknowledge that this broad measure does not capture the specific strategic orientation of that innovation, which reinforces the importance of our call for future research.

Analytical Strategy To test our hypotheses, we employ a series of Ordinary Least Squares (OLS) regression models, with all models including sector-fixed effects. Our strategy is as follows:

Hypothesis 1: We assess the direct impact of ESG Scores on ROA and Market Capitalization.

Hypothesis 2: We test the effect of our innovation proxies on ESG Scores and CO_2 Emissions.

Hypothesis 3: We test the moderating role of innovation by introducing an interaction term between the ESG Score and R&D spending.

3.1 *Data analysis techniques*

The data were analysed using three regression models to assess the relationship between financial innovations, sustainability outcomes, and financial performance.

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The data for this study were sourced from the Bloomberg platform, providing comprehensive financial and sustainability information for a sample of companies across the Banking & Finance, Consumer Discretionary, Industrial, Utilities, Technology, and Energy sectors.

To empirically test our hypotheses concerning the role of innovation, this study utilizes corporate research and development (R&D) expenditure as the primary proxy for a firm's innovation activities. While R&D spending is a widely accepted proxy in the literature for a firm's commitment to innovation, we acknowledge that this broad measure does not capture the specific strategic orientation of that innovation—for instance, whether it is targeted at green technologies or general process improvements. This methodological limitation reinforces the importance of our call for future research to disaggregate 'innovation' into more granular, sustainability-focused categories.

The hypotheses were tested using a series of Ordinary Least Squares (OLS) regression models based on data aggregated from these sectors. Model 1 examined the impact of innovation proxies on sustainability outcomes (ESG Score and CO_2 Emissions) to test H2. Models 2 and 3 assessed the direct impact of ESG performance on financial outcomes (ROA and Market Capitalization, respectively) to test H1. Finally, Model 4 introduced an interaction term between ESG Score and R&D spending to test the moderating effect proposed in H3.

All models controlled for firm size (using Log-transformed Revenue) and included sector-specific fixed effects to account for industry variations. The table shows the structure and purpose of each regression model we used. We designated specific models to isolate and test each of our three core hypotheses.

Regression models and their specifications

Model	Purpose	Independent Variable(s)	Dependent Variable(s)
Models 1a & 1b	To test H2: whether financial innovations are associated with improved sustainability outcomes.	• R&D Spending (as a proxy for innovation) • Sector Controls	• ESG Score (Model 1a) • CO_2 Emissions (Model 1b)
Models 2 & 3	To test H1: whether sustainable practices are associated with improved financial performance.	• ESG Score • Sector Controls	• Return on Assets (ROA) (Model 2) • Market Capitalization (Model 3)
Model 4	To test H3: whether R&D spending moderates the relationship between ESG and firm value.	• ESG Score • R&D Spending • ESG * R&D Interaction • Sector Controls	• Market Capitalization

Table 2. Regression models and their specifications

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3.2 Model Diagnostics

To ensure the validity of the OLS regression results, a series of diagnostic tests were conducted on the core models. The results confirm that the assumptions of OLS regression are largely met, strengthening the reliability of the findings**.**

Multicollinearity: A Variance Inflation Factor (VIF) analysis was performed to detect multicollinearity among the independent variables. The VIF for all variables in the primary models was found to be below 2.5, which is well under the common threshold of 5, indicating that multicollinearity is not a concern in this analysis.

Autocorrelation: The Durbin-Watson test was used to check for autocorrelation in the residuals. The test statistic for the primary model predicting Return on Assets (ROA) was 1.89. As this value is very close to 2.0, it suggests there is no significant autocorrelation in the data.

Heteroskedasticity: The Breusch-Pagan test was conducted to test for heteroskedasticity. The test yielded a p-value of 0.11. Since this value is greater than the significance level of 0.05, we fail to reject the null hypothesis of homoskedasticity, indicating that the variance of the residuals is constant.

This table reports the results of the diagnostic tests conducted to ensure the validity of the OLS regression assumptions.

Diagnostic Test	Statistic / Value	Interpretation / Result
Multicollinearity (VIF)	All variables < 2.5	No significant multicollinearity detected.
Autocorrelation (Durbin-Watson)	1.89	No significant autocorrelation detected.
Heteroskedasticity (Breusch-Pagan)	p-value = 0.11	Fail to reject null hypothesis; homoskedasticity is assumed.

Table 3. Model Diagnostics

4. REGRESSION ANALYSIS

Regression Results for Hypothesis 1 (ESG and Financial Performance)

The table presents the results of the OLS regression models testing the association between ESG scores and financial performance metrics.

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VARIABLES	Model 2(Dep: ROA)	Model 3(Dep: Market Cap)
ESG Score	0.160*	0.056*
	p=0.000	p=0.000
Log (Revenue)	0.450*	0.730*
	p=0.000	p=0.000
Constant	-2.986*	1.834*
	p=0.000	p=0.000
Observations	358	358
R-squared	0.354	0.819

Table 4. Regression Results for Hypothesis 1

This table provides a clear and powerful answer to our first research question. The results for both Model 2 and Model 3 show that the ESG Score has a highly significant positive effect on both profitability (ROA) and market value. The extremely low p-values (p=0.000) confirm this is not a random chance finding, providing strong support for Hypothesis 1.

Regression Results for Hypothesis 2 (Innovation and Sustainability Outcomes)

The results of the OLS regression models testing the impact of innovation proxies on sustainability outcomes.

VARIABLES	Model 1a(Dep: ESG Score)	Model 1b(Dep: CO_2 Emissions)
R&D Spending	0.0003*	-3.565*
	p=0.003	p=0.000
Renewable Energy	0.178*	-499.01*
	p=0.000	p=0.000
Log (Revenue)	1.968*	2963.7
	p=0.000	p=0.252
Constant	29.54*	56001.3
	p=0.000	p=0.056
Observations	358	358
R-squared	0.589	0.279

Table 5: Regression Results for Hypothesis 2

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Here, we investigate if innovation helps firms become more sustainable. The results strongly support this idea. The low p-values show that higher R&D Spending is significantly linked to better ESG scores and lower carbon emissions. This confirms Hypothesis 2 and establishes innovation as a critical driver of corporate sustainability.

Regression Results for Hypothesis 3 (Moderating Role of R&D)

The results testing the moderating effect of R&D spending on the relationship between ESG and market capitalization.

VARIABLES	Model 4(Dep: Market Cap)
ESG Score	0.055*
	p=0.000
R&D Spending	0
	p=0.180
ESG * R&D Interaction	-1.58E-07
	p=0.896
Log (Revenue)	0.726*
	p=0.000
Constant	1.879*
	p=0.000
Observations	358
R-squared	0.821

Table 6: Regression Results for Hypothesis 3

This table reveals the most surprising finding of our study. To test if R&D acts as a "value amplifier," we look at the "ESG * R&D Interaction" term. Notice its p-value is 0.896, which is very high. This means the effect is not statistically significant, and we therefore do not find support for Hypothesis 3. This suggests that simply spending more on R&D does not make a high ESG score more valuable, pointing to the critical importance of how that innovation money is spent.

5. CONCLUSION

This research provides compelling evidence that financial innovations are pivotal in achieving both financial and environmental goals. The findings offer a roadmap for firms, policymakers, and researchers to drive sustainable financial growth and address global sustainability challenges. Investing in ESG strategies should be a top priority for practitioners, who should also apply sophisticated financial models for risk analysis and strategic planning, while customizing financial

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innovations to fit specific industry challenges. The study provides a reproducible foundation for further research and supports well-established hypotheses. Its outcomes can be used by academia to underscore the importance of sustainable finance in corporate strategies.

This research provides compelling evidence that integrating ESG principles into corporate strategy is not just an ethical imperative but a driver of financial value. The empirical results confirm that firms with higher ESG scores tend to exhibit superior financial performance, as measured by both profitability and market valuation.

For future research, this study opens avenues to explore the mediating role of specific 'green innovations' versus general R&D and to further investigate the critical influence of governance quality in the ESG-performance relationship.

This research provides robust empirical validation for the positive relationship between a firm's ESG performance and its financial value. However, the primary value of this paper lies in its nuanced exploration of the underlying mechanisms. The key contributions are threefold:

Theoretical Contribution: We refine sustainability theory by demonstrating the critical distinction between innovation as a mediator versus a moderator, challenging the notion that general R&D spending is an effective amplifier of ESG benefits.

Empirical Contribution: We provide new, multi-sector evidence that untargeted innovation investment is not significantly associated with amplifying firm value in an ESG context, highlighting a crucial boundary condition for the existing literature.

Practical Contribution: We deliver a clear, actionable message for managers and investors: to unlock the full financial potential of ESG, firms must cultivate a governance structure capable of directing innovation towards specific green outcomes, as simply funding a large R&D department is insufficient.

Scope for future research: Future studies should focus on longitudinal analyses to explore the sustained impact of financial innovations and investigate the role of emerging technologies, such as blockchain and IoT, in enhancing ESG outcomes.

Our research provides robust empirical validation for the positive relationship between a firm's ESG performance and its financial value. However, its primary contribution lies in revealing that this relationship is not straightforwardly amplified by general innovation spending. Our findings

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demonstrate that broad R&D investment, in isolation, is insufficient to drive sustainability outcomes or moderate the ESG-value link. This suggests the critical importance of strategic execution over budgetary inputs alone, highlighting that the *type* and *focus* of innovation are very crucial. Ultimately, for practitioners, this research shows the need for targeted, governance-led strategies to convert sustainability commitments into defensible financial success.

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'SERVICE FAILURE TO SERVICE RECOVERY': A STUDY FROM THE B2B PERSPECTIVES IN MALAYSIA

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ABSTRACT

This study examines the effects of service failure on service recovery expectations, of service recovery expectations on justice theories, of justice theories on post-recovery satisfaction, and of post-recovery satisfaction on behavioural constructs. In other words, this paper has examined the following research questions, i.e., what is the effect of service failure on service recovery expectations; (ii) what is the effect of service recovery expectations on justice theory; (iii) what is the effect of justice theory on post-recovery satisfaction; and (iv) what is the effect of post-recovery satisfaction on WOM and purchase intention. To conduct this a quantitative method was used, and 430 samples were collected from Kuala Lumpur, Malaysia. Structural equation modeling was used to analyse the data. The results suggest that all the hypotheses were confirmed, confirming the model suggested by Azemi et al. (2019).

Keywords: Service failure, service recovery expectations, justice theories, post-recovery satisfaction, behaviour, justice theory, procedural justice, distributive justice, interactional justice, quantitative method, structural equation modeling

INTRODUCTION

Many service firms in today's world aim for perfect service delivery, but such perfection is extremely difficult to attain (Baliga et al., 2021; Choi and La, 2013). The high level of human involvement in live manufacturing and delivery, and issues of intangibility, inseparability, and variability of service, have forced firms to deploy various recovery techniques (Ahmad et al., 2022). Successful service recovery can overcome disappointment and yield significant outcomes including satisfaction, repurchase intention, and positive word-of-mouth (WOM) (Choi and La, 2013). Previous research confirms that service recovery expectations strategies are key antecedents in building an ongoing relationship with customers who are unhappy at the initial encounter (Kim et al., 2022).

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However, despite the importance of a proper understanding of service failure and recovery, most researchers have focused on the business-to-customer market, with limited attention being paid to the business-to-business context (Kim et al., 2022; Oflac et al., 2021; Sahaf and Fazili, 2024). Moreover, the limited focus on the business-to-business context has so far been devoted to understanding the effects of service failure on delivery times, negative WOM, satisfaction/dissatisfaction, suppliers' competencies, partners' tolerance level, switching costs, recovery mechanisms, analysis of the causes and types of failure, etc. (Hubner et al., 2018; Oflac et al., 2021). Little attention has been paid to the recovery stages that appear after the occurrence of service failure (Oflac et al., 2021; Van Vaerenbergh et al., 2019). According to Azemi et al. (2019), the following sequence might take place: service failure occurs, service recovery expectation is generated, a recovery strategy is provided, a recovery evaluation is produced, and customers become involved in post-recovery behaviour, although this sequence has not been verified in the literature. This study, therefore, employs the model proposed by Azemi et al. (2019) to examine, in the business-to-business context, how firms were affected during the critical phase of the COVID-19 crisis (Ozuem et al., 2021). Further, it also finds how a service failure can generate service recovery expectations, which then produces the justice theory, the justice theory gives rise to positive recovery-satisfaction, which finally results in WOM and purchase intentions. Various firms in industries such as hotels, restaurants, airlines, gas, electric, etc., faced enormous issues due to service failure. However, when the issues were fixed, they achieved a higher level of satisfaction, and as a result, the behavioural outcomes (Song et al., 2023). These findings are in line with the industry results, suggesting that when work on service failure, 78% of consumers do more business with the firms, 30% of consumers increase their spending, and 83% become loyal and spread positive word-of-mouth (Bishop, 2025).

Based on the importance of the topic and suggestions from Azemi et al. (2019), this study thus has the following objectives: (i) to examine the effect of service failure on service recovery expectations or justice theory; (ii) to examine the effect of service recovery expections on justice theory; (iii) to examine the effect of justice theory on post-recovery satisfaction; and (iv) to examine the effect of post-recovery satisfaction on WOM and purchase intention.

The study was conducted in Kuala Lumpur, Malaysia during the COVID-19 lockdown from 430 SMEs, where there is limited prior knowledge on SMEs (Hilam et al., 2020; Tripuathi et al., 2020). The data was collected based on the non-probability purposive sampling technique, and was analysed using SEM technique.

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LITERATURE REVIEW

The occurrence of service failure is almost inevitable for all firms, and represents a significant challenge. Owing to the intangible and inseparable nature of service, failure in service usually occurs (Ahmad et al., 2022; Shan et al., 2024). This may convey negativity and dissatisfaction to consumers and stop them from buying the services that the firm provides. Bousnina and Zaiem (2018) define service failure as performance that falls short of consumer expectations or customers' zone of tolerance, and link it with a lack of quality in the service, or deficiency and delay in delivery. These issues usually occur owing to errors caused by employees or procedures at the time of service delivery and can easily cost firms a significant amount of money (Sahaf and Fazili, 2024).

The literature on service failure can be divided into two forms. The first explores the disconfirmation of consumer expectations leading to dissatisfaction, and is characterised by severity, frequency, and cause (Bousnina and Zaiem, 2018). The second form investigates the consequences, such as the effects on attitudinal and behavioural constructs. Moreover, the literature includes only a handful of studies on the topic using both qualitative and quantitative methods (Albayrak et al., 2025). Significant outcomes noted in the literature relating to service failure include dissatisfaction with quality, changes in performance, high costs for service providers as customers switch to alternative firms, repatronage of service providers, effects on long-term loyalty, a shortened duration of customer relationships, negative emotional reactions, anger and frustration, and loss of market share (Koc et al., 2017).

When a firm encounters a service failure, the focus turns to what can be done to address that failure. Interest in recovering from the service failure plays a major role in preventing the above issues, specifically dissatisfaction (Shan et al., 2024). Firms that address the issues raised by service failure are not only likely to deal with things correctly when they go wrong, but also tend to avoid similar errors occurring in the future (Koc et al., 2017). The positive commercial aspect of service recovery can mitigate the various negative aspects, whereas being unable to resolve such issues puts firms at a disadvantage when seeking to enhance customer satisfaction and future purchasing intentions (Shams et al., 2024).

The importance of reducing the effects of service failure has also been noted by researchers (Tran, 2024). Lin et al. (2011) defined this attempt to reduce the impact as a process that firms followed to correct a failed service, while Song et al. (2023) described it as a process through which firms engaged with customers to address their complaints and deal with any disappointments. Chang and Hsiao (2008) defined it as an action taken to ameliorate the emotional discontent or anger of customers.

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Furthermore, Owusu et al. (2025) considered it as a remedial behaviour consisting of three main tactics, namely apology, compensation, and perceived fairness of policies and procedures. Previous researchers named these theories distributive justice, procedural justice, and interactional justice (Aryono, 2024). The literature reveals that service recovery expectations after failure is mainly influenced by theories, known collectively as justice theory (Chang and Hsiao, 2008; Aryono, 2024). According to these theories, when consumers encounter fair treatment during the complaint-handling process, they feel delighted. Moreover, service failure recovery rebuilds relationships, dissipates anger, creates goodwill, increases purchases, leads to positive WOM, enhances relationship quality, and, most importantly, increases customers' satisfaction and future purchasing intentions (Azemi et al., 2019).

The prior literature on the combination of the constructs, i.e. service failure and service recovery expectations, integrates an overarching customer experience into five stages as follows: service failure occurs, service recovery expectations is generated, a recovery strategy is provided, a recovery evaluation is produced, and customers become involved in post-recovery behaviour (Azemi et al., 2019). A few previous studies on service failure and service recovery expectations can be found. Choi and La (2013) examined service failure, recovery evaluation, and post-recovery behaviour, and found that the reason for service failure could be due to the firm, the customer, or any other unknown factor. Siu et al. (2013) examined the recovery strategic provision and recovery evaluation phases, and found that if the customer received a fair recovery, his/her earlier satisfaction with the firm remained. Casado-Diaz and Juan (2009) examined a similar concept, but applied justice theory to the recovery strategy and found that each of the justice theories had a significant effect on customers' responses. Likewise, Matikiti et al. (2019) studied the effect of service failure on service recovery expectations, and also the effect of service recovery expectations on relational constructs within the airline industry. They found that service failure had a significant effect on service recovery expectations and that service recovery expectations in turn had a significant effect on satisfaction and loyalty.

In comparison with service failure in the consumer market, issues can also occur in business-to-business markets (Ebrahimi, 2024). Issues within the business-to-business market mainly occur owing to incomplete orders or late deliveries (Ahmad et al., 2022). When these incidents happen, business-to-business customers react in one of the following ways: they either tolerate the suppliers and stay with them, owing to switching costs, agreements, investments, length of the relationship, etc., or they may complain about the unsatisfactory episodes and ask the business partner to take care of the issue, replacing the product or providing a refund (Oflac et al., 2021). One or just a few service failures may not have any effect on business-customer relationships, but repeated negative outcomes can lower

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business customers' intention to stay with the business partner, and increase the chances of switching to competitors (Hubner et al., 2018). Regular exposure to failure creates negative perceptions, expectancy, WOM, satisfaction, trust, commitment, behaviours, etc., not only among customers, but also among suppliers (Baliga et al., 2021).

CONCEPTUAL MODEL

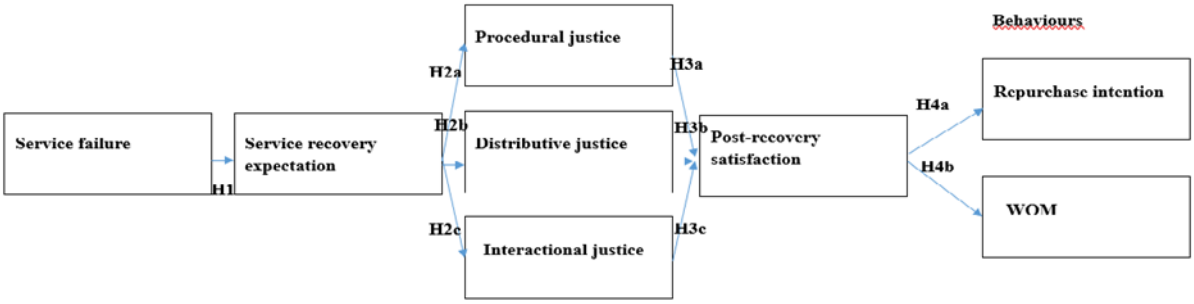


Figure 1. Conceptual model

Effect of service failure on service recovery expectations

Service recovery expectations is the action taken to retain customer loyalty by making a timely appropriate response to a customer complaint (Chang and Hsiao, 2008, p. 515). It is the action that is taken to minimise the losses that occur owing to service failure and to ameliorate the anger of the customer (Chang and Hsiao, 2008). When a company faces failure, customers may show an expectation for the failure to be recovered (Azemi et al., 2019; Ahmad et al., 2022; Sahaf and Fazili, 2024). Following a failure situation, firms need to analyse whether they have feasible solutions or recovery plans to tackle the issues that arise. Effective recovery can compensate for the failure by enhancing a service firm's inputs and customers' attitudes. On the other hand, when the recovery effort fails to exceed the threshold of expectation, customers' perceptions and dissatisfaction do not change, but rather worsen (Kim et al., 2022). However, there is very little evidence on the effect of service failure on service recovery expectations in the business-to-business context. Thus:

H1: Service failure has a significant effect on service recovery expectations.

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Effect of service recovery expectations on justice theory

Perceived justice theory provides a comprehensive model that helps in understanding the process between service recovery expectations and complaint processes (Xu et al., 2019). The concept of perceived justice theory originated from social exchange theory and equity theory, and explains that when people are dissatisfied owing to service failure, they take action, such as becoming angry, engaging in negative WOM, and defecting from the firm (Zhang et al., 2024).

Perceived justice theory is divided into three dimensions: so-called distributive justice, interactional justice, and procedural justice. Distributive justice is defined as the allocation of costs and benefits in achieving equitable relationships (Sahaf and Fazili, 2024). It is determined by the perceived fairness of the outcome (Haris, 2023), and is based on equity theory, which defines a fair exchange in which each party receives an outcome that is equivalent to his/her contribution (Ahmad et al., 2022). In the case of service failure, distributive justice emphasises the outcome of the exchange, and consists of tangible rewards such as refunds, discounts, coupons, etc. for the failed service (Sahaf and Fazili, 2024). Interactional justice refers to how consumers and their complaints are treated during the service failure and recovery process (Haris, 2023). It consists of elements such as treating customers with respect, politeness, concern, and empathy, and providing apologies and applicable explanations for the failure and recovery (Ahmad et al., 2022). Finally, procedural justice is defined as the perceived fairness of policies, procedures, and criteria used by the firms to arrive at the outcome of a dispute or negotiation (Sahaf and Fazili, 2024). In the case of a service failure or recovery, procedural justice emphasises the customers' perceptions of the fairness of processes or procedures needed to resolve the conflict (Sahaf and Fazili, 2024). It includes taking quick action towards resolving service failure by treating customers fairly and removing inconveniences (Matiki et al., 2019).

When an issue related to service failure occurs, customers expect the firm to resolve that issue according to one of the perceived justice theories. Although there is some discussion in the literature on the topic, but insufficient evidence is provided. Hence, our next hypothesis is:

H2: Service recovery expectations has a significant effect on (2a) procedural justice, (2b) distributive justice, and (2c) interactional justice.

Effect of perceived justice theory on post-recovery satisfaction

Post-recovery satisfaction, also referred to as customers' secondary satisfaction, is considered an appropriate outcome of service recovery expectations (Mathew et al., 2020). Successful service

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recovery strategies, such as pay, performance appraisals, lay-off policies, and other procedures, have been found to repair customers' dissatisfaction and heighten post-recovery satisfaction (Mohd-Any et al., 2019). The dimensions of service recovery, or perceived justice theory, are heavily used to compensate consumers and have a significant effect on post-recovery satisfaction (Mohd-Any et al., 2019).

Some researchers even view service failure as an occasion created by firms to enhance post-recovery satisfaction (Rahman, 2024). They suggest that, as consumers forget about a poor service experience over time, or cannot see any apparent difference between the service provider and its competitors, in order to remind customers of their services, they build redeemable failures into the firm's services (Rahman, 2024). Service recovery gives customers a strong impression that justice is done in a timely manner, and that the firm is ahead in dealing with such issues (Mathew et al., 2020). Although there is some literature on the effect of justice theory on post-recovery or secondary satisfaction within the business-to-consumer context, little is known within the business-to-business context. Hence, the next hypothesis is:

H3: (3a) Procedural justice, (3b) distributive justice, and (3c) interactional justice have a significant effect on post-recovery satisfaction.

Effect of post-recovery satisfaction on post-recovery behaviour

Post-recovery behaviour is defined as customers' intention to repurchase services from the same retailer after the recovery of the service (Mathew et al., 2020). It can be classified as an economic behavioural intention and a social behavioural intention, and can be viewed as an outcome of customers' post-recovery satisfaction (Sahaf and Fazili, 2024). Customers with positive post-recovery satisfaction show a significantly positive attitude towards the service firm, repurchasing the brand and spreading positive WOM. This study has included repurchase intention and WOM as the dimensions of post-recovery behaviour, and examined the effect of post-recovery satisfaction on each (Mathew et al., 2020). Thus, the next hypothesis is:

H4: Post-recovery satisfaction has a significant effect on (4a) repurchase intention and (4b) WOM.

METHODOLOGY

A self-structured seven-point Likert scale was used for the data collection. More than 1,000 SMEs (small and medium-sized enterprises) in Kuala Lumpur were contacted to gather the data, of which

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630 showed an initial interest in the study and 430 subsequently took part in this research. The data were collected from SMEs in Kuala Lumpur because the city offers a wide range of services to entrepreneurs and businesspeople, from planning a project to reaching its full potential. It is an emerging global city and a regional and global hub, being an emerging financial capital, growing at 6–7% annually, and contributing 16% of Malaysia's national production (SMECorp, 2023). It is among the fifth largest economies after Singapore, Jakarta, Bangkok, and Manila, and the city serves as the cultural, financial, tourist, and economic center of the country as well as possess a strategic location and connectivity with other emerging markets in Asia and the Pacific region (Forglobal, n.d.). Moreover, SMEs are the anchors of the economy and are responsible for economic growth in the region.

The participants were asked practical questions, for instance, whether they had faced any issues during the pandemic era, especially during the dates given above (i.e. from 4 to 18 April 2020). Next, they were asked to think about any business partners or scenarios that arose owing to COVID-19, and how far any kind of delay, system issue, or other service failure resulting from the pandemic had caused them serious damage or problems. All was done using Google Forum, social media, etc., due to the COVID-19 restrictions.

430 cases were selected using the convenience sampling method, i.e. (37 items *5) + 5 moderating groups (30 for each moderator) = 335, meaning that this number of participants was sufficient. The recommendations of previous researchers, who suggested collecting five samples per variable, were followed a suggested to check for non-response bias, conducting multivariate analysis, assessing the required number of items, and using structural equation modelling (SEM) (Hair et al., 2006; Hussain et al., 2023). The study took place between 4 to 18 April 2020 using Google Forum, social media, etc., due to the COVID-19 restrictions.

Thirteen constructs were used in this study: service failure, service recovery expectations, procedural justice, distributive justice, interactional justice, post-recovery satisfaction, repurchase intention, WOM, anger, past transactions, switching costs, order frequency, and order size, with the items adopted from the previous studies. Further, Harman's single-factor test was used, and no issue of common method bias was found (Hussain et al., 2023).

Further, we used a two-step systematic approach was adopted to develop a measurement model and a structural model, separately. SEM was used to examine the structural model. Confirmatory factor analysis (CFA) was used to check the unidimensionality of the constructs and the validity of the measures (Hair et al., 2006). First, reliability tests were carried out using Cronbach's alpha and

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composite reliability at the items and constructs levels, respectively. Both had values of over 0.8, confirming the reliability requirements (Hair et al., 2006; Hussain et al., 2023).

In addition, validity tests using convergent validity, discriminant validity, and nomological tests were carried. The average variance extracted (AVE) was used to assess the convergent validity. The results indicated that the AVE was higher than 0.5, suggesting an adequate convergent validity. Additionally, discriminant validity was used by comparing the AVE for the focal measure with a similar but conceptually different construct and the square of the correlation between the two factors (Hussain et al., 2023). Discriminant validity indicated that the relationships between the research factors were less than the suggested value of 0.92. Following this, nomological validity was carried out, specifically using goodness-of-fit. The results suggested a good model fit with a root mean square error of approximation (RMSEA) and standardised root mean squared residual (SRMR). Both were found lower than 0.08. Further, a comparative fit index (CFI) and non-normed fit index (NNFI) were taken, and were found higher than 0.8, confirming the requirements of model fit (Hair et al., 2006; Hussain et al., 2023).

Next, the structural model was analysed using the nomological validity. The results suggested that the model fit, at this stage, suggesting that the root mean square error of approximation (RMSEA) and standardised root mean squared residual (SRMR) were lower than 0.08, and the comparative fit index (CFI) and non-normed fit index (NNFI) were found higher than 0.8, confirming the requirements of model fit (Hair et al., 2006). Finally, hypotheses were examined below in the results.

Results

The last stage was to examine the research model and the hypotheses in Table 1.

H	Hypotheses	Standardised path coefficient (β)	CR (t-value)	P	Result
H1	Service failure -> service recovery expectation	0.77	8.77	***	Supported
H2a	Service recovery expectation -> procedural justice	0.88	10.03	***	Supported
H2b	Service recovery expectation -> distributive justice	0.83	9.97	***	Supported
H2c	Service recovery expectation -> interactional justice	0.95	11.032	***	Supported
H3a	Procedural justice -> post-recovery satisfaction	0.71	7.757	***	Supported
H3b	Distributive justice -> post-recovery satisfaction	0.93	9.961	***	Supported
H3c	Interactional justice -> post-recovery satisfaction	0.81	8.32	***	Supporte

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					d
H4a	Post-recovery satisfaction -> repurchase intention	0.97	10.371	***	Supported
H4b	Post-recovery satisfaction -> WOM	0.92	10.024	***	Supported

Table 1. Direct hypotheses

The results confirm that each of the hypotheses are found significant, which means that service failure effects on service recovery expectation, service recovery expectation on justice theory dimensions, justice theory dimensions on post-recovery satisfaction, and finally, post-recovery satisfaction on repurchase intention, and WOM, confirming Azemi et al. (2019)'s suggestion in B2B context.

FINDINGS AND DISCUSSION

The findings confirm Azemi et al. (2019)'s suggestion that handling service failure adequately becomes the reason for enhancing consumers' satisfaction, and as a result, enhances their repurchase intention and WOM. Second, these findings also confirm that service failure enhances service recovery expectations. Previous literature suggests that when consumers face service failure, they expect firms to make a recovery (Ahmad et al., 2022). Any effort by the service providers to rectify or restore the losses suffered by consumers induces favourable behavioural intentions on the part of consumers (Sahaf and Fazili, 2024). Therefore, when service failure occurs, consumers expect the provider to offer service recovery (Song et al., 2023). Effective recovery can enhance consumers' attitudes, while failure can further worsen the situation (Kim et al., 2022). Although there is some evidence in the B2C sector, but limited evidence is found in the B2B context, making this study and the findings pivotal.

Third, the finding confirms the effect of service failure on all three types of justice theory, i.e., procedural justice, distributive justice, and interactional justice. It is evident that when customers receive compensation for bad service, their attitude becomes positive, and they start liking the firm (Matiki et al., 2019). Once again, these findings are in line with previous research (Ding and Lii, 2016). However, most of these previous studies took place in the business-to-consumer context, with little evidence available in the business-to-business context.

Next, this study confirms the effects of each of the justice theories on post-recovery satisfaction, as set out in H3a, H3b, and H3c. This confirmation is in line with previous findings, where researchers conducting similar studies identified the effect of one on the other (Mohd-Any et al., 2019; Rahman, 2024). Justice theory, or compensation for failed service, increases consumers' positive attitude and

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behaviour towards a firm and gives them a feeling that the firm cares for them. Again, most studies on this topic have been conducted in the business-to-consumer context, with little attention being paid to the business-to-business context, so this represents a contribution to the literature.

Then, we examined the effect of justice theory dimensions on post-recovery satisfaction. Our findings confirmed a few similar findings and suggested that various strategies used to recover service failure can result in enhancing consumers' post-recovery satisfaction (Mohd-Any et al., 2019; Rahman, 2024; Song et al., 2023). Although previous studies have used similar constructs to justice theory dimensions, there is limited evidence on the above, including mostly similar studies were conducted in B2C context than B2B context, making this a novel study.

Finally, the last hypotheses, i.e. H4a and H4b, addressed the effects of post-recovery satisfaction on repurchase intention and WOM, respectively. Both hypotheses were confirmed by this study, in line with the findings of previous studies (Mathew et al., 2020). When consumers are pleased and satisfied with a firm, they spread positive WOM and purchase again. However, most of these earlier studies were conducted in the business-to-consumer context, with little emphasis placed on the business-to-business context; hence, these findings also contribute to the literature.

Implications

Next, the implications are provided. First, the managerial implications are based on two sections. The first section covers the implications based on the direct findings, and the second section covers the implications based on the indirect findings. Starting from the managerial implications based on direct findings, managers will be able to understand the role of service failure on service recovery, justice theory, post-recovery satisfaction, and behavioural constructs. They will be able to understand that an effective service recovery strategy would enhance customers' post-recovery and help to enhance positive WOM and re-purchase intention. It is evident from the literature that firms sometimes create a service failure situation so that they can come up with instant strategies to recover from failure, provide compensation to customers, and spread positive WOM on the firm and brand (Choi and La, 2013).

Further, the managerial implications are provided. Managers will be able to understand the role of service failure on service recovery, justice theory, post-recovery satisfaction, and behavioural constructs. They will be able to understand that an effective service recovery strategy would enhance customers' post-recovery and help to enhance positive WOM and re-purchase intention. It is evident that firms sometimes create a service failure situation so that they can come up with instant strategies

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to recover from failure, provide compensation to customers, and spread positive WOM on the firm and brand (Choi and La, 2013).

Limitations and future studies

A number of limitations can be identified in this study. Firstly, the data were collected using non-probability convenience sampling, which created an issue regarding representation of the population. A future study could minimise this gap by collecting data using a probability sampling method. Secondly, the study acquired data through the quantitative survey method. A similar topic could be researched using mixed or qualitative methods. Furthermore, rather than using a survey method, a future study could collect data using experimental studies to minimise this gap. Thirdly, another limitation concerns the generalisability of the findings. Since the data for this study were collected from only one city, i.e. Kuala Lumpur, the findings cannot be generalised to other cities or countries. Hence, a future study on the topic could minimise this gap by conducting research in the context of other cities or countries.

Another limitation relates to the study's setting in the business-to-business context, since various other contexts could be investigated, such as the business-to-customer context, customer-to-customer context, etc. Future studies could thus extend the topic into other contexts. Finally, this study has focused only on the effects of service failure and service recovery expectations on limited constructs. Various other attitudinal and behavioural constructs could also be investigated. Future studies could minimise these gaps by looking into the effects on other constructs.

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STRATEGIC HUMAN RESOURCE MANAGEMENT AND CORPORATE SOCIAL RESPONSIBILITY: A SYNERGISTIC APPROACH TO SUSTAINABLE COMPETITIVE ADVANTAGE

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ABSTRACT

The effectiveness of structured governance models in family businesses is profoundly influenced by three critical factors: ownership concentration, board composition, and management team dynamics. Furthermore, the choice between authoritative and informal leadership styles significantly shapes the governance structure adopted. This study investigates how these governance models impact human resource management (HRM) practices, particularly focusing on succession planning—a pivotal challenge for family-owned enterprises.

This research examines the interplay between governance structures and HRM strategies in family businesses through a qualitative case study approach. The analysis reveals how effective governance can enhance talent retention, facilitate leadership transitions, and ensure the long-term sustainability of family businesses. The findings offer actionable insights for family business owners and HR professionals navigating the complexities of succession planning and talent management.

This study contributes to the academic discourse on family business management and underscores the importance of governance in shaping HRM practices. By addressing the unique challenges of family businesses, this research provides a foundation for future studies on talent retention and leadership development, offering valuable implications for academia and practice.

While the study focuses on an Italian family business, its findings offer valuable insights for family businesses globally, particularly in addressing succession planning and talent retention challenges.

Keywords: Family Business Governance; Succession Planning; Talent Retention; Human Capital Management (HCM); Leadership Styles; Corporate Social Responsibility (CSR) & HRM Synergy; Ownership Concentration; Board Composition; Professionalization; Sustainable Competitive Advantage.

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INTRODUCTION

Family businesses are critical in the global economy, contributing significantly to employment and economic growth. However, their unique governance structures and human resource management (HRM) practices often present challenges, particularly in areas such as succession planning and talent retention. While structured governance models—shaped by ownership concentration, board composition, and management team dynamics—are known to influence organizational outcomes, their impact on HRM in family businesses remains underexplored.

This study seeks to address this gap by investigating how governance models affect HRM practices, focusing on succession planning. By examining the interplay between governance structures and HRM strategies, this research aims to provide actionable insights for family business owners and HR professionals while contributing to the broader academic discourse on family business management. The remainder of the paper is organized as follows: Section 2 presents a literature review and background. Section 3 describes our methodology. Section 4 outlines the case study and discussion. Section 5 concludes the research.

LITERATURE REVIEW AND BACKGROUND

Existing literature highlights the importance of governance models in shaping organizational outcomes, particularly in family businesses. Studies by Smith (2020) and Johnson *et al.* (2021) emphasize the role of ownership concentration and board composition in determining governance effectiveness. Additionally, research by Lee and Kim (2019) underscores the impact of leadership styles—whether authoritative or informal—on governance structures.

In HRM, family businesses face unique challenges, such as balancing family and non-family interests, ensuring talent retention, and managing succession planning (Garcia and Martinez, 2022). While some studies have explored the relationship between governance and HRM, a lack of research focuses specifically on how governance models influence succession planning and talent retention in family businesses.

A more extensive literature base includes research on the impact of corporate social responsibility (CSR) in HRM, suggesting that structured HRM policies aligned with governance practices can foster sustainable competitive advantages (Orlitzky *et al.*, 2011; Shen and Benson, 2016). Furthermore, studies such as Chua *et al.* (2009) and Mustakallio *et al.* (2002) explore how governance affects human capital management (HCM) strategies.

Family Businesses in the Global Context

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Family businesses are a cornerstone of the global economy, accounting for approximately 70-90% of global GDP and employing a significant portion of the workforce worldwide (Family Firm Institute, 2023). These businesses range from small, local enterprises to large multinational corporations, and they are often characterised by their long-term orientation, strong organisational cultures, and close ties to their communities. However, family businesses face unique challenges, such as balancing family and business interests, managing succession planning, and retaining talent across generations.

Family businesses are particularly prevalent in Italy, where this study is conducted. They represent over 85% of all enterprises and contribute significantly to the country's economic output (AIDAF, 2022). The Italian context is marked by a strong tradition of family ownership and a preference for informal governance structures, which can both enable and constrain effective human capital management (HCM).

Several key factors, including ownership concentration, board composition, and management team dynamics, shape governance models in family businesses. Research by Gersick *et al.* (1997) introduced the Three-Circle Model, which highlights the interplay between family, ownership, and management in family businesses. This model underscores the complexity of governance in family businesses, where overlapping roles and interests can lead to conflicts and inefficiencies.

Governance Models in Family Businesses and Leadership Styles

Corporate governance, conceptualized as a set of organizational and institutional mechanisms that regulate managerial conduct (Charreaux, 1997), is a critical factor for the growth of family businesses, facilitating the optimization of decision-making processes. It can act both as a control tool, mitigating conflicts of interest among stakeholders (Jensen and Meckling, 1976), and as a learning catalyst, enhancing managerial skills and knowledge (Barney, 1991; McNulty and Pettigrew, 1999). In line with the perspective of Filatotchev and Wright (2005), corporate governance is defined here as a dynamic and continuously evolving system (Young and Thyll, 2008), which adapts and transforms over time.

The governance of family businesses represents a delicate balance between preserving family values and the need to adopt broad-minded professional management practices. Family culture, intrinsically linked to the history and values of the founding core, can act both as a resource and as a constraint, influencing strategic decisions and human resource management (Astrachan and Carey Shanker, 2003). Successful family businesses are those that effectively integrate these two aspects, creating a governance system that fosters transparency, accountability, and long-term value creation. Achieving this requires a continuous commitment from the family, ownership, and management, as well as a willingness to adapt to changes in the external environment.

To establish an efficient and effective balance, a leadership style must be clearly defined. Leadership in family businesses is a complex construct influenced by unique dynamics that set it apart from non-

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family firms. The leadership styles adopted in these organizations often reflect the founder's values and vision, shaping the organizational culture and influencing adaptability and innovation (Le Breton-Miller *et al.*, 2004). Collaborative leadership styles, on the other hand, can enhance employee engagement and organisational resilience.

Leadership in family businesses differs from that of non-family businesses primarily due to the emotional considerations of leaders (Gomez-Mejia *et al.*, 2011), their longer-term mandates (Bernhard and O'Driscoll, 2011), and their significant role within the organization (Carney, 2005).

Lewin *et al.* (1939) identified three primary leadership styles: autocratic, participative, and laissez-faire. In family businesses, these styles manifest with specific behavioral inclinations of the leader, aimed at achieving desired objectives (Fries *et al.*, 2021). Autocratic leadership, while it can strengthen organizational culture, may limit innovation and adaptability. Conversely, collaborative and participative styles foster employee engagement and organizational resilience.

Ownership Concentration

The high concentration of ownership, typical of family businesses, can generate both advantages and disadvantages. On the one hand, it can foster a strong alignment of interests between ownership and management, promoting a long-term vision and sustained commitment (Schulze *et al.*, 2001). On the other hand, it can lead to centralized decision-making, a lack of transparency, and potential conflicts of interest (La Porta *et al.*, 1999).

The composition of the board of directors is another crucial aspect of family business governance. Schulze *et al.* (2001) highlight that a high concentration of ownership can result in centralized management, reducing transparency and limiting the firm's adaptability to market changes. Other studies emphasize that such a structure can enhance stability and support a long-term strategic vision (Miller and Le Breton-Miller, 2005).

In contrast, some research suggests that the inclusion of independent directors—i.e., non-family members—can bring external expertise, reduce family biases, and improve decision-making quality (Anderson and Reeb, 2004). However, it is essential to strike a balance between family representation and board independence to avoid alienating family members while preserving their identity (Corbetta and Salvato, 2004).

The presence of independent directors can enhance managerial oversight and help mitigate conflicts of interest (Bennedsen *et al.*, 2007). Nevertheless, excessive external influence may create tension with family members, threatening internal cohesion and the transfer of socio-emotional wealth (Gómez-Mejía *et al.*, 2007). Therefore, governance in family businesses requires a delicate balance between maintaining family control and integrating external expertise to ensure sustainability and innovation.

Human Capital Management in Family Businesses

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Family businesses, characterized by unique governance structures and distinctive cultural dynamics, face specific challenges and opportunities in human capital management (HCM). Talent retention, particularly for non-family employees, represents a significant issue, often exacerbated by perceptions of nepotism and limited career advancement prospects (Barnett and Kellermanns, 2006). However, adopting effective governance models that promote meritocracy, and transparency can mitigate these challenges.

The relationship between governance models and HCM practices in family businesses has received increasing attention in recent studies. Empirical research has shown that structured governance models—distinguished by diverse boards of directors and professional management teams—can significantly enhance HCM outcomes (Mustakallio *et al.*, 2002). These models foster transparency, accountability, and meritocracy, which are crucial elements for attracting and retaining qualified talent.

However, the effectiveness of such models is closely tied to their alignment with family values and the broader organizational culture (Miller and Le Breton-Miller, 2005). Family governance must balance the interests of the family with the needs of the business while ensuring a fair and stimulating work environment for all employees.

Moreover, fostering an inclusive corporate culture that values diversity and equity can help attract and retain high-level talent. Diversity management programs, corporate welfare initiatives, and work-life balance policies can contribute to creating a positive and engaging work environment for all employees (Nidaazzi and Zaher, 2025).

As family businesses evolve, they often encounter obstacles that limit their expansion. As business size and workload increase, owners may struggle to manage their responsibilities, even when delegating tasks partially or entirely to family members.

The study by van Aaken *et al.* (2017) applies behavioral economics principles to model the performance of family SMEs through three growth phases, each characterized by a specific governance model: self-governance, family governance, and corporate governance. In the initial phase, entrepreneurs independently establish management rules. However, as the business expands and new family members join, the risk of intra-family conflicts rises, making it necessary to implement mechanisms for dispute resolution and define new decision-making structures. Both formal and informal conflict resolution mechanisms are essential for managing tensions that may arise among family members.

Over time, family businesses tend to adopt formal corporate governance tools to support growth and mitigate agency problems arising from the separation between ownership and management.

However, this perspective does not consider that generational transitions do not necessarily lead to further business growth and assumes—sometimes incorrectly—that in the third phase, family businesses will automatically open to external investors.

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Succession Planning

Succession planning plays a vital role in ensuring the continuity of a family business, allowing for the transfer of power and leadership from the predecessor to the successor, thereby enabling the company to endure across generations (Aronoff *et al.*, 2003).

It is a highly delicate and gradual process that can take several years, often leading to disputes between the predecessor and the successor. Although succession presents an opportunity to change the business model (BM), the predecessor, attached to the stability achieved, may often find it difficult to accept (Ouiakoub and Poulain-Rehm, 2024).

During this phase, strong leadership measures must be established to clarify decision-making processes, organize work activities more efficiently, and delegate operational responsibilities while maintaining strategic planning authority within the family (Lepage & Tarillon, 2025).

Studies show that only 30% of family businesses survive into the second generation, and only 12% reach the third generation (Ward, 2011). The challenges are multifaceted and include various aspects, such as founders' reluctance to plan for succession (Mahomed and Mtembu, 2021), the informal nature of succession planning across generational stages (Bloemen-Bekx *et al.*, 2021), and the interplay between effective succession planning and financial risk management (Mihaylov and Zurbruegg, 2020).

Supported by transparent processes and external expertise, effective governance models can facilitate smoother transitions.

Generational change represents a true transformation, which requires a participatory approach and shared vision between the predecessor, who seeks continuity, and the successor, who is driven by a desire for renewal. A co-leadership period, based on dialogue with the entire family, could be the most effective method for managing the transition (Ouiakoub and Poulain-Rehm, 2024).

In cases where future generations are not yet ready to take on corporate governance, studies suggest that a valid strategy involves separating ownership from governance. Delegating decision-making processes allows the family to retain ownership of the business until the next generation is prepared to assume responsibilities (Filatotchev *et al.*, 2020). This theory was confirmed in a study on agricultural family businesses, where, in cases where children lacked the motivation or skills for key decision-making roles, a well-structured separation ensured success. It also contributed to the creation of a dynamic and stimulating work environment, where employees and descendants are valued based on their skills and competencies (Lepage and Tarillon, 2025).

Research Gap

While existing research has explored the impact of governance models on organisational outcomes, few studies focus on their influence on HCM practices in family businesses, particularly succession planning and talent retention. This study aims to address this gap by examining how governance

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models shape HCM practices in an Italian family business, offering theoretically and practically significant insights.

METHODOLOGY

This study adopts a qualitative case study approach to explore the relationship between governance models and HRM practices in family businesses.

Data were collected through semi-structured interviews with 15 participants, including family business owners, board members, and HR managers. Ethical approval was obtained, and all participants provided informed consent before the interviews.

The interviews focused on understanding the governance structures in place, their impact on HRM strategies, and the challenges associated with succession planning.

The data were analysed using thematic analysis, focusing on identifying patterns and themes related to governance, HRM, and succession planning. This approach allowed for an in-depth exploration of the complexities and nuances inherent in family business management.

CASE STUDY AND DISCUSSION

This chapter presents a qualitative case study of an Italian family business operating in the luxury sector, specifically in the production of custom-made yachts. Based in Tuscany, the business has been operational for over three generations and exemplifies both the strengths and challenges typical of family-owned enterprises. The study focuses on the company's governance model and its impact on human capital management (HCM), particularly in the areas of succession planning, talent retention, and the balance between family and professional interests.

The business operates under a hybrid governance model, combining elements of both formal and informal structures. This model reflects the family's deep involvement in the business while gradually integrating professional management practices to adapt to the evolving demands of the luxury market. The family retains majority ownership, with decision-making power concentrated among senior family members. This structure has allowed the business to maintain a strong sense of identity and continuity over the years. The board includes both family and non-family members, with external directors bringing professional expertise and fresh perspectives. This diversity has been instrumental in navigating the complexities of the luxury market and fostering innovation. The management team is a mix of family and non-family professionals, reflecting a gradual shift toward professionalization. Family members contribute their deep technical knowledge and passion for craftsmanship, while non-family professionals bring strategic and operational expertise.

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Succession planning emerged as a critical challenge for the business. The lack of a formalized succession plans created uncertainty among employees and family members, particularly during the transition from the second to the third generation. The younger generation, eager to modernize the business and expand its global presence, faced resistance from older family members who were more attached to traditional practices. External board members played a crucial role in mediating these conflicts and facilitating a smoother transition. Their involvement highlights the potential for professionalization to mitigate the challenges of succession planning, aligning with Ward's (2011) finding that only 30% of family businesses survive into the second generation.

The business's approach to talent retention was deeply influenced by its governance model. Family members often held key positions, which limited opportunities for non-family employees and led to high turnover among mid-level managers. However, the inclusion of non-family professionals in the management team helped improve employee morale and retention, as it signaled a commitment to meritocracy and career growth. The company's emphasis on craftsmanship and attention to detail—hallmarks of its luxury brand—also played a role in attracting and retaining skilled workers who shared its passion for excellence.

The case study highlighted the impact of leadership styles on HCM. The founder's authoritative leadership style initially fostered a strong organizational culture rooted in tradition and quality. However, over time, this approach hindered adaptability and innovation. The third generation's more collaborative leadership style helped modernize the business, improve employee engagement, and align the company with the evolving expectations of luxury clients.

The business's success in the luxury yacht sector can be attributed to its distinctive competencies, which set it apart from competitors. Family members possess deep technical knowledge of yacht design and production, ensuring that each product meets the highest standards of craftsmanship. The integration of non-family professionals has strengthened the company's strategic capabilities, enabling it to navigate global markets and changing consumer preferences. The company's commitment to producing custom-made yachts reflects its attention to detail and ability to meet the unique needs of its clients. This customer-centric approach has been a key driver of its competitive advantage.

While the business has successfully navigated many challenges, it continues to face several hurdles. Balancing tradition and innovation remain a delicate task, particularly as the younger generation seeks to modernize operations while preserving the company's heritage. Attracting and retaining top talent in a competitive industry requires ongoing investment in professional development and a clear commitment to meritocracy. The company's reliance on family members for key roles, while a strength in terms of technical expertise, may limit its ability to scale and adapt to new market demands.

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This case study illustrates the complexities of managing human capital in a family business operating in the luxury sector. The company's hybrid governance model, combined with its distinctive competencies and customer-centric approach, has enabled it to thrive for over three generations. However, the challenges of succession planning, talent retention, and leadership transitions highlight the need for continued professionalization and strategic adaptation. By addressing these challenges, the business can ensure its long-term sustainability and maintain its position as a leader in the luxury yacht industry.

CONCLUSION

Although grounded in the context of an Italian family business, the findings of this study offer valuable insights that transcend national and cultural boundaries. Family businesses globally, irrespective of their size, industry, or geographic location, frequently encounter similar challenges concerning governance, human capital management (HCM), and leadership transitions. These challenges encompass generational succession, talent retention, and the delicate balance between sustaining family values and adopting professionalization. Consequently, the results of this study possess the potential to inform and inspire family businesses functioning in diverse contexts, from Europe and the Americas to Asia, Africa, and beyond.

One of the most universal challenges highlighted in this study is generational succession. The transition from one generation to the next is a critical moment for any family business, often accompanied by tensions, uncertainties, and resistance to change. These dynamics are not unique to Italian family businesses; they resonate in family enterprises across the globe. For instance, in Latin America, where family businesses dominate the economic landscape, succession planning is often complicated by deeply ingrained cultural norms that prioritise family loyalty over professional expertise. Likewise, in Asia, the Confucian emphasis on filial piety and respect for elders can pose obstacles for younger generations seeking to modernise business practices. The findings of this study—particularly the significance of structured governance models and the inclusion of external professionals in facilitating smoother transitions—offer actionable strategies for family businesses navigating these challenges in various cultural contexts and settings.

Another key insight from this study is the role of structured governance models in enhancing HCM outcomes. The case study demonstrates that a hybrid governance model, combining family oversight with professional management, can significantly improve talent retention and organisational adaptability. This finding resonates with the experiences of family businesses in other regions. For instance, in Germany, the tradition of including external directors on supervisory boards (as mandated by the country's two-tier governance system) has enhanced decision-making and fostered innovation.

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In contrast, family businesses in regions with less formalised governance structures, such as parts of Africa or the Middle East, often struggle with nepotism and a lack of transparency. The lessons from this study—such as the benefits of diverse boards and professionalized management teams—could serve as a blueprint for family businesses seeking to strengthen their governance practices in these regions.

Leadership styles play a crucial role in shaping organisational culture and employee engagement, as highlighted in this study. The transition from an authoritative leadership style to a more collaborative approach was pivotal in modernising the Italian family business and enhancing employee morale. This insight is particularly relevant for family businesses in cultures where hierarchical leadership is prevalent. For instance, in many Asian and African family businesses, patriarchal leadership styles can stifle innovation and discourage younger generations from taking the initiative. By adopting more inclusive and collaborative leadership practices, these businesses could unlock new opportunities for growth and innovation while maintaining the respect and trust of their employees.

Involving non-family professionals in governance and management has emerged as a crucial factor in the success of Italian family businesses. This practice enhances talent retention and demonstrates a commitment to meritocracy, which is vital for attracting and retaining top talent. This finding has broad applicability, particularly in regions where family businesses are often viewed as insular or resistant to external influence. For instance, in Latin America, where family-owned conglomerates dominate the economy, incorporating non-family professionals could help address issues such as high turnover and limited career advancement opportunities for non-family employees. Similarly, in Africa, where family businesses drive economic development, increased professionalisation could enhance their competitiveness and sustainability.

While this study provides valuable insights, it is not without its limitations. First, the single-case study design restricts the generalisability of the findings. The Italian family business examined here functions within a specific cultural and industrial context, which may not fully represent the diversity of family businesses worldwide. Second, the study primarily emphasises the perspectives of family members and senior managers, potentially overlooking the views of non-family employees or external stakeholders. Lastly, the qualitative nature of the research, while rich in depth, does not facilitate statistical generalisation or the establishment of causal relationships.

To address these limitations and build upon the findings of this study, future research could explore several promising avenues. First, comparative studies across cultural and industrial contexts could illuminate how governance models and HCM practices vary and adapt to local conditions.

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For instance, how do family businesses in collectivist cultures (e.g., China or India) balance family interests with professionalisation compared to individualist cultures (e.g., the United States or the United Kingdom)?

Second, the impact of digital transformation on governance and HCM in family businesses represents an emerging area of interest. How are family businesses harnessing technology to modernise their operations and enhance talent retention? Third, future research could investigate the role of gender diversity in family business governance and its implications for innovation and sustainability. For example, how does the inclusion of women in leadership positions influence succession planning and organisational culture?

This study makes several significant contributions to both theory and practice. From a theoretical perspective, it extends the literature on family business management by highlighting the specific impact of governance models on HCM practices, particularly in succession planning and talent retention. It also contributes to the broader discourse on organisational governance by demonstrating how hybrid models can balance family and professional interests. From a practical standpoint, the study offers actionable insights for family business owners and HR professionals. For example, the importance of structured governance models, collaborative leadership styles, and including non-family professionals can inform strategies for enhancing organisational sustainability and competitiveness. These insights are not only relevant for family businesses but also for SMEs and startups navigating similar challenges.

Family businesses play a vital role in the global economy, yet their unique governance structures and the challenges of managing human capital necessitate careful oversight. By adopting effective governance models, promoting collaborative leadership, and integrating non-family professionals, family businesses can enhance their human capital management practices and ensure long-term sustainability. This study lays a foundation for future research and provides actionable insights for family business owners and HR professionals navigating the complexities of governance and human capital management.

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APPENDIX

1. Governance Model and Human Capital Management (HCM)

Introduction:

"In a family business, the decision-making process and the individuals involved can significantly influence employee management. Discuss how your governance model influences hiring, promotions, and employee development".

Questions:

- How does having family members in key decision-making affect how employees are managed?
- What are the pros and cons of having family and non-family members on the board when managing people?
- How has bringing external professionals to the management team changed how employees feel about fairness and opportunities?
- What steps have you taken to make sure family interests don't overshadow the need for professional management?

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2. Succession Planning

Introduction:

"Passing the business from generation to generation is a big moment for any family business. It can come with challenges but also opportunities. Let's explore how your family has handled this transition".

Questions:

- What were the most significant challenges when transitioning from the second to the third generation?
- How did having external board members help during the succession process?
- How could we have improved the transition?
- How did you prepare the younger generation to take on leadership roles?

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3. Talent retention and Professionalization

Introduction:

"Keeping talented employees is key to the success of any business, but it can be tricky in a family business where family members often hold top positions. Let's talk about how you've managed this balance".

Questions:

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- Why do you think some mid-level managers decided to leave the company?
- How has having non-family professionals in leadership roles affected employee morale and retention?
- What changes have you made to ensure that promotions and opportunities are based on merit, not just family ties?
- How did you explain the shift toward a more professional management style to your employees?

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4. Leadership Styles and adaptability

Introduction:

"How leaders run the business can shape the company's culture and ability to adapt to changes. Let's discuss how leadership styles have evolved in your family business".

Questions:

- How did the founder's leadership style shape the company in its early days?
- What changes in leadership style have you noticed with the third generation taking over?
- How did employees react to the shift from a more traditional leadership style to a more collaborative one?
- What positive changes have you seen since adopting a more modern leadership approach?

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5. Synergy Between Governance, HCM, and Sustainability

Introduction:

"Balancing family values with professional management can help a family business stay competitive in the long run. Discuss how your governance and people management practices contribute to the company's success".

Questions:

- How has having a mix of family and non-family leaders helped the company stay competitive?
- What benefits have you seen from combining family values with professional management practices?
- How do you know if the changes you've made in governance and people management are working well?
- What challenges do you see in keeping the business successful for future generations?

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CONSUMPTION INCOME ANALYSIS – RURAL-URBAN DISPARITIES ACROSS SIX DISTRICTS IN MAHARASHTRA, INDIA

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ABSTRACT

This study takes a closer look at how household spending habits in Maharashtra have changed before, during, and after the COVID-19 pandemic. It zeroes in on six key districts—Mumbai, Pune, Nashik, Nagpur, Aurangabad, and Amravati—and examines spending across three vital categories: food, health, and leisure (which includes recreation, dining out, and vacations). By analyzing secondary data from the Consumer Pyramids Household Survey (CPHS) for March 2019, 2020, and 2021, the research uses a quantitative approach to explore how various socio-economic factors like income, education, occupation, household size, and gender impact spending choices.

The results show that income and household size were the main drivers of food and health spending, while education played a significant role in shaping leisure spending in urban areas after the pandemic. The crisis pushed people to prioritize essential goods and digital services. Urban households bounced back more quickly in terms of leisure spending, whereas rural households tended to be more cautious. These differences highlight the vulnerabilities faced by rural and low-income groups, emphasizing the need for targeted policy measures.

This research adds to economic theory by applying Engel's Law and Keynesian consumption theory to data from the pandemic era, and it offers policy suggestions aimed at fostering equitable recovery through investments in healthcare, digital infrastructure, and income support.

Keywords: Household Consumption Expenditure, Urban-Rural Disparities, Socio-Economic Determinants, Maharashtra Economy

INTRODUCTION

Maharashtra, often seen as India's economic engine, showcases a striking contrast between wealth and hardship. Contributing nearly 13% to the national GDP, the state boasts vibrant metropolitan areas

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like Mumbai and Pune, alongside agriculturally reliant districts such as Aurangabad and Amravati. This socio-economic diversity makes Maharashtra an intriguing case for examining household consumption patterns, particularly during significant systemic shifts.

like the COVID-19 pandemic, which deepened pre-existing inequalities and forced households to reassess spending priorities.

Household consumption expenditure is an important measure of economic well-being and social security. Consumption expenditure indicates not only purchasing capacity, but also consumption-related economy services such as health and education, while acting as a gauge of financial buffering. For an economy like India, where a large part of the workforce is informal and the safety net is largely nonexistent, changes in consumption patterns during emergencies may provide rich contexts for understanding household vulnerabilities, adaptability, and coping mechanisms.

The COVID-19 pandemic, which emerged at the start of 2020, has led to unprecedented shifts in consumption behaviours. Maharashtra, one of the hardest hit states with massive employment loss, restricted mobility, and instigated delivery of public health emergency protocols, required households to recalibrate their consumption; while urban households likely had some degree of float through savings or access to digital services, rural and low-income households that relied on agriculture and informal wages experienced substantial losses.

This analysis concerns household consumption in three categories:

1. Food Expenditure: Fundamental and income-elastic with consuming needs that are immediate.
2. Health Expenditure: Representation of access to and availability of health services.
3. Leisure Expenditure: Representation of the capacity to be comfortable and discretionary.

The research applies classical consumption theories such as Engel's Law, Keynesian consumption theory, the Life Cycle Hypothesis (Modigliani & Brumberg), and the Permanent Income Hypothesis (Friedman). This paper provides empirical evidence on the differences in consumption and highlights regional and demographic differences in household behavior (from March 2019 to March 2021) in six districts of Maharashtra, India (Mumbai, Pune, Nashik, Nagpur, Aurangabad, and Amravati) to inform recommendations for policy direction for an inclusive recovery..

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THEMATIC LITERATURE REVIEW

1. Theoretical Foundations

Engel's Law states that the share of income spent on food falls with income. This is still pertinent when studying those at the bottom of the income distribution how much they prioritize spending on essentials versus non-essentials. For instance, Keynesian theory examines the relationship between current consumption and disposable income; in particular, provides useful grounds for interpreting abrupt decreases in consumption during an economic shock.

Moreover, the Life Cycle Hypothesis and Permanent Income Hypothesis suggest households smooth consumption over time, based on expectations of income in the future. While consumption smoothing took place before the pandemic, we know that behaviour was interrupted due to the sudden and unforeseen loss of income, especially for informal workers.

2. COVID-19 and Consumption Shifts

Global studies (e.g., Baker et al., 2020) showed heightened essential spending and contraction in discretionary outlays. In India, Das and Rathi (2020) observed reduced expenditure on leisure and apparel, while Sharma & Singh (2021) emphasized the role of precautionary savings amid heightened uncertainty.

3. Socio-Demographic Determinants

Global research (e.g., Baker et al., 2020), showed increased essential spending, and reduced discretionary expenditure. In the Indian context, Das and Rathi (2020), showcased that spending for leisure and clothing was modestly reduced, whereas Sharma & Singh (2021), showed precautionary saving was critical given increased uncertainty.

4. Digital Adaptation

Household structure and characteristics have the potential to affect spending behaviours. Mehek et al. (2023), had shown female-headed households adjust spending to prioritize food and health spending, while Gupta & Pal (2022), acknowledged rural households faced higher out-of-pocket health spending. Education and occupation also have a key role in protecting consumption from shocks (Srivastava & Jha, 2022).

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5. Policy Responses

Government interventions, including PMGKY and PDS, played a significant role. Banerjee et al. (2020) discovered that direct cash transfer schemes helped to reduce consumption shocks, while Dutta et al. (2021) argued for the digital targeting of welfare programs.

OBJECTIVES AND HYPOTHESES

Objectives

The study will evaluate the changing nature of household consumption in Maharashtra across the three significant years 2019, 2020 and 2021—before the COVID-19 pandemic, during the pandemic, and post pandemic recovery. The main aim is to understand how various socio-economic and demographic determinants influenced consumption behaviour among rural and urban households, especially for essential and non-essential goods, food, health, and leisure.

1. Examine shifts in household consumption from 2019 to 2021.

The aim of this objective is to understand how household expenditure behavior changed during the pandemic. The three time-points in time—March in 2019 (pre-COVID), March 2020 (start of lockdowns), and March 2021 (early recovery from the COVID lockdowns)—offer timelines to follow disruptions and changes in consumption. By identifying patterns of consumption in the years of interest, the study also characterizes changes and pivots in household priorities and vulnerabilities while under crisis conditions.

2. Analyze socio-economic determinants of food, health, and leisure expenditure.

The study examined how a variety of factors -- income, education, occupation, gender, household size, and geographic area -- influenced spending on three broad categories:

Food, as a need

Health, during a time of a public health emergency

Leisure, as discretionary spending

The analysis provides insights into the households that maintained or altered their consumption levels when faced with economic pressure, respective of their resiliency or vulnerability as groups'.

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3. Compare rural and urban spending behavior.

Building on the evidence based findings, this study hopes to provide actionable policy recommendations to support households when there is another crisis. Specifically, the primary goal is to identify institutional gaps in income protection, healthcare access, digital readiness, and education, particularly for rural and marginalised households. These findings are deemed useful in planning for more inclusive economic recovery and planning.

4. Recommend policy measures for post-crisis recovery.

Considering Maharashtra's heterogeneity, one question to consider is whether urban households behaved differently than rural households. Urban households could have been more adaptable at reprioritizing expenditures (given their greater access to digital resources and higher rates of formal employment), while rural households are typically impacted more significantly because of their dependence on informal or construction labor/higher unavailability of modes of services (like health and education) or digital assistance. Thus, this study is interested not only in the quantitative differences in spending from pre- to post-COVID, but also in the qualitative aspects of recovery across urban-rural gradients.

Hypotheses

The following hypotheses were developed based on economic theory, previous empirical literature, and the anticipated impact of COVID-19 on consumption behavior:

H1: Income is a key determinant of food expenditure.

Engel's law indicates that as one's income rises, the share of income devoted to food falls. This hypothesis tests if income played a role in determining food expenditure across rural and urban contexts, and the way it behaved under crisis conditions.

H2: Education is a determinant of leisure expenditure in urban homes.

Leisure, being discretionary in nature, is expected to be influenced by education within urban contexts with greater access to tech-related platforms and services (online subscriptions, dining, and travel). The hypothesis investigates whether households with higher levels of education were able to preserve leisure spending amid economic uncertainty.

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H3: household size has an effect on food and health expenditure.

Households with more members have more consumption needs for food and health. This hypothesis assesses whether household size has a statistically significant relationship with consumption in both categories.

H1: Income is a major driver of food spending.

Engel's law states that when one's income increases, the proportion of income spent on food decreases. This hypothesis verifies whether income was a factor in determining food spending between rural and urban settings, and how it acted under crisis situations.

H2: Education determines leisure spending in urban households.

Leisure, as discretionary consumption, should be affected by education in urban environments with more exposure to tech-related platforms and services (online subscriptions, eating out, and travel). The hypothesis examines whether higher-educational households were in a better position to maintain leisure spending during times of economic insecurity.

H3: household size impacts food and health spend.

Those with larger families have higher consumption requirements for food and health. This hypothesis tests if household size has a statistically significant association with consumption under the two categories.

H4: Occupation plays a role in health spending.

Employees in formal employment sectors get employers' healthcare benefits, but informal employment does not receive these benefits. This hypothesis examines if occupation status (whether formal or informal employment) controlled out-of-pocket health expenditure.

H5: The gender of the household head has no appreciable effect on total consumption.

Although there are consistently significant distinctions between men's and women's income and work in decision-making, this hypothesis takes into account that the gender of the household head does not promote variations in the totality of household expenses, particularly when other socio-economic factors are controlled.

H6: Rural families consume less on leisure than city families.

Leisure tends to rely on disposable surplus income and access to services. Rural families tend to have limited leisure activities since they must allocate their spending on necessities. This hypothesis is to test discretionary expenditure in the urban-rural divide.

H7: Expenditure on health was higher in 2020 and 2021.

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In light of the health pandemic induced by COVID-19, this hypothesis anticipates the size of health expenditure to be higher during and after the pandemic owing to the hassle of low income.

H8: Urban households recovered their leisure spending quicker.

In light of the upfront health of urban regions supplemented by their healthcare infrastructure, superior digital methodology, and formal work, urban regions potentially restored their leisure consumption more quickly than rural regions.

METHODOLOGY

Study Design

This study adopts a quantitative and explanatory research design, and tests the relationship between social and economic factors and household consumption using empirical data. The data has come from the Consumer Pyramids Household Survey (CPHS) conducted by the Centre for Monitoring Indian Economy (CMIE), which provides household-based expenditures over time.

Six districts were considered in Maharashtra - Mumbai, Pune, Nagpur, Nashik, Aurangabad, and Amravati - so that the socio-economic, geographical, and social diversity of the state could be reflected. Each district includes rural and urban households which will be the basis for the intra-district comparison.

The time frame from March 2019 to March 2021 provides:

(a) the pre-crisis baseline - (2019)

(b) the crisis period - (2020)

(c) the post-crisis early recovery - (2021)

Variables

- Adjusted Food Expenditure – Represents basic necessities and family nutrition requirements.
- Adjusted Health Expenditure – Represents doctor charges, medicine, insurance, and hospital bills.
- Adjusted Leisure Expenditure – Represents entertainment, recreation, dining out, and holiday expenditure.

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Independent Variables

- Adjusted Total Income – Income after adjusting for inflation and regional difference.
- Education Group – Classified into no schooling, primary, secondary, and tertiary education.
- Occupation Group – Classified into formal sector, informal sector, self-employed, and unemployed.
- Gender of Household Head – Male or female.
- Household Size Group – Classified by number of members.
- Region – Rural or urban classification.
- Analytical Tools and Techniques
- Descriptive Statistics: Utilized to depict trends in spending over years and household categories.
- Multiple Regression Analysis: Conducted separately for food, health, and leisure spending to determine the impact of independent variables.
- Diagnostic Checks:
- Variance Inflation Factor (VIF) – To check for multicollinearity between predictors.
- Residual Analysis – To test for heteroskedasticity and misspecification.
- Robust Standard Errors – Employed to enhance precision and account for heteroskedasticity.

RESULTS AND ANALYSIS

Regression Summary Table

Expenditure Type	Key Predictors	Urban R^2	Rural R^2	Key Findings
Food	Income, Household Size	0.64	0.58	High income elasticity; size consistently significant
Health	Income, Occupation, Size	0.68	0.57	Pandemic-driven surge; education amplified access disparity
Leisure	Education, Region, Income	0.62	0.41	Urban recovery evident; rural stagnation persisted

(Source: Author's Analysis

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- Rural Consumer Trends
- Spending was focused on needs rather than wants, particularly in food purchases.
- Health expenditures increased primarily driven by increased medical requirements from the pandemic, although there remained constrained access to these services.
- Few rural dwellers adapted to the digital world leaving few alternatives such as telemedicine or remote services.
- Leisure consumption remains at zero levels, even into 2021.
- Urban Consumer Trends
- Digital platforms dominated household consumption in health-related purchases, shopping, and recreational activities (e.g., e-commerce, OTT platforms and teleconsultation).
- Health related expenditures significantly increased although some of that was mitigated by employer help.
- Leisure expenditures and restaurant spending began to rebound in 2021, again dominated by households with higher education and higher income households.

Discussion

1. Theoretical validation

- Engel's Law was confirmed that the largest share of household expenditure goes to these necessities while at the same time revealing a larger share of rural household expenditure on food.
- Keynesian Theory was supported: income shocks (job loss, lockdowns) led to sharp cutbacks in non-essential spending.
- The Life Cycle and Permanent Income Hypotheses are evident where in urban areas, leisure and health related expenditures began to rebound in 2021, which assumed a degree of onward spending avoidance, but also reflected confidence in the stability (income and/or other) as the pandemic progressed.

2. Literature Linkages

- The role of income and household type influencing food expenditure on matched the Gupta & Pal (2022).
- Education in leisure spending and to some extent digital resilience, as barriers to leisure consumption is significant in relation to Rani et al. (2023).

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- It is evident in patterns of health inequity in rural areas from Wagstaff (2002), 'access to services, should not lead to exclusion when a need exists'.

3. Policy Implications

- **Education and formal employment** enabled smoother transitions during the crisis.
- **Rural areas** require focused investment in:
    - Digital infrastructure
    - Affordable healthcare
    - Financial tools for resilience
- **Informal workers**, regardless of region, were the most affected due to lack of safety nets.

CONCLUSION AND POLICY RECOMMENDATIONS

1. This research demonstrates that household consumption patterns utilized in Maharashtra during COVID-19 were significantly influenced by income, education, occupation, household size, and regional context. Urban households were able to recover quickly driven by higher levels of digital utilization, formal employment protections, and improved infrastructure. Rural households had to prioritize survival expenditures on food and health with almost no recovery on leisure spending.
2. Significant Contributions- Confirms classical consumption theories in a pandemic environment.
3. Provided district level, rural-urban comparison over a three-year panel.
4. Provided a foundation for developing useful information informed crisis-responsive policies.
5. Policy Suggestions
6. Digital Infrastructure: Close the broadband and mobile coverage gap in rural areas with access to education and telemedicine and other online services.
7. Investment in Healthcare: co-designing and subsidizing rural primary healthcare systems that are affordable and close to public care.
8. Financial literacy and insurance: supporting savings tools and household budgeting and encouraging insurance schemes for

The COVID-19 crisis served as an unprecedented stress test of household economic behavior. This research draws firstly from macro-economic trends as well as micro-level vulnerabilities to strengthen the case for inclusive, evidence-based development that emphasizes structural inequalities in access, opportunity and resilience rather than in growing average incomes.

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INFLUENCERS AND INFORMATION CREDIBILITY: PERCEPTION, TRUST, AND THEIR ROLE IN INFORMING THE PUBLIC

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ABSTRACT

Influencers represent a relatively recent phenomenon in the field of digital communication, with their impact becoming particularly pronounced alongside the rise in popularity of social media platforms. These individuals possess the ability to shape the attitudes, perceptions, and behaviours of their audiences through the content they share online. Given the increasing presence of influencers in digital life and their influence on young people, this paper investigates how students at the University of Zadar perceive influencers compared to traditional sources of information. Special attention is given to authenticity, expertise, transparency, and the level of awareness about sponsored content and its potential influence. The research was conducted using an online survey among students from the Department of Tourism and Communication Sciences at the University of Zadar in Croatia. The results indicate a statistically significant difference in the perception of credibility between influencers and traditional media, with traditional media being perceived as more credible. The authenticity and expertise of influencers have a positive impact on the audience's trust in their posts, while transparency does not represent a significant factor in building trust. The study did not confirm any difference in the influence of influencers on respondents' attitudes depending on whether influencers are perceived as merely disseminating information or interpreting and adapting it. Furthermore, no statistically significant correlation was found between the amount of time spent following influencer content and awareness of sponsored posts. In conclusion, the high level of respondents' awareness regarding the presence of sponsored content suggests a good level of media literacy within this population, but also highlights the need for additional educational programs for more critical evaluation of influencer content.

Keywords: Influencers, Students, Digital media, Authenticity, Credibility, Transparency, Croatia

INTRODUCTION

The aim of this paper is to examine how university students in Croatia perceive the credibility of social media influencers compared to traditional media sources. Specifically, the study investigates the

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extent to which influencer characteristics—namely expertise, authenticity, and transparency—influence public trust. It also explores how students perceive the role of influencers in disseminating and interpreting information, and assesses their awareness and critical understanding of sponsored content and covert advertising.

Since the early 1990s, the number of internet users has been steadily increasing, reflecting the continuous growth and development of the digital environment. Today, 5.35 billion people around the world use the internet, while the number of social media users stands at 5.05 billion. Among internet users aged 16 to 64, the most popular social media platforms are Instagram, WhatsApp, Facebook, WeChat, and TikTok. Instagram and TikTok are favoured by younger users, while WhatsApp is predominantly used by those of middle and older age. Facebook is most commonly used among older populations, while WeChat is the most frequent choice for middle-aged users (Datareportal, 2024).

According to Datareportal (2024), 22.6% of social media users aged 16 to 64 follow influencers or other experts. Although influencers have a significant presence on social media, accounts belonging to friends and family, celebrities, entertainment pages, music, and culinary content are more frequently followed. They are followed more often than athletes, brands supported by users, companies related to users' professional lives, beauty and fitness experts, as well as journalists and media outlets.

Social media and particularly social networking platforms have become significant channels for communication and information exchange in everyday life. Moreover, they have emerged as important platforms for education, self-presentation, the initiation of social and political movements, various forms of creative expression, business opportunities, entertainment, and the promotion of products and services. Within this environment, influencers have emerged; these are individuals who, most simply put, create content and build relationships with their followers through their profiles on platforms such as TikTok, YouTube, and others.

The role and significance of influencers in contemporary society has prompted numerous scholars to investigate their influence and impact within their respective countries. For example, the report The Influence of Influencers (Mai, Saiphoo, Soares, & Gruzd, 2022) demonstrates that influencers have become key actors in the digital world, particularly when it comes to raising awareness of products and services. The report highlights that influencers exert a strong influence on Canadians, especially among younger audiences. TikTok is identified as the most popular platform, with food, music, and travel being the most followed content categories. Respondents place the greatest trust in influencers who appear authentic and knowledgeable, while the physical appearance of the influencer is considered less

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important. Most users research products recommended by influencers, although they are less likely to actually purchase them. Influencer recommendations have a similar impact as traditional advertisements.

In the context of research on the motivation for purchasing products recommended by influencers (Croes & Bartels, 2021), results indicate that young adults are motivated to follow influencers by factors such as: "...information sharing, cool and new trend, relaxing entertainment, companionship, boredom/habitual pass time, and information seeking." Age, gender, and level of education played an important role.

The purpose of this research is to contribute to a clearer understanding of the role influencers play in shaping public opinion and trust, particularly among younger audiences in the context of a rapidly evolving digital media environment. The findings aim to support further academic inquiry, inform communication practices, and guide policy discussions related to media literacy, influencer regulation, and digital advertising ethics.

THEORETICAL BACKGROUND

Authenticity is crucial for influencers, especially in commercial collaborations with various stakeholders. While such partnerships provide financial gain, they can also impact the influencer's credibility. Research by Audrezet, De Kerviler, and Moulard (2020) identified two key strategies that influencers employ to maintain authenticity in commercial collaborations. The first is passionate authenticity, where influencers choose brands or products they genuinely like. The second is transparent authenticity, where influencers openly disclose their commercial role and provide objective opinions without concealing sponsorship. Based on these strategies, the authors propose a four-pole model that combines passion and sincerity, passion without sincerity, sincerity without passion, and neither passion nor sincerity.

In the study by Lou and Yuan (2019), the Social Media Influencer Value (SMIV) model was developed, demonstrating that factors such as expertise, trustworthiness, attractiveness, and similarity to the audience positively influence consumers' trust in sponsored influencer content. This trust then affects brand awareness and purchase intention. Similarly, Van Reijmersdal et al. (2024) examined how different influencer self-presentation styles affect perceived source credibility and subsequent audience responses. Their study found that layperson and opinion leader self-presentation strategies were more persuasive than the micro-celebrity approach. Influencers who portray themselves as laypersons are seen as more trustworthy and socially attractive, which positively affects brand

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attitudes and purchase intentions. Presenting as an opinion leader is also persuasive, as it signals competence and experience to the audience.

The study on the impact of sponsorship disclosure on influencer credibility (Sesar, Martinčević, & Boguszewicz-Kreft, 2022), conducted on a student sample, showed that influencers who clearly disclose sponsored content are perceived as more credible. Therefore, the authors recommend that influencer communication should be transparent. They also emphasize that transparent and credible influencers have a positive effect on brand awareness and purchase intention.

However, Balaban, Mucundorfeanu, and Mureșan (2022) emphasize that simply recognizing sponsored content does not necessarily lead to a critical or defensive attitude toward it. Their research among adolescents shows that even when advertising is clearly labeled and understood, users rarely develop deeper resistance to covert persuasion. This challenges the assumption that exposure alone is sufficient for developing advertising literacy.

Sehrawat and Tyagi (2023) focused on examining the credibility of social media influencers from the perspective of end users and marketing professionals. Through a review of relevant literature, they conclude that the credibility of influencers depends not only on the size of their audience, but also on its authenticity and level of engagement. They particularly emphasize the importance of authenticity, as their audience expects honesty and transparency. Otherwise, it may negatively affect the influencer's credibility. In the context of credibility, they highlight the importance of follower engagement through, for example, likes, comments, and content sharing.

The study by Hwang and Jeong (2016) examined how individuals respond to sponsored blog posts when bloggers clearly disclose that the post is sponsored. It investigated whether such posts would be perceived as more credible if bloggers additionally stated that their opinions are honest, despite the sponsorship. The findings indicated that such statements can improve perceived credibility, particularly among individuals with a high level of scepticism toward product reviews.

The development of technology and modern media, especially social networks, has significantly contributed to opinion leaders playing an increasingly important role in everyday life and the business world. Casaló, Flavián, & Ibáñez-Sánchez (2020) aimed to determine which characteristics of Instagram posts influence users being perceived as opinion leaders and how this affects the behaviour of their followers. The research showed that the originality and uniqueness of published content significantly contribute to the perception of a user as an opinion leader, while the quality and quantity of posts were not found to be statistically significant factors.

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In addition to their commercial and lifestyle roles, influencers can also play an important role in political sociallization. The study by Peterm & Muth (2023) on the perceived influence of influencers in the context of political socialization and youth mobilization showed, among other things, that young people tend to rely more on traditional media as sources of information and opinion formation. Influencers serve as an additional source. When it comes to changing opinions, influencers have limited impact – they can only reinforce existing attitudes. Political influencers are perceived as more credible compared to those who comment on political events only occasionally. Nevertheless, even such influencers can encourage political engagement.

The study on the perception of influencer credibility (Rizzo, 2024) found that an individual's decision to follow an influencer is significantly influenced by the influencer's perceived expertise, trustworthiness, and attractiveness. The study highlights that perceived similarity between followers and influencers can be significant in certain cases, but not to the same extent as expertise and trustworthiness. This may be explained by the fact that individuals may choose to follow an influencer because of their expertise or credibility in a particular field, regardless of whether they share the same interests or values.

It is also important to emphasize the significance of the quality of content created by influencers. The study conducted by Balaban, Iancu, Mustăţea, Pavelea, and Culic (2020) indicates that producing content perceived as high-quality is associated with an increase in the number of followers, the development of positive attitudes, and the strengthening of trust in influencers.

METHODOLOGY

In order to fulfill the aim of this study, the following research questions were explored: RQ1: Does the public perceive influencers as credible sources of information? RQ2: Do expertise, authenticity, and transparency influence the public's trust in influencers? RQ3: Does the public believe that influencers merely disseminate information, and/or interpret and adapt it before sharing it with the public? RQ4: Is the public aware of sponsored content and covert advertising, as well as its potential influence (manipulation through influencers)? In accordance with the research objectives and formulated research questions, the following hypotheses were proposed: H1: There is a statistically significant difference in the perceived credibility of influencers compared to traditional media as sources of information in the Republic of Croatia. H2: Public trust in influencers is positively correlated with their authenticity, expertise, and transparency. H3: There is a statistically significant difference in the perceived influence of influencers among groups of respondents with differing perceptions of influencers' role in information dissemination. H4: There is a statistically significant difference in the

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level of awareness of sponsored content and covert advertising between individuals with higher and lower exposure to influencer content.

For the purposes of this research, a quantitative approach was employed, based on a survey questionnaire conducted among students at the University of Zadar. This methodology enables data collection from a larger sample of respondents, resulting in greater representativeness and the possibility of generalizing the results to a wider population. Given that the research questions and hypotheses focus on exploring relationships and differences between variables (e.g., differences in perception, the connection between trust and influencer characteristics), the quantitative method enables the accurate measurement of perceptions and attitudes across different respondent groups.

The questionnaire was created and published using Google Forms. The research included students of all years at the Department of Tourism and Communication Sciences (full-time and part-time students) at the University of Zadar. The survey was published on 24 February and closed on 2 March 2025. Of the total number of invited students (293), 87 completed the questionnaire and participated in the study. The questionnaire contained 22 questions that were related to the use of social networks, attitudes and perceptions of influencers as opinion leaders, their role in disseminating and filtering information, and socio-demographic characteristics of the respondents. The questions were closed-ended, allowing respondents to select from predefined options, with the exception of two questions that were open-ended, enabling respondents to provide their own responses. A five-point Likert scale was employed for all questions assessing respondents' perceptions and attitudes. On the first page of the instrument, respondents were informed that participation is completely voluntary, that they may withdraw at any time, and the answers would be anonymous. The data were analysed using IBM SPSS Statistics v26. Both descriptive and inferential statistical methods were employed in the data analysis.

RESEARCH RESULTS

Out of 293 planned responses (sent invitations), 87 were completed (number of filled-out questionnaires), which amounts to 29.7%. The respondents were mostly aged between 18 and 20 years (49%), followed by 28% aged between 21 and 23 years, 20% aged between 24 and 25 years, and 3% older than 26 years. Of the total 87 respondents (74 women and 11 men – 2 did not specify their gender), the majority (63) were undergraduate students (41 in their first year, 14 in their second year, and 8 in their third year). A total of 24 respondents were graduate students (17 in their first year of graduate studies and 7 in their second year).

The results clearly show that the majority of respondents spend a significant part of their day using social networks. The largest percentage of respondents (35.6%) reported spending 3 to 4 hours daily on social media. This category represents the most frequent response, suggesting that this is the

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average amount of time most people allocate to social media. The second most common category is 2 to 3 hours per day, chosen by 34.5% of respondents. While 19.5% said they spend five or more hours daily on social media, only a smaller number of respondents (4.6%) reported spending less than one hour per day.

Respondents evaluated the frequency of their use of information sources (ranging from never to very often). The most frequently used sources (responses "often" and "very often") were web portals (46%), television (26.4%), and influencers (25.3%). The least used sources were radio (74.7% responded "never" or "rarely") and newspapers (89.6% responded "never" or "rarely"). These results indicate that the student respondents prefer digital sources of information, such as web portals and influencers, over traditional media like newspapers and radio. The results also suggest that, although influencers are not the primary source of information, they have a significant presence in informing young people.

Next, respondents were asked to specify which social media platforms they use for following influencers and to what extent (from never to very often). The majority of respondents use Instagram (90.8%), with 59.8% using it often or very often. This is followed by TikTok (74.7%, with 52.8% using it often or very often) and YouTube (72.4%, with 21.8% using it often or very often). Facebook is used by only 34.5% of respondents, mostly rarely or never (a total of 82.7%). Snapchat (13.8%), Twitter/X (10.3%), and LinkedIn (5.7%) are the least represented platforms for following influencers. Other platforms ("something else") were mentioned by a total of 6.9% of respondents, but the vast majority (97.7%) use them rarely or never.

When asked about their level of trust in the information shared by influencers, respondents expressed a variety of attitudes. The largest share of participants (47.1%) reported that they neither trust nor distrust information from influencers, reflecting a marked sense of ambivalence or caution. A total of 24.1% reported having little trust, while 10.3% reported having no trust at all in the information shared by influencers. On the other hand, 18.4% of respondents mostly trust such information, while none of the participants expressed complete trust. The results indicate that neutrality and scepticism towards information provided by influencers prevail among respondents, with only a minority expressing trust. After expressing their level of trust in influencers, respondents indicated the perceived level of expertise, authenticity, and transparency of the influencers, as shown in Table 1. It can be concluded that the majority of respondents perceive influencers as insufficiently competent, inauthentic, and lacking in transparency. The most positive assessment was given in the category of transparency; however, even in this regard, scepticism prevails.

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		1	2	3	4	5
Expertise	n	8	44	33	2	0
	(%)	9.20%	50.60%	37.90%	2.30%	0.00%
authenticity	n	45	0	34	8	0
	(%)	51.70%	0.00%	39.10%	9.20%	0.00%
transparency	n	35	0	34	15	3
	(%)	40.20%	0.00%	39.10%	17.20%	3.40%
Legend: 1 - not at all; 2 - a little; 3 - to some extent; 4 – mostly (faitly); 5 - completely						

Table 1- *Perceived level of expertise, authenticity and transparency*

In response to the question about perspectives on the role of influencers in information dissemination, most respondent (52.9%) believe that influencers combine both approaches—interpreting information and adapting it to the audience while also simply disseminating information. Additionally, 34.5% of respondents think that influencers primarily interpret and tailor information to the interests of their audience. A smaller portion (10.3%) perceives influencers as merely disseminating information without interpretation. Lastly, 2.3% of respondents are unsure about the role influencers play. These findings suggest that most respondents recognize influencers as active intermediaries who do more than just pass along information.

The next question aimed to assess the perceived level of influence on attitudes, behaviour, or decisions of respondents. The results show that 13.8% of respondents believe that influencers do not influence their attitudes, behaviour, or decisions at all (n = 12). A larger proportion of respondents, 28.7%, state that influencers mostly do not influence them (n = 25). The largest number of respondents chose the neutral option, meaning that influencers neither influence nor do not influence, which accounts for 34.5% of the responses (n = 30). Finally, 23.0% of respondents believe that influencers mostly influence their attitudes, behaviour, or decisions (n = 20).

Responses regarding how aware the respondents are that influencers often post sponsored content and covert advertisement the largest number of respondents, 59.8% (n = 52), stated that they were fully aware that influencers often post sponsored content or covert advertisement. This was followed by the category of respondents who were mostly aware, which made up 32.2% of the responses (n = 28). A smaller number of respondents, 8.0% (n = 7), chose the neutral option, i.e. that they were neither aware nor unaware of this practice by influencers. It is interesting to note that no respondent chose the options mostly or not at all aware, which indicates a high level of awareness among the respondents.

Testing the hypotheses

To test hypothesis H1, it was first necessary to determine the dominant source of information for each respondent. Since the respondents reported how often they use each source of information, we

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grouped them into two categories: a) the group that more frequently uses influencers as sources of information, and b) the group that more frequently uses "traditional" media. We calculated the average ratings for all „traditional" media and compared them to the ratings for influencers. If the rating for influencers was higher than the average rating for traditional media, the respondent was categorized into the 'influencer users' group, and vice versa, respondents whose average rating for traditional media was higher than the rating for influencers were categorized into the 'traditional media users' group. If the ratings were equal, the respondent was assigned to the neutral group 'both equally'. The results in Table 2 show that nearly the same number of respondents use influencers and traditional media as their dominant source of information. Specifically, 48.3% of respondents (n = 42) stated that they are more frequently informed through influencers, while a slightly higher percentage, 49.4% of respondents (n = 43), indicated traditional media as their main source of information. A smaller number of respondents, 2.3% (n = 2), stated that they use both sources of information equally – influencers and traditional media.

The Kruskal-Wallis test was used to examine whether there is a statistically significant difference in the perception of the credibility of information between different sources of information. The results of our research (table 2) show that there is a statistically significant difference in the perception of credibility between influencers and traditional media as sources of information (H (2) = 7.254, p = .027).

		Descriptive statistic		Kruskal-Wallis H		
	Dominant source of information	N	Mean Rank	χ2	df	p
Trust in information shared by influencers	influencers	42	49,63	7.254	2	0.027
	Traditional media	43	37,51			
	Both equally	2	65,25			

Samples in comparison	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig. a
Traditional media – Influencers	12.119	5.123	2.366	0.018	0.054
Traditional media– both sources	-27.738	17.082	-1.624	0.104	0.313
Influencers – both sources	-15.619	17.091	-0.914	0.361	1.000

a Significance values have been adjusted by the Bonferroni correction for multiple tests.
N - number of participants; χ2 - chi-squared statistic; df - degrees of freedom; p - probability value; Sig. - Significance; Adj. Sig. - Adjusted Significance

Table 2 - *Kruskal-Wallis H test "trust in information shared by influencers" by "dominant source of information"*

After identifying a significant overall difference, we conducted pairwise comparisons between groups to determine which specific groups showed a significant difference. The p-value for the comparison between "traditional media" and "influencers" is 0.018, indicating a significant difference in the

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perception of credibility between these two groups. However, after applying the Bonferroni correction, the p-value increases to 0.054, which is slightly above the significance level of 0.05. This means that, under a more conservative interpretation, the difference would not be considered strictly significant after the correction, but it remains very close to the significance level. For the comparisons between "traditional media" and "both equally", as well as between influencers and "both equally", the differences are not statistically significant ($p > 0.05$). The hypothesis H1 stating that there is a statistically significant difference in the perception of credibility between influencers and traditional media can be considered supported, but with certain limitations.

Variables	B	SE B	Beta	t	p
Expertise	0.413	0.131	0.317	3.144	0.002
Authenticity	0.312	0.079	0.402	3.961	0.000
Transparency	-0.005	0.073	-0.008	-0.072	0.943
Note: R (multiple correlation coefficient) = 0.592; R2 (coefficient of determination) = 0.350; F = 14,927; Sig. = 0.001 Legend: B - unstandardized Beta; SE B - standard error of B; Beta - standardized Beta (β), t - t-statistic; p - probability value					

Table 3: *Regression of authenticity, expertise and transparency on trust in information shared by influencers*

To test the hypothesis that students' trust in influencers is positively correlated with their authenticity, expertise, and transparency (H2), a multivariate regression was conducted. The results (table 3) indicated the predictors (the set of independent variables) explained 35% of the variance in trust in information shared by influencers. The overall relationship proved to be statistically significant ($R^2 = 0.350$, $F = 14.927$, $p < 0.001$). It was found that authenticity ($\beta = 0.402$, $p = 0.000$) and expertise ($\beta = 0.317$, $p = 0.002$) of influencers are significantly and positively associated with trust in the information they share, which supports part of the hypothesis. Higher perceptions of authenticity increase audience trust, higher perceptions of expertise also increase trust. Transparency is not a significant predictor of trust ($p = 0.943$), meaning that this factor has no statistically significant impact on perceptions of influencer credibility. The hypothesis H2 was partially confirmed – trust in information shared by influencers is positively related to authenticity and expertise, but not significantly related to transparency.

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		Descriptive statistics		Kruskal-Wallis H		
	Role of influencers in disseminating news and information	N	Mean rank	$\chi 2$	df	p
Impact of influencers on public attitudes, decisions and behaviour	interpreting information and adapting it to the audience	30	42.42	6.566	3	0.087
	disseminating without interpretation	9	28.00			
	Combination of both approaches	46	48.79			
	Don't know	2	29.50			
	Total	87				

Table 4 - *Kruskal-Wallis H test role of influencers in disseminating news and information by impact of influencers on attitudes, decisions and behavior*

To test our third hypothesis (H3), a Kruskal-Wallis test was conducted to compare the variable "role of influencers in *disseminating* news and information" with " influence of influencers on attitudes and behaviour" (table 4). The empirical significance, as indicated by the p-value (α), was found to be 0.087, or 8.7%, which exceeds the conventional significance level of 5%. Consequently, the proposed hypothesis (H3) is not supported (H (3) = 6.566, p = 0.087), leading to the conclusion that there is no statistically significant difference in the perceived influence of influencers among groups of respondents with varying attitudes towards their role in information and news dissemination.

		Descriptive statistics		Kruskal-Wallis H		
	Exposure to influencer content	N	Mean rank	$\chi 2$	df	p
Awareness of sponsored content and covert advertisement	Less than 30 min.	32	41.81	1.085	4	0.897
	30 min. to 1 hour	19	42.55			
	1 to 2 hours	11	46.95			
	2 to 3 hours	16	45.41			
	More than 3 hours	9	48.72			
	Total	87				

Table 5. *Kruskal-Wallis H test exposure to influencer content by awareness of sponsored content and covert advertisement*

The final hypothesis (H4) investigates whether there is a significant difference in awareness of sponsored content and covert advertisement among respondents with higher and lower exposure to influencer content. The results of the conducted Kruskal-Wallis test (H(4) = 1.085, p = 0.897) indicate that the null hypothesis cannot be rejected, as the p-value of 0.897 is substantially above the significance level of 0.05 (table 5). Based on the analysis results, hypothesis H4 is not supported, as no significant difference in awareness of sponsored content and covert advertisement was found among respondents depending on the level of exposure to influencer content.

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CONCLUDING DISCUSSION

Influencers play an increasingly significant role as sources of information for many young people, especially in the context of social media. Through platforms such as Instagram, TikTok, YouTube, and others, influencers regularly share content on a wide range of topics. This paper focused on exploring how and to what extent the Croatian university students perceives influencers as credible sources of information and to analyse their influence on publics' attitudes and decisions. The first research question asked to what extent the Croatian public perceives influencers as credible sources of information. The results of our research show that there is a statistically significant difference in the perception of credibility between influencers and traditional media as sources of information. The Kruskal-Wallis test indicated an overall significant difference between groups, while detailed pairwise comparisons confirmed that the difference lies between influencers and traditional media. Although the p-value for this pair increased to 0.054 after Bonferroni correction, the results still suggest a trend in perceiving traditional media as more credible sources compared to influencers. This can be explained by the fact that traditional media are subject to professional standards and ethical guidelines that ensure greater objectivity and verification of information. In contrast, influencers frequently operate in the absence of clear regulations, which may impact perceptions of their credibility and result in inconsistencies in the quality and objectivity of the information they disseminate. The significance of traditional media as authoritative sources of information is also confirmed by recent research, which shows that, despite the rise of digital media, many citizens still place greater trust in traditional news sources such as television, radio, and print media. Furthermore, the fact that most internet users believe disinformation is most widespread on social media further supports this claim (Ipsos, 2023). In a similar vein, a recent study found that Croatian citizens place the most trust in public television and radio stations, while being more cautious about information from social media, despite using these platforms more frequently to stay inform. (Blagojević, 2024).

The next research question examined the factors (expertise, authenticity, and transparency) that affect the public's trust in influencers. The multivariate regression analysis partially supported the hypothesis that public trust in influencers is positively associated with their expertise, authenticity, and transparency. The findings indicate that as influencers are perceived as more authentic and sincere, they tend to gain greater trust from their audience. This result is expected and aligns with previous research that emphasizes the importance of spontaneity, consistency, and honesty in building a connection with the audience (e.g., Audrezet et al. 2020).

The expertise of influencers makes a substantial contribution to trust, indicating that the public's decisions are not based solely on impressions, but also on perceived competence. Similarly, Van Reijmersdal et al. (2024) found that influencers who present themselves as laypersons or opinion

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leaders are perceived as more credible than those adopting a micro-celebrity approach, which further highlights the importance of perceived expertise and authenticity in building trust. This reinforces the idea that perceived competence is a crucial factor in establishing trust. Influencers who consistently demonstrate expertise are viewed by the public as reliable sources of information—an observation consistent with Rizzo (2024), who suggests that expertise plays a central role in the decision to follow an influencer. These findings also align with Sehrawat and Tyagi (2023), who emphasize that influencer credibility is strongly linked to authenticity, transparency, and audience engagement.

The public views authentic influencers as more trustworthy sources of information, which influences how receptive they are to the messages these influencers transmit (Lou & Yuan, 2019). The connection between authenticity and trust can also be explained through relationships in which the audience perceives influencers as close friends or role models. Surprisingly, the transparency of influencers did not significantly influence trust, indicating that the public might not view the disclosure of information sources as a key factor in evaluating the credibility of influencers. It is possible that transparency is taken for granted or that the audience does not adequately notice labels indicating sponsored content. Additionally, it is possible that the public does not view transparency as a crucial factor in decision-making and frequently does not perceive sponsorships as compromising credibility.

The next assumption posited that the effect of influencers on public attitudes, decisions, and behaviour differs according to their role in disseminating information. The results of the Kruskal-Wallis test show that there is no statistically significant difference in how respondents perceive the impact of influencers on attitudes, behaviour or decision-making among groups of respondents who perceive their role in information dissemination differently. Although differences between groups were expected, our results suggest that these differences are not pronounced enough to be considered significant. Influencers' roles in the modern digital landscape are so varied and adaptable that participants do not experience them as distinctly differentiated. A substantial percentage of respondents (52.9%) in this study view influencers as a blend of information transmitters and interpreters, which may also account for the lack of significant differences found between groups. Whether respondents perceive influencers mainly as information transmitters, interpreters, or a combination of both, their perception of the impact of influencers on their attitudes, behaviour, and decisions remains largely consistent. It is possible that the perceived influence of influencers is not directly tied to how respondents view them in terms of information dissemination, and that they have formed opinions about influencers' influence based on personal preferences.

Our final assumption was that participants who are more frequently exposed to influencer content would demonstrate a different level of awareness regarding sponsored content and covert advertisement compared to those who are less exposed. The results of our study show that exposure

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to influencer content (time spent) is not crucial for recognising sponsored content and covert advertising. It is possible that our respondents may not differentiate between paid and unpaid (organic) content, even if they frequently come across it. Simply being exposed to influencers is not enough to foster awareness of sponsored content and covert advertising, highlighting the need for more comprehensive educational initiatives that would allow users to better comprehend and critically evaluate influencer information. These findings are supported by Balaban, Mucundorfeanu, and Mureșan (2022), who found that even when adolescents recognize sponsored content, they rarely develop deeper resistance to covert advertising. This suggests that awareness does not automatically lead to critical thinking, reinforcing the idea that exposure alone is insufficient for developing advertising literacy.

Given the above, it can be concluded that despite the increasing prominence of influencers within the digital landscape, our findings reveal a distinct disparity in credibility perceptions between influencers and traditional media, with the latter maintaining a privileged status as trusted information sources. Authenticity and expertise emerge as key determinants of trust in influencers, whereas transparency appears less influential than anticipated. Moreover, the impact of influencers on audience attitudes and behaviours is not uniformly perceived, suggesting that their influence might be context-dependent rather than universal. Importantly, mere frequency of exposure to influencer content does not enhance awareness of sponsored or covert advertising. While our research enhances the understanding of the complex and multifaceted role that influencers play within the modern media ecosystem, it also underscores the necessity of ongoing monitoring of shifts in public perception and the development of educational strategies aimed at promoting users' critical engagement with influencer-generated content in digital contexts.

THEORETICAL AND PRACTICAL IMPLICATIONS

The results of this study highlight that authenticity and expertise are key factors contributing to the development of audience trust in influencers, whereas transparency (such as labeling content as sponsored) does not have a statistically significant effect. This research complements existing studies on trust in influencers as sources of information and suggests directions for future research focused on more specific communicative elements that either foster or diminish audience trust.

The results also indicate that participants' perceptions of influencers' roles—whether as transmitters, interpreters, or both—do not significantly affect their assessment of influencers' impact. This indicates that the influence exerted by influencers may stem from other factors, which should be explored more thoroughly in future research. From a practical perspective, the findings underscore the importance

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for influencers to build an image of authenticity and expertise, as these elements are essential for establishing trust with their audience. Simply labeling content as sponsored may not be sufficient to enhance credibility. Instead, it is necessary to invest in content that genuinely reflects real-life experiences and personal involvement.

Although students demonstrate a high level of awareness regarding sponsored content, this study found that such awareness is not related to how frequently they follow influencers. This suggests a need for educational initiatives designed to enhance young people's critical evaluation of digital content and their understanding of the impact of covert advertising

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ICT AND SMART TECHNOLOGIES AS ENABLERS OF DIGITAL STRATEGY IN THE GREEK FOREST SERVICES: A FACTOR ANALYSIS THROUGH THE LENS OF NEW PUBLIC MANAGEMENT

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ABSTRACT

The utilization of Information and Communication Technologies (ICT) and smart and intelligent technologies constitutes a key element of administrative modernization within the Greek Forest Service, in the context of implementing New Public Management (NPM). This study explores the use, perceived effectiveness, and acceptance of innovative technologies through Principal Component Analysis (PCA), as well as quantitative methods such as the Kruskal-Wallis test and correlation analysis. The results revealed three main factors influencing ICT integration: (a) the degree of usage, (b) the perception of their effectiveness, and (c) the acceptance of Artificial Intelligence and emerging technologies. Moreover, critical challenges were identified, including a lack of training, generational differences in innovation adoption, and the absence of a supporting regulatory framework. The connection of the findings to the principles of NPM and good governance highlights the need for targeted policies, infrastructure upgrades, and the enhancement of staff competencies. The study contributes to the redesign of forest policies and promotes sustainable and technologically mature public administration.

Keywords: Digital Public Governance, Artificial Intelligence, ICT Integration, Administrative Innovation, Forest Services, Technological Readiness

INTRODUCTION

This study is structured around four strategic objectives reflecting the dual pursuit of digital capacity building and administrative modernization: (1) assessing the degree of ICT use, (2) analyzing perceived effectiveness, (3) exploring AI acceptance, and (4) formulating strategic proposals. All objectives align with the principles of New Public Management (NPM), emphasizing institutional support and digital transformation in public governance.

Information and Communication Technologies (ICT), alongside smart technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and big data, represent not merely technical tools

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but drivers of reform grounded in efficiency, transparency, and accountability (Hood, 1991; Pollitt & Bouckaert, 2017; OECD, 2020). Their strategic deployment in the public sector must integrate organizational change to achieve tangible impact (Mergel, 2019; Khoshroo & Talari, 2025).

In Greece, the Forest Service—responsible for managing 67% of the national territory—faces the dual challenge of safeguarding ecological assets and embracing innovation. Tools such as GIS, IRIDA, and AI provide a foundation for real-time decision-making, yet their integration remains uneven. The Forest Service's constitutional mandate—management and protection of public forest resources—demands a tailored digital strategy that enhances innovation performance while safeguarding public value (European Commission, 2021; Buhalis et al., 2024).

This study investigates the adoption of digital strategy in the Forest Service under the NPM lens. The central research question is: *To what extent, and through which factors, is the adoption of a digital strategy influenced?* Three sub-questions guide the analysis:

(a) What is the degree of ICT and smart technology usage among personnel?

(b) How do age, position, and education affect the acceptance of digital innovations?

(c) How is the perceived effectiveness of digital tools evaluated concerning administrative functions?

LITERATURE REVIEW

New Public Management and Administrative Reform

New Public Management (NPM) has emerged over the past decades as a set of theories and practices aimed at improving the effectiveness and efficiency of the public sector through the adoption of tools and methods from the private sector (Hood, 1991; Pollitt & Bouckaert, 2017). The core principles of NPM include decentralization, transparency, efficiency, accountability, citizen-as-client orientation, and the enhancement of innovation. A fundamental characteristic of NPM is the deconstruction of vertical hierarchy. It challenges traditional hierarchical models by promoting decentralization, organizational flexibility, and decision-making closer to the point of action.

In the Greek Forest Service, operational structures without intermediate levels between the Regional Forest Services partially reflect the logic of decentralization and functional autonomy (Karadonta & Papadopoulos, 2021). This feature aligns with the NPM philosophy, which is embedded in forest policy and the management of environmental public goods (Christensen & Lægreid, 2011; Laegreid, 2017).

NPM, as both a managerial philosophy and a practical framework, emphasizes the efficiency of public sector governance—such as that of the Forest Service—through entrepreneurial practices, a client-centered approach, the reduction of bureaucracy, and the integration of technologies. Recent studies highlight that NPM reforms are increasingly intertwined with digital transformation

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strategies, where ICT becomes a lever for administrative redesign and organizational agility (Khoshroo & Talari, 2025). With the adoption of ICT, including Artificial Intelligence, the implementation of NPM influences the management of the forestry sector in both Greece and Europe.

The application of NPM principles in Forest Services aims to strengthen organizational capacity to effectively address environmental, social, and technological challenges (Christensen & Lægreid, 2011; Greve, 2015). Organizational readiness and digital maturity have been identified as critical enablers in the public sector's transition to performance-based management models (Cheng & Miao, 2025).

Digital Strategy in Public Administration

Digital transformation has become a cornerstone of public administration globally, as public organizations are increasingly expected to operate with greater flexibility, transparency, and efficiency (Mergel, 2019; OECD, 2020; Ingraham & Laurence, 2004). Digital strategy goes beyond the mere adoption of tools—it involves strategic planning for their integration into organizational processes, the enhancement of employees' digital skills, the restructuring of services, and the adoption of new forms of governance (Janssen & van der Voort, 2016; Desouza, 2019).

Strategic digital transformation in the public sector requires more than the adoption of tools; it demands alignment with long-term goals of organizational agility and innovation capacity (Buhalis et al., 2024). Accordingly, digital strategy should be viewed as a governance mechanism—closely tied to administrative modernization and the development of institutional capacity (Ratna et al., 2024).

In the field of natural resource management—and forest management in particular—digital strategy plays a critical role. It is associated with the monitoring of forest areas, the timely prevention of risks (e.g., wildfires, illegal logging), as well as with transparency and citizen participation with open data and citizen information systems (United Nations E-Government Survey, 2022). Digital strategy in Forest Services should not be implemented in a fragmented manner but must be established as an integrated institutional axis of operation (Vlachou, Karadonta & Papadopoulos, 2023). Strategic digital transformation follows identifiable stages that align with core principles of New Public Management, including decentralization and performance orientation (Khoshroo & Talari, 2025). Emphasis is placed on geospatial data management, timely information dissemination, and crisis response, through systems such as GIS and IRIDA.

It is noteworthy that the technological dimension was often overlooked in earlier versions of NPM, which makes the integration of information and communication technologies imperative in modern forms of public administration (Dunleavy et al., 2006).

ICT and Smart Technologies in the Digital Transition of Forest Governance

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Information and Communication Technologies (ICT), including Geographic Information Systems (GIS), Digital Signatures, and document management systems such as IRIDA, significantly enhance administrative efficiency and support daily operations (OECD, 2020; Ferlie, 1996). In parallel, smart technologies, namely Artificial Intelligence (AI), the Internet of Things (IoT), and Big Data Analytics—provide advanced capabilities for automation, real-time decision-making, and complex risk analysis (Halaweh, 2018; United Nations, 2022). These systems enable adaptive responses in dynamic environments, which is particularly crucial in forest governance.

Beyond their operational functionalities, smart technologies also influence how public organizations learn, adapt, and generate public value in institutional contexts marked by complexity and uncertainty (Tangi et al., 2024). Their integration into Forest Services is not only a technical endeavor but a strategic and organizational challenge that requires institutional readiness, long-term planning, and the cultivation of a coherent digital culture across all administrative levels (Karadonta & Papadopoulos, 2023). The avoidance of fragmentation and the continuity of reform demand alignment of digital transformation efforts with broader institutional structures and leadership commitment (Buhalis et al., 2024).

Modern forest governance is increasingly shaped by global pressures such as climate change, biodiversity decline, and emerging zoonotic risks (Ceballos et al., 2015). In this context, digital technologies not only boost operational effectiveness but also support sustainable resource management and bioeconomy principles (Nitoslawski et al., 2021; Weiss, 2013). The application of tools such as remote sensing, big data, and automated monitoring strengthens evidence-based decision-making and enhances the system's ability to adapt to environmental volatility (FAO, 2020). When these technologies are embedded within adaptive governance frameworks, they contribute to long-term institutional resilience and administrative innovation (Schraeder & Overeem, 2024).

Moreover, aligning digital transformation with New Public Management (NPM) principles reinforces transparency, accountability, and the effective allocation of public resources (Bertot et al., 2010; United Nations, 2022). Nevertheless, barriers persist—ranging from user heterogeneity and digital skill gaps to the absence of a stable institutional framework, particularly within the Greek public administration. These challenges emphasize the need for targeted capacity-building initiatives and the development of digital leadership to guide the transition (Mergel, 2019; Doornbos, 2003).

International Practice Examples and Comparative Analysis

International experience confirms that the successful integration of ICT and smart technologies in the public sector requires technological readiness, institutional organization, and a clear accountability framework (OECD, 2020; World Bank, 2021). Although the implementation of such strategies varies across countries, common trends can be observed in services related to forest

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and environmental governance. In China, neural models are being developed to predict the spread of forest fires based on environmental data (Zechuan et al., 2022). Finland utilizes sensor networks to monitor forest health and carbon dioxide absorption (Salla et al., 2020). In Japan, intelligent systems are used to identify high-risk areas due to extreme weather events. In Greece, the National Observatory has developed the "Deep Cube" and "Seas Fire" programs, which apply predictive intelligence methods to assess forest fire risk.

These examples demonstrate that smart technologies, when embedded in an organized administrative and institutional framework, can effectively support evidence-based decision-making, enhance transparency, and strengthen administrative capacity in environmental governance. These approaches reflect a broader trend in digital-era governance, where smart technologies are not isolated tools but components of strategic public management under the NPM framework (Greve, 2015).

RESEARCH METHODOLOGY AND SAMPLING

This study employed a structured questionnaire designed following established methodological approaches from relevant literature (Bryman, 2016; Kallas & Paparisteidis, 2022; Kyriazis, 2011). The objective was to investigate the extent of ICT and smart technology usage, employee acceptance levels, and the strategic value of digital tools within the Greek Forest Service, under the conceptual framework of New Public Management (NPM). This approach enabled the recording of staff attitudes and the identification of critical factors influencing digital transformation.

The data were collected between June 2023 and January 2024 from a stratified random sample of 232 employees, representing approximately 29% of the total workforce (around 800 employees). The sampling design ensured balanced representation in terms of hierarchical position, educational level, and geographic location. A preliminary pilot test with six employees was conducted to validate the clarity of the questionnaire and estimate the completion time. The final version was disseminated electronically using Google Forms, ensuring anonymity and voluntary participation.

The questionnaire consisted of 20 variables, including 15 items focused on the usage, perception, and acceptance of ICT and smart technologies, and 5 demographic and professional variables. Most questions used a five-point Likert scale (1 = Not at all – 5 = Very much), while some were multiple-choice, ranking, or dichotomous in nature to allow a more nuanced analysis.

Data analysis was conducted using SPSS (v.26) and involved two primary statistical techniques. First, Principal Component Analysis (PCA) was applied to group interrelated variables and identify underlying dimensions of ICT adoption. The adequacy of the dataset was verified via the KMO and Bartlett's tests, and interpretation relied on factor loadings as proposed by Jolliffe and

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Morgan (1992). Second, the Chi-Square (X^2) test was used to explore associations between socio-demographic characteristics (such as age, role, and education) and ICT-related responses.

Based on the PCA results, three composite indicators were developed to provide a more holistic understanding of the technological maturity of the Forest Service: (1) Infrastructure Adequacy Index, (2) Digital Readiness Index, and (3) AI Acceptance Index. Each index was constructed using selected variables from the questionnaire and followed established methodological guidelines for composite index development in public sector research (OECD, 2008; Greco et al., 2019). These indicators support the study's analytical framework and contribute to evidence-based proposals for enhancing digital governance in line with the principles of NPM and good administrative practice.

RESULTS

Demographic Profile and Sample Overview

The statistical and qualitative analysis of data from 232 employees of the Greek Forest Service yielded significant findings regarding the digital transformation of the organization. The high internal consistency of the questionnaire (Cronbach's alpha = 0.9) confirms the reliability of items related to ICT and smart technology use (Bonett & Wright, 2015). With a sample size representing nearly 29% of the total workforce (approx. 800 employees), the analysis achieves statistical significance and a margin of error below 5% (Cohen, 1992).

The demographic profile reflects a mature and highly qualified workforce. The gender distribution is balanced (50.9% male, 49.1% female), with most respondents (85.4%) belonging to the 46–65 age group. In terms of professional roles, Forest Engineers (30.6%) and Forest Rangers (25.0%) are the most represented, followed by Section Heads and administrative personnel. The educational level is relatively high, with 42.2% holding a university degree, 34.5% a postgraduate degree, and 11.6% a doctoral degree. Furthermore, 73% of participants report more than 20 years of experience, demonstrating a workforce with substantial institutional knowledge. However, the limited presence of younger employees may pose a challenge to the pace of digital innovation.

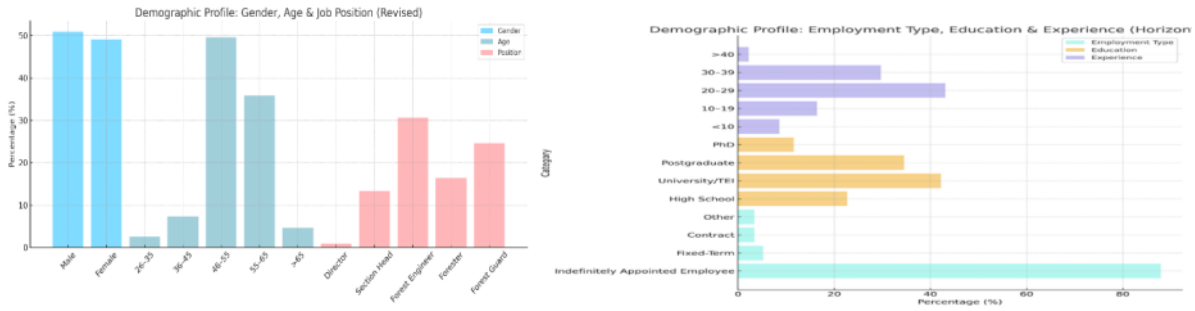


Figure 1: "Demographic Composition of Respondents in the Greek Forest Services Survey"

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The aggregated data depicts a workforce that is both mature and highly skilled. However, the limited presence of younger employees may act as a structural constraint on the pace of digital innovation. The analysis of variables such as gender, age, education, professional role, and years of experience offers a comprehensive and representative profile of the sample, highlighting both its strengths and demographic imbalances.

Factor Analysis and Composite Indicators

Principal Component Analysis (PCA) identified three key dimensions related to the integration of ICT and smart technologies: ICT Usage, Perceived Effectiveness, and AI and Innovation Acceptance. The first factor (46.4% of total variance) is associated with variables such as daily ICT use, experience, and satisfaction with infrastructure, showing higher values among Forest Engineers and experienced users. The second factor (36.1%) reflects perceptions regarding the effectiveness of ICT in enhancing administrative performance and citizen service quality, with stronger agreement among better-educated and administratively responsible staff. The third factor (17.4%) captures attitudes toward Artificial Intelligence, automation, and remote work, with higher scores among younger and more highly educated employees

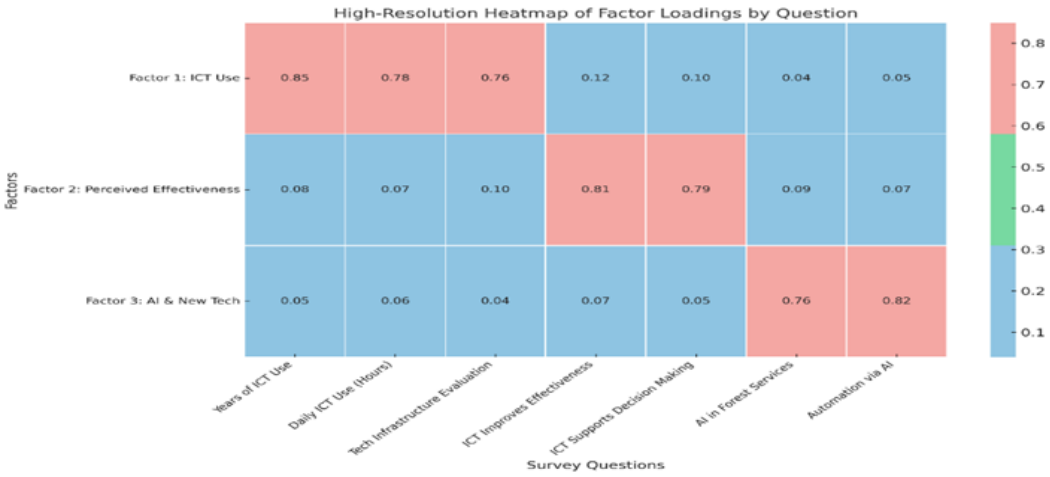


Figure 2. Factor Loadings Heatmap for ICT and Smart Technology Survey Items (PCA Analysis)"

To operationalize these findings, three composite indicators were developed, each aligned with one of the PCA-derived dimensions and grounded in the variables captured by the questionnaire: (i) Infrastructure Adequacy Index: This index evaluates the perceived sufficiency and quality of the ICT infrastructure available to Forest Service employees. It includes access to desktop and laptop computers, GIS/IRIDA systems, internet connectivity, and other work-related software. A higher score indicates confidence in the capacity of the technical infrastructure to support digital tasks. Lower values were reported by older employees and those in remote or under-resourced units, pointing to structural and generational disparities (OECD, 2020). (ii) Digital Readiness Index: This

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indicator measures employee competence and confidence in using digital tools, drawing on responses related to years of ICT experience, frequency of use, engagement with digital services (e.g., gov.gr, GIS), and self-assessed skill levels. It reflects the cognitive and behavioral readiness of personnel to engage in digital workflows. The highest values were found among younger staff and those with fewer than 10 years of service (van Deursen & Helsper, 2015; European Commission, 2022). (iii) AI Acceptance Index: This index captures employee attitudes toward Artificial Intelligence, including perceptions of its usefulness, potential for automation, trust in algorithmic tools, and concerns about job displacement. It reflects the psychological and organizational openness to adopting disruptive technologies. Lower values were more common among older or less formally educated staff, underscoring the need for capacity building and strategic leadership to manage digital change (Macedo & da Silva, 2019; Zhang et al., 2021).

The corresponding mean scores for these indicators reveal an uneven digital maturity profile within the organization. The Digital Readiness Index recorded the highest value (M = 3.8/5), indicating that employees are generally confident and familiar with digital tools. The Infrastructure Adequacy Index followed with a moderate average (M = 3.2/5), revealing limitations in the availability and quality of technological infrastructure. The AI Acceptance Index, with the lowest mean (M = 2.9/5), reflects a cautious stance toward emerging technologies and the perceived risks of automation.

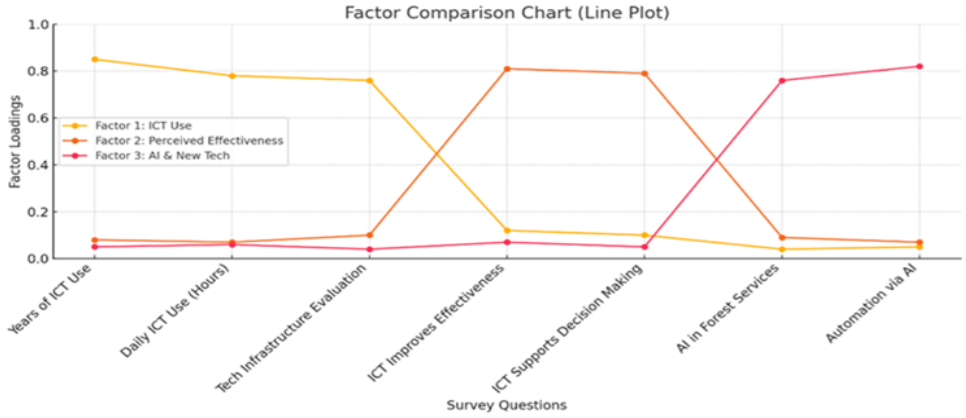


Figure 3. Factor loadings comparison across core ICT-related questions

These findings suggest a workforce that is largely digitally literate and willing to engage with technology, but also one constrained by uneven infrastructure and organizational hesitation toward innovation. The relatively low AI acceptance, in particular, underscores the lack of an institutional framework for advanced technologies and the absence of a coherent strategy for their integration. This indicates a potential mismatch between the behavioral readiness of employees and the structural readiness of the organization.

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From the perspective of New Public Management, this imbalance calls for targeted investment in digital infrastructure, the development of a clear regulatory and strategic framework for AI, and the promotion of accountability mechanisms to ensure that technological advancements lead to sustainable administrative innovation (Buhalis et al., 2024; Kidron et al., 2024; OECD, 2020; Halaweh, 2018; Pollitt & Bouckaert, 2017; United Nations, 2022).

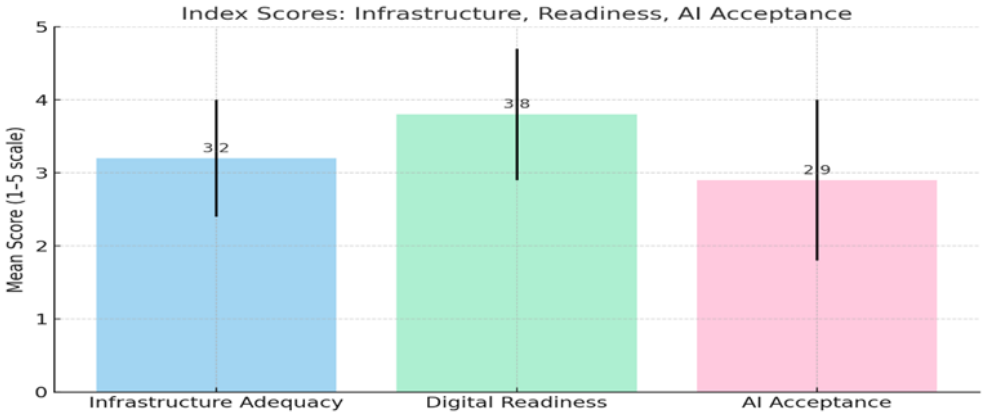


Figure 4. Mean index scores for Infrastructure Adequacy, Digital Readiness, and AI Acceptance, based on a 1–5 Likert scale. Error bars represent standard deviations

DISCUSSION – SYNTHESIS OF FINDINGS AND CASE EXAMPLES

Interpretation of Findings through the Lens of New Public Management and Digital Governance

This study explored the key factors influencing the adoption of a digital strategy in the Greek Forest Service, within the conceptual framework of New Public Management (NPM). The findings confirmed that the use of ICT is associated with increased administrative effectiveness and reinforces core NPM principles such as efficiency, transparency, and accountability (Hood, 1991; OECD, 2020).

Regarding the first research question, the overall use of ICT and smart technologies was found to be relatively high, particularly for critical digital tools such as GIS, IRIDA, and digital signature systems. This was confirmed by the PCA results, which highlighted ICT usage as a dominant factor in digital transformation. Concerning the second research question, Chi-square (X^2) analysis showed that younger employees and those in administrative roles exhibited greater familiarity with and acceptance of digital innovations, supporting earlier studies on age-related digital engagement (Mitzner et al., 2010; van Deursen & Helsper, 2015). Finally, with respect to the third research question, employees' perceptions of ICT effectiveness were overwhelmingly positive. This was reflected in the high Digital Readiness Index and moderate AI Acceptance Index, validating the relevance of smart governance approaches in forestry administration (Cordella & Bonina, 2012; United Nations E-Government Survey, 2022).

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Institutional Need for a Comprehensive Digital and AI Governance Framework

Despite the overall readiness and willingness of employees to adopt digital tools, the study revealed a significant institutional gap: the absence of a comprehensive framework regulating the use of ICT and Artificial Intelligence in the public sector. This gap highlights the need to integrate digital transformation efforts within formal structures of transparency, ethical oversight, and independent accountability mechanisms (European Commission, 2022).

Without a clear regulatory and strategic framework, there is a risk that the deployment of new technologies could replicate existing dysfunctions or introduce new forms of opacity, as highlighted in critiques of NPM's technocratic logic (Pollitt, 2003). To ensure legitimacy and sustainability, digital and AI initiatives must be embedded within broader institutional reforms, emphasizing democratic control, human rights safeguards, and public trust. This institutional gap is further evidenced by the low score of the AI Acceptance Index (2.9/5), as highlighted in the results. The moderate levels of acceptance indicate hesitation and concern among employees, particularly those in older age groups or lower educational levels, reinforcing the urgency for a formal and transparent regulatory framework.

Challenges and Strategies for Improvement

Building on the study's findings and aligning with good international practices, five strategic priority areas are proposed: (1) Capacity Building: Continuous training of public employees in digital skills, algorithmic literacy, and change management, ensuring behavioral readiness for technological adoption (Gopinathan et al., 2025). (2) Institutional Governance: Establishment of dedicated digital transformation units within public organizations to ensure cross-functional coordination. (3) Legal Framework: Implementation of enforceable and transparent regulations governing the ethical and lawful use of AI, aligned with GDPR and digital rights. (4) Citizen Participation: Inclusion of end-users in the design, evaluation, and feedback processes of digital services, to foster user-centered innovation. (5) Interoperability: Ensuring secure, integrated, and efficient information systems across government agencies, enabling consistent service delivery and data sharing.

Several international examples demonstrate how public administrations have successfully navigated similar challenges. Estonia offers a fully integrated e-governance system based on secure digital identities and inter-agency interoperability. Denmark leads in embedding algorithmic transparency and AI ethics across public functions. South Korea, through its Digital Government Strategy, emphasizes participatory governance and long-term digital planning to ensure resilience and responsiveness (OECD, 2020; United Nations E-Government Survey, 2022). These cases underscore the need to couple technical tools with institutional commitment, policy coherence, and democratic

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safeguards. These recommendations address the gap between high digital readiness and lower infrastructure and AI acceptance, stressing the need for both behavioral and structural reforms.

Roadmap for ICT and Smart Technologies in Public Forest Administration

The evidence confirms that ICT and smart technologies can substantially improve the quality and effectiveness of public forest administration. However, digital transformation should not be viewed merely as a technical upgrade, it is primarily a governance challenge. The success of any such transformation depends on the presence of strategic vision, institutional structures, and accountability mechanisms.

An effective roadmap for Forest Services should be structured around three interdependent pillars: (a) Institutional Commitment: Sustained leadership support, adequate funding, and long-term planning. (b) User-centered Innovation: Active engagement of frontline employees and citizens in co-creating digital solutions tailored to operational needs. (c) Data-driven Accountability: Use of performance indicators, feedback loops, and digital monitoring to assess outcomes and ensure transparency.

This roadmap should guide not only the deployment of ICT infrastructure but also the cultural and procedural shifts necessary for sustainable change. In the face of growing environmental and climate challenges, the Forest Service's future effectiveness will increasingly depend on its ability to leverage digital tools for resilience, transparency, and adaptive public management.

CONCLUSIONS – POLICY RECOMMENDATIONS AND RESEARCH LIMITATIONS

This study demonstrated that the integration of Information and Communication Technologies (ICT) and smart technologies, including Artificial Intelligence (AI), is a critical enabler of modernization within the Greek Public Forest Administration. The findings revealed a high level of readiness and a generally positive attitude among employees, especially concerning fundamental digital tools, while also identifying asymmetries related to age, experience, job position, and education level.

Despite the encouraging levels of digital engagement, the partial acceptance of AI and expressed concerns regarding its implementation point to the need for institutional guidance, ethical safeguards, and trust-building mechanisms. Technological innovation can indeed catalyze transformation, but only when combined with strong institutional commitment, a coherent strategic vision, and adaptive administrative structures.

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Based on the study's results, the following policy directions are recommended: (i) Establishment of a National Framework for ICT and AI in Public Administration, incorporating regulatory clarity, measurable indicators, and ethical principles. (ii) Horizontal implementation of a digital strategy across Forest Services, ensuring unified planning, interoperability, and equal access to digital resources. (iii) Comprehensive and tailored training programs, adapted to the needs of different employee groups and job roles, to foster inclusive digital capacity building. (iv) Pilot projects with structured evaluation frameworks, focusing on AI applications, automation of processes, and open data initiatives. (v) Enhanced interoperability and data governance, aimed at improving inter-agency collaboration, service efficiency, and institutional accountability.

RESEARCH LIMITATIONS AND PROSPECTS FOR FURTHER EXPLORATION

This study focused on the Greek Forest Service, an administrative body with a distinct organizational structure and operational complexity. While this focus enabled an in-depth analysis, it also limits the generalizability of the findings to other sectors or countries. Moreover, the research design relied exclusively on high-validity quantitative data, without incorporating qualitative methods. This was a deliberate methodological choice at the current phase, prioritizing statistical rigor and indicator construction.

Future research would benefit from integrating qualitative approaches—such as interviews or ethnographic observations—to explore organizational culture, behavioral resistance, and internal communication dynamics in greater depth. Additionally, the present study offers a valuable snapshot of the current state of digital transformation, serving as a reference point for longitudinal evaluations and comparative studies.

Further investigation into the institutional framework, mechanisms of intergenerational collaboration, and the implementation of technological pilot projects within the Forest Service are essential. These areas can provide deeper insights into digital readiness, cultural adaptation, and the long-term sustainability of proposed digital governance strategies.

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VR ADOPTION PERCEPTIONS AMONG MANAGERS AND PROFESSIONALS

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ABSTRACT

Virtual Reality (VR) is an immersing technology that may yield significant benefits in organizations. However, mainly due to conservatism, the adoption of VR may face objections. This study examines managers and professionals' openness, awareness and perceptions towards the adoption of VR in engineering contexts. Thus, the perceptions of 56 participants were gathered by means of a structured instrument comprising of 35 statements. A multi-phase statistical analysis was conducted, including Categorical Principal Component Analysis, Automatic Linear Modeling, and CHAID decision trees. The results indicate that VR awareness and exposure are shaped primarily by education and prior hands-on experience, while adoption is significantly influenced by professional tenure and age. Perceptions of the benefits of VR and limitations are moderated by experience and the size of the organization, with longer-tenured professionals expressing greater skepticism. Similarly, future outlook and perceived institutional support are affected by tenure and educational background, suggesting the need for targeted engagement strategies. These findings provide empirical guidance for integrating VR technologies into engineering work environments and highlight adoption challenges. The insights may be helpful in the process of promoting effective and sustainable VR adoption.

Keywords: Virtual Reality (VR), Adoption Willingness, Technology Readiness Levels (TRL), User Perception, Quantitative Analysis

INTRODUCTION

Technology, the hallmark of innovation, increases the efficiency, accuracy, speed, and other important factors of organizational processes (Ouyang, et al., 2015). Innovation does not overlook management processes. Consequently, technology plays a crucial role in a wide range of management activities, e.g., modeling business processes of enterprises based on process management (Ryzhakova, et al.,

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2019), or, harnessing the power of Artificial Intelligence (AI) to support business operations (Gil, et al., 2019).

One of the immersive technologies in organizations is Virtual Reality (VR), that promises to provide visualization, upgraded control, and automated managerial processes (Burdea & Coiffet, 2024). In practice, VR is a computerized simulation that creates a virtual reality utilizing three-dimensional (3D) visualization, accompanied by a tracking mechanism, which is achieved by means of hardware such as head-mounted displays (HMDs). VR is not limited to visualization, i.e., senses like sound, touch, and even smell may be simulated (LaValle, 2023). Milgram et al. (1995) introduced a conceptual continuum to describe VR implementation, ranging from a completely real environment to a fully virtual one. According to this scale, Augmented Reality (AR), which is "an enhanced version of the real world, achieved through the use of computer-generated digital information, including visual, auditory, and other sensory elements" (Hayes, 2024), is an intermediate rank. Mixed Reality (MR) integrates VR and AR, combining physical and virtual objects (Milgram & Kishino, 1994). Another classification of VR implementations is the level of interactivity. Standard computer screens-based interaction is applied in a non-immersive VR, commonly used in education and architectural visualization (Burdea & Coiffet, 2024). Large projection is applied in semi-immersive VR, while headsets and motion tracking are used in fully immersive VR.

Though VR was initially considered a gaming technology, today its applications can be found in a wide range of domains, e.g., safety, education, military, medicine training, and modeling (Hamad & Jia, 2022). Specifically, VR constitutes a prominent contribution to engineering, e.g., virtual prototyping for designers. VR also enables remote collaboration via virtual meetings, often called Shared Virtual Reality (SVR), which serves as a significant advantage in the global environment and an enhancement in the managerial environment (Ashtari, et al., 2020). VR has been found significantly beneficial in areas including visualization of the construction of complex processes, safety management, communication, education in construction management, and also project management (Albahbah, et al., 2021). For example, the Visual Immersive Analytics for Project Management (VIAProMa) framework aims to provide a shared virtual environment to explore complex projects collaboratively (Hensen & Klamma, 2021).

The aim of this study is to examine perceptions of VR implementation in engineering and managerial environments, with focus on understanding how VR is adopted, its perceived benefits, challenges, and impact on organizational processes and training practices. It does not analyze VR adoption from an objective technical point of view, but rather evaluates the perceived aspects of the technology –

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which have significant implications on the adoption process. More specifically, the objectives of this study were to examine how professionals and managers perceive the usefulness and applicability of VR in the organization, while identifying the key benefits and barriers associated with VR implementation.

The study employed a comprehensive, fully exploratory research design that integrated multiple analytical techniques. A questionnaire designed for this purpose was the primary source of the raw data. An advanced analysis was applied, including thematic grouping, dimensionality reduction using CATPCA (Categorical Principal Component Analysis), predictor identification using ALM (Automatic Linear Modeling), and a hierarchical analysis using CHAID decision trees. The results draw a holistic picture, which may be helpful when VR technology implementation is considered in the organization.

LITERATURE REVIEW

VR has been increasingly adopted in many domains. In scalable training for industrial settings - meta-analyses confirm its effectiveness in improving manufacturing and assembly performance (Radhakrishnan, et al., 2021; de Giorgio, et al., 2023). In education, it enhances engineering training under hazardous scenarios (Ghazali, et al., 2024; Huang & Tseng, 2025) and boosts confidence among learners. In healthcare, VR improves clinical knowledge and procedural skills (Sung, et al., 2024). VR was even found to have a positive and significant influence on the intentions of consumers to purchase- fashion goods (Konstantoulaki, et al., 2024). Chang et al. (2024) also illustrate VR's role in soft skills development such as communication, leadership, and conflict resolution. Beyond performance, VR fosters emotional engagement and empathy. Gallego-Abellán et al. (2024) found that immersive journalism via VR enhances emotional responses and perspective-taking, which has implications for stakeholder alignment and decision-making. Costa et al. (2025) emphasize VR's role in enhancing safety and reducing operational risks. De Freitas et al. (2022) demonstrate VR's ability to improve error detection and cross-disciplinary collaboration, and Chang, Kao, & Wang (2022) explore its influence on creativity in design.

VR has a significant contribution in complex engineering domains. For example, in aerospace, automotive industry, and shipbuilding it reduces dependence on physical prototypes and supports real-time collaboration among distributed teams (Fussell, 2020). Wolfartsberger (2019) introduced VRSMART, a VR-CAD platform that improves users' ability to detect design flaws. Other studies

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further affirm VR's benefits in spatial reasoning and communication (Coburn, et al., 2017; Nelson, et al., 1999). Strojny and Dużmańska-Misiarczyk (2023) emphasize its positive impact on knowledge retention—especially with interactive feedback.

VR is also valuable in systems engineering and risk management. Keren et al. (2018) found that immersive simulations enhance stakeholders' understanding of system component interactions and support effective team decision-making. This advantage extends to later lifecycle phases such as maintenance and post-delivery support. For instance, Gomes and Zachmann (1999) and Doil et al. (2003) pioneered VR-based maintenance training, and, Borro et al. (2004) and Zhu et al. (2010) demonstrated VR's application in jet turbine upkeep and integration issue detection.

From a design perspective, VR enhances user-centered development by allowing designers to perceive systems from the user's point of view. Avatar-based interaction can expose needs driven by disability, culture, or extreme conditions (Kouprie & Visser, 2009), fostering empathy and innovation (Chan, et al., 2015). Additionally, VR transforms traditional CAD workflows by simplifying 3D model manipulation and easing spatial reasoning demands (Hsi, et al., 1997).

Recognition of VR's strategic value continuously increasing among managers across industries. It is perceived as a tool that improves onboarding, employee integration, and cultural assimilation (Jensen & Konradsen, 2018). Moreover, it enhances customer engagement in marketing and tourism through immersive experiences and virtual tours (Tussyadiah, et al., 2018). Buhalis et al. (2024) present a framework illustrating how technologies like VR are becoming integral part of strategic operations in tourism and hospitality. VR supports not only visualization but also automation, personalization, and sustainability. The study stresses that successful adoption depends on leadership, staff training, and ethical issues such as privacy and trust—underscoring the need for a holistic organizational approach. According to Shekhar and Valeri (2024) innovative technologies such as VR are used to create an authentic connection between tourists and destinations. VR allows tourists to experience a location before, during, and after their visit, supporting more informed travel decisions and reducing the gap between expectations and reality. Augmented Reality (AR) complements this by providing real-time information about attractions, local customs, traditions, and cuisine, enriching the overall travel experience.

Despite the outstanding benefits of the VR technology, implementation challenges remain. For example, Malekpour et al. (2025) identified eight key barriers that limit customer satisfaction and the adoption of grocery shopping in the metaverse: concerns related to functionality, enjoyment, social interaction, cost, privacy, safety, ownership, and virtual store atmosphere. Social interaction emerges

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as a particularly complex issue, with some users valuing solitude while others miss human contact. To accommodate diverse preferences, customizable interaction settings and virtual community features are recommended. Additionally, concerns about potential price increases due to adoption of advanced technologies highlight the need for transparent pricing and clear cost communication to encourage broader adoption.

Saghafian et al. (2021) highlight organizational barriers such as system integration, interdisciplinary coordination, and scalability planning. Managers are aware of both VR's innovative potential and the complexities involved in its practical adoption. While much of the research highlights short-term learning outcomes, Stefan et al. (2023) call for longitudinal studies to evaluate the long-term impact. Chang et al. (2024) showed that VR training is effective in teaching social, safety, and professional skills, including children with disabilities and adults with and without disabilities. Nonetheless, they mentioned that further research is required to evaluate the cost-benefit. This last factor may introduce a significant concern among decision-makers regarding VR adoption.

Taken together, the literature highlights the strategic cross-disciplinary potential of VR across the entire systems lifecycle - from its initial design phases to post-deployment training and support, across a broad variety of domains and fields. The review forms the foundation for the current study, which explores managers and professionals' perceptions of VR adoption.

METHODOLOGY

The methodology is aimed at evaluating how Virtual Reality (VR) is perceived by managers and professionals in engineering.

The quantitative questionnaire

To empirically assess perceptions of virtual reality (VR) among professionals, a structured closed-ended questionnaire was developed as the primary data collection tool. Grounded in a comprehensive literature review and expert consultations (Swedberg, 2020), the instrument was designed to support a quantitative exploratory methodology. The questionnaire included two main sections: Part 1 collected demographic and organizational background details such as age, gender, education level, field of specialization, professional role, organizational type, experience, organizational size, and support innovation; Part 2 focused on familiarity with VR, adoption feasibility, and perceptions of VR's utility across systems engineering stages—including specification, design, development, testing, and maintenance. Respondents rated VR's usefulness, cost-effectiveness, and risk-reduction potential, and

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evaluated drivers for VR adoption, e.g., return on investment, customer demand, and barriers such as model cost, and system mismatch with VR technology.

To ensure reliability, the questionnaire was pilot-tested and refined. It was then distributed electronically, enabling voluntary and anonymous participation by professionals from diverse engineering backgrounds. The research was approved by the institution's ethics committee.

Data analysis methodology

A four-phase statistical process was applied to analyze responses to the 35 surveyed items (mostly ordinal, some nominal), which comprised thematic grouping, dimensionality reduction via CATPCA, predictor identification using ALM, and hierarchical analysis through CHAID decision trees. This structured approach is summarized and detailed in Figure 1 below.

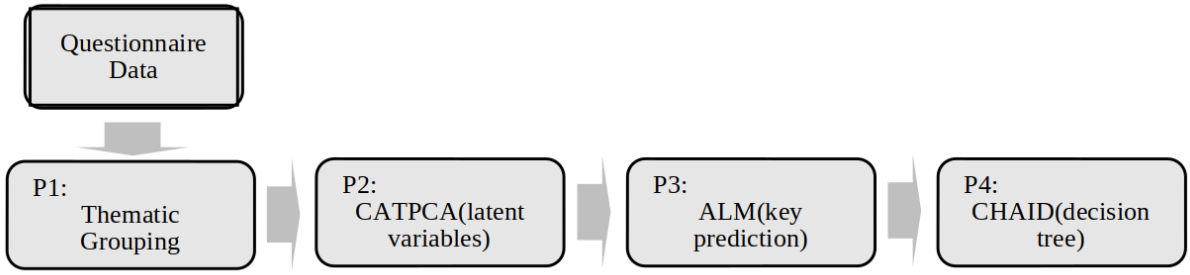


Figure 1. *Analytical workflow of the VR perception study*

Phase 1 – thematic categorization: Variables were organized into clusters to guide the analysis. The independent variables fell into three categories: (1) demographic and educational background, (2) professional experience and role, and (3) organizational and industry context. The dependent variables were grouped into: (1) VR awareness and exposure, (2) adoption and implementation, (3) perceived benefits and limitations, and (4) future outlook and support. Thematic grouping was guided by Braun and Clarke's (2006) framework, combining theory with inductive analysis.

Phase 2 – dimensionality reduction: CATPCA was performed on each dependent cluster to extract latent constructs from mixed-scale data (Meulman, et al., 2004), using varimax rotation. Components were retained based on eigenvalues, explained variance, and Cronbach's alpha (Cronbach, 1951).

Phase 3 – predictor identification: ALM (IBM Corp., 2021) identified key predictors per construct using automated preprocessing, outlier handling, and AICC-based model optimization (Burnham &

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Anderson, 2004). A forward stepwise method ranked predictors, with multicollinearity checks for model robustness.

Phase 4 – hierarchical segmentation: The Chi-squared Automatic Interaction Detector (CHAID) (Kass, 1980) was used to model hierarchical links between ALM-derived predictors and latent outcomes. Trees were limited to three levels, with accuracy assessed via misclassification risk and gain summaries (Biggs, et al., 1991).

RESULTS

Participant demographics

Overall, the process yielded n=56 valid responses. The final sample was predominantly male (85.7%) and with most in age range of 31–50. Most of the participants had a bachelor's (58.9%) or master's degree (35.7%), with backgrounds in electrical (45.5%), mechanical (18.3%), and computer engineering (15.2%). The average experience in the field was 10.2 years, with 4.3 years in their current role. Key roles included systems engineers (27%), project managers (21%), and integration engineers (17%). Over 40% worked in large organizations (100+ employees), indicating a highly experienced, technically diverse respondent group.

Thematic categorization and causal analysis framework for VR adoption

The questionnaire variables were thematically organized into three clusters of independent variables: (1) demographics and education, (2) professional experience, and (3) workplace context. Dependent variables were grouped into four overarching themes: (1) VR awareness, (2) adoption and use, (3) perceived benefits and limitations, and (4) future outlook. This thematic structure, summarized in Table 1, served as the basis for the subsequent stages of the causal modeling and analysis.

Variable Type	Thematic Group	Included Variables
Independent variables	Demographics and background	Sex, age, education level, academic degree
	Professional experience and role	Organization type, years of engineering experience, current role
	Workplace and industry context	Activity area, tenure in role, organization size
Dependent variables	VR awareness and exposure	Familiarity with VR, source of awareness, prior VR usage
	VR adoption and implementation	Frequency of use, integration into tasks, feasibility of adoption
	Perceived benefits and limitations of VR	Perceived usefulness, cost/time savings potential, impact on engineering efficiency
	Future outlook and organizational support	Organizational encouragement, perceived future necessity, applicability across domains

Table 1. *Thematic Categorization of Independent and Dependent Variables (for VR Adoption)*

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VR Awareness and Exposure: Latent Structure and Predictors

A one-dimensional CATPCA measuring VR awareness explained 32.4% of the variance (Cronbach's α = 0.69), with occupational relevance and prior use emerging as the strongest contributors. The findings of the ALM analysis show that **respondents with lower educational levels (technician or bachelor's degree) reported significantly higher levels of VR awareness and exposure compared to those with a master's degree or above** (b = 0.48, p = 0.046; R^2 = 27.1%; AICC = 0.26). A CHAID analysis further confirmed education as the primary differentiator (F(1, 54) = 3.84; p = 0.06; Risk estimate = 0.90; SE = 0.59; Tree depth = 3; 7 nodes, 4 terminal). Figure 2 depicts a decision tree that the process yields, and shows how individual background factors, particularly education level and professional experience, hierarchically shape the respondents' awareness of VR.

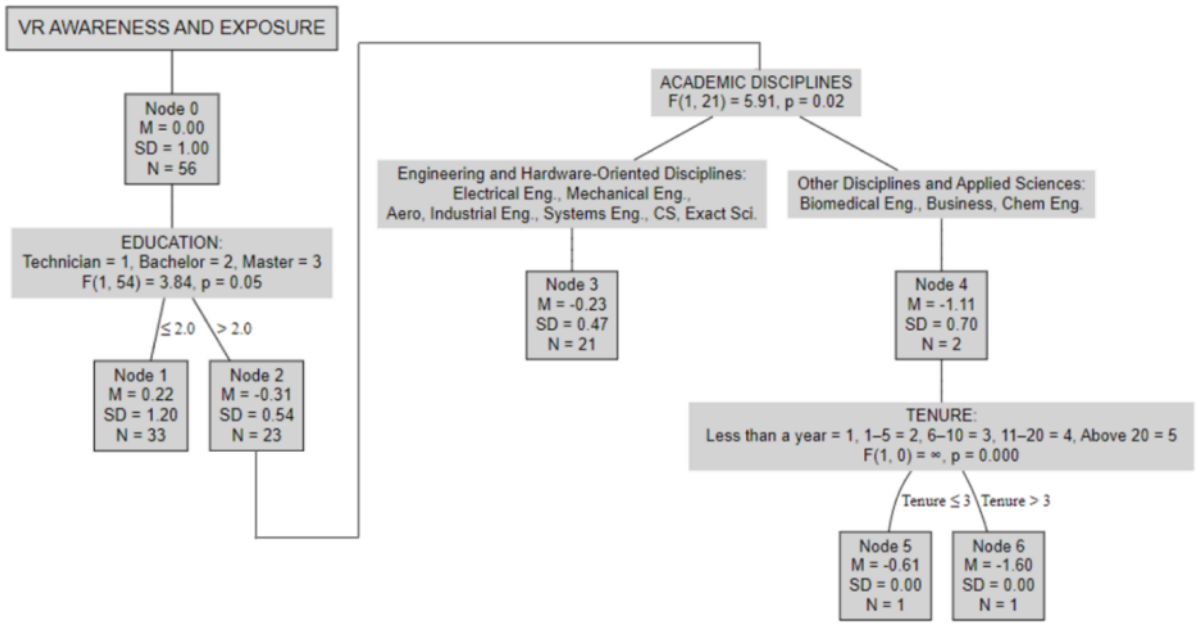


Figure 2. *Figure 2. Hierarchical Predictors of VR Awareness and Exposure*

Respondents with a technician-level education demonstrated the highest VR awareness and exposure (M = 0.22), whereas those with advanced degrees in non-engineering fields and extended tenure showed the lowest (M = –1.60). These findings reveal a stratified pattern whereby both academic specialization and professional seniority jointly diminish VR awareness and exposure.

VR Adoption and Implementation: Latent Structure and Predictors

To evaluate VR adoption and implementation behavior, a one-dimensional CATPCA accounted for 40.9% of the variance (Cronbach's α = 0.95). The highest loadings were associated with VR's cost-

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saving potential in the development, requirements, and maintenance stages. ALM results identified tenure as the sole significant predictor (b = 1.18, p = .045; R^2 = 29.2%; AICC = –0.99), indicating that **longer-tenured professionals are more likely to adopt and implement VR**.

A CHAID analysis reinforced **tenure as the primary differentiator of VR adoption and implementation** (F(1, 54) = 5.02; p = 0.03; Risk Estimate = 0.91; SE = 0.21; Tree depth = 2; 6 nodes, 4 terminal). Respondents with one year or less of tenure exhibited the lowest adoption levels (M = –1.23). Within this group, age further compounded the effect: those aged 51–60 and above recorded the lowest predicted scores (M = –1.59), followed by the 41–50 group (M = –1.20). These findings reveal a layered inhibitory pattern, where **minimal organizational experience and older age jointly reduce VR adoption and implementation behavior**.

Perceived Benefits and Limitations of VR: Latent Structure and Predictors

To evaluate perceived benefits and limitations of VR, a one-dimensional CATPCA explained 51.4% of the variance (Cronbach's α = 0.91). The highest loadings were observed for customer demand, technological advances, and development costs. ALM identified tenure as the sole significant predictor (b = –1.45, p = .003; R^2 = 31.6%; AICC = –6.19), where **professionals with longer tenure reported more skepticism toward VR's benefits**.

A CHAID analysis confirmed tenure as the primary differentiator (F(1, 54) = 10.49; p = 0.002; Risk Estimate = 0.58; SE = 0.21; Tree depth = 2; 7 nodes, 5 terminal). Respondents with over 20 years of experience exhibited the lowest perceived benefit scores (M = –1.45). Among them, the organizational size further shaped perceptions where those in mid-sized organizations (21–50 employees) reported the most negative evaluations (M = –4.31), and individuals in smaller or larger organizations demonstrated relatively more favorable views.

Future Outlook and Organizational Support: Latent Structure and Predictors

To evaluate expectations regarding VR's future role and organizational support, a one-dimensional CATPCA explained 43.6% of the variance (Cronbach's α = 0.87). The strongest loadings were related to VR's suitability for mechanical engineering, UI design, and hardware, while organizational encouragement showed a weaker influence. ALM identified tenure as the sole significant predictor (b = –1.03, p = .043; R^2 = 35.5%; AICC = 0.14), suggesting that **shorter-tenured professionals are more optimistic about VR's future role and organizational support**.

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A CHAID analysis further confirmed tenure as the primary differentiator ($F(1, 54) = 4.48$; $p = 0.04$; Risk Estimate = 0.77; SE = 0.22; Tree depth = 3; 7 nodes, 4 terminal). Namely, professionals with more than 10 years of experience exhibited lower future outlook scores. Among them, those in **larger organizations (51–100 employees and above) reported mixed perceptions**, while **respondents with technician-level education showed the highest optimism** ($M = 1.82$).

Integrated Overview of Awareness, Adoption, Benefits, and Outlook Toward VR

A comparative summary was compiled using the multivariate findings across all four dimensions investigated, i.e., awareness, adoption, perceived benefits, and future outlook, , which provides a holistic view of the dominant factors shaping perceptions toward VR. Table 2 outlines each dimension's internal consistency, explained variance, key statistical predictors, tree complexity, and the demographic groups associated with the most extreme scores.

VR Construct	Core Theme (CATPCA)	Key Influencer (ALM)	Primary Segmentation (CHAID)	Interpretation
VR Awareness and Exposure	Shaped by occupational relevance and prior use, reflecting its work-driven nature	Lower educational attainment is associated with higher levels	Highest among practically trained technicians; lowest among non-engineering professionals with long tenure	Not merely a function of exposure or age, but shaped by practical orientation. Advanced academic credentials in unrelated fields and entrenched roles may hinder openness.
VR Adoption and Implementation	Shaped by cost reduction priorities and practical feasibility	Longer tenure predicts greater adoption likelihood	Lowest levels are found among older professionals with shorter tenure	New employees with extensive prior experience may resist due to legacy thinking, while long-tenured employees embrace it as part of evolving workflows.
Perceived Benefits and Limitations of VR	Shaped by customer demand, technological advancement, and development costs	Longer tenure is associated with greater skepticism	The most negative evaluations were observed among experienced professionals in mid-sized organizations (21–50 employees)	Professionals with over 20 years of experience in mid-sized firms may view VR as misaligned with established systems, possibly due to limited adaptability or outdated infrastructure
Future Outlook and Organizational Support	Shaped more by alignment with mechanical, UI, and hardware needs than by strategic	Shorter tenure predicts greater optimism	Highest optimism found in technician-trained professionals; lowest among long-tenured staff	Support for VR's future hinges less on formal leadership and more on whether professionals feel personally empowered to innovate. Smaller

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VR Construct	Core Theme (CATPCA)	Key Influencer (ALM)	Primary Segmentation (CHAID)	Interpretation
	enthusiasm		in small organizations	organizations and older staff may feel resource-constrained, reducing their future optimism

Table 2. *Multivariate Predictors and Hierarchical Classifications Across VR Perception Constructs*

The comparative summary highlights tenure, education, and organizational size as consistent differentiators across all VR perception constructs. **Individuals with shorter tenure and practical technical training (e.g., technician-level education) consistently reported greater VR awareness and exposure, stronger optimism, and higher adoption and implementation intentions**. In contrast, **long-tenured professionals, particularly those in mid-sized organizations or with non-engineering academic backgrounds, exhibited lower perceived benefits, reduced enthusiasm, and greater skepticism**. These patterns suggest that targeted engagement strategies are essential to overcome structural and experiential barriers and to support more inclusive and effective VR integration across professional segments.

DISCUSSION

This study uncovers complex and occasionally unexpected trends in how various managers and professionals perceive and approach the adoption of VR technology, highlighting the interplay between individuals' backgrounds, tenure, organizational settings, and their attitudes toward innovation.

Technically trained professionals, particularly technician-level staff, demonstrate the highest levels of VR awareness and future optimism. This finding shifts the focus from general assumptions about age or tenure to the effects of practical, hands-on exposure. Practical orientation appears to foster more familiarity and comfort with the VR immersive technology compared to theoretical or managerial backgrounds. Interestingly, lower formal academic attainment is associated with greater awareness of VR. This suggests that openness to VR is not simply a result of the educational level, but of occupational relevance and frequency of exposure. In contrast, professionals with advanced academic credentials in non-engineering fields may lack direct interaction with VR technologies, leading to reduced awareness or interest. Longer tenure in an organization predicts a higher likelihood of adopting VR. This challenges the original expectation that newer employees would be more receptive to technological change. The findings suggest that experienced professionals may view VR as a

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natural extension of evolving workflows, especially when implementation aligns with ongoing organizational adaptation. The lowest adoption levels were observed among older professionals with short tenures. These individuals may carry over rigid mental models or "legacy thinking" from prior roles, making it harder for them to integrate into new technological environments. Their limited immersion in current systems may reduce both engagement and adaptability. Skepticism regarding VR's benefits was most prominent among experienced professionals in mid-sized organizations (21–50 employees). This group may view VR as misaligned with existing infrastructure or workflows, particularly when legacy systems, limited budgets, or institutional inertia inhibit effective integration.

Optimism about the future of VR is most evident among practically trained individuals with shorter tenure. In contrast, older staff in small organizations report lower optimism, potentially due to perceived constraints on resources, limited empowerment to innovate, or less exposure to newer tools. This highlights that support for VR is driven less by strategic enthusiasm and more by perceived day-to-day applicability and autonomy. These patterns help explain diverging perceptions of technological maturity. According to Bonen's four-level scale and the Technology Readiness Levels (TRL) framework (Bonen & Arkin, 2003; NASA, 2012), technician-level staff may see VR as validation-ready or even production-ready, while more skeptical professionals situate it at earlier conceptual stages. This misalignment contributes to fragmentation in organizational readiness.

In parallel, Stacey's Matrix provides a framework for understanding how decision-making processes change depending upon the nature of the change (Stacey, 1966). VR exists in the "complex" quadrant - a domain where both the goals (what to do) and means (how to do it) are unclear or contested. Emergent strategies and iterative development are more suitable than traditional planning in such a domain. Thus, resistance to VR may stem not from rejection of the technology itself, but from discomfort with the ambiguity surrounding its implementation. From a generational perspective, Generation Z tends to offer a compelling contrast. For example, according to Rodrigues, Sousa, and Borges (2024) individuals from this cohort consistently demonstrate a preference for virtual environments such as digital museums, especially when these environments are associated with positive and stimulating experiences. Their research indicates that members of Gen Z tend to perceive virtual experiences as offering higher levels of sensory engagement, technological novelty, and authenticity compared to traditional formats.

This aligns with broader research emphasizing the cognitive and emotional affordances of VR. VR engages users on the emotional and reflective levels, which can disrupt established professional routines. Therefore, VR is not merely a visual aid, but a cognitive-technological interface that

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challenges conventional work patterns and demands thoughtful change management. For example, Chang et al. (2024) found that VR training not only supports technical learning but also develops interpersonal and leadership skills, particularly in complex organizational environments. Moreover, resistance among senior employees may stem from cognitive lock-in, where existing mental frameworks hinder openness to new technologies. Conversely, Gallego-Abellán et al. (2024) demonstrated that immersive VR journalism enhances empathy and perspective-taking, creating stronger stakeholder alignment.

In conclusion, successful integration of VR requires sensitivity to both technological maturity, indicated by the TRL framework and organizational complexity, as conceptualized in Stacey's Matrix. The generational shift represented by Gen Z, with its preference for immersive and emotionally engaging technology, may serve as a catalyst for wider organizational adoption. Nonetheless, this requires cross-generational collaboration, infrastructure alignment, and targeted training strategies.

While the study provides valuable insights into VR perceptions among managers and professionals, several limitations should be noted. First, the relatively small sample (n = 56) was large enough to establish statistical significance, however, extreme values (if they exist) may be missed. Second, the cross-sectional design captures views at a single point, missing potential changes over time as VR matures. As Stefan et al. (2023) observed, long-term effects of VR adoption remain underexplored. Finaly, the use of self-reported data may introduce bias, especially among participants unfamiliar with VR. Though advanced methods like CATPCA and CHAID were applied, such techniques are sensitive to data quality.

Future research should include more diverse sectors, e.g., education and healthcare, adopt longitudinal designs to track readiness over time, and consider qualitative approaches to better understand the cognitive and emotional factors influencing adoption. As Saghafian, Laumann, and Skogstad (2021) argued, successful VR integration depends not only on utility but on organizational alignment and support.

CONCLUSIONS AND IMPLICATIONS

This study examines how professionals in engineering and managers perceive the integration of VR technologies. The findings highlight a generally positive attitude toward VR, especially in its ability to enhance visualization, collaboration, and learning through interactive simulations. Participants noted that VR enables better engagement with complex spatial and technical information and facilitates more effective professional training. Nonetheless, the study also revealed several challenges such as

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high costs, resistance to change, lack of technical infrastructure, and limited familiarity with VR tools among employees. The implementation of VR was found to be more effective when accompanied by appropriate training and aligned with the specific needs of the professional context.

The study findings demonstrate that factors like educational levels, technician training levels, degrees, tenure, and age - significantly impact how VR technology is perceived. These findings have a direct implication on the VR adoption process. Namely, when the viability of the technology is pre-tested, biases of subjective opinions (which are an inseparable part of the evaluation) may be identified. Moreover, they can assist in the evaluation of the implementation process, a cost which in some cases may be in the scale of the technology core cost. The findings may also serve as a guideline for efficient implementation and specifically mitigate human objections which were revealed in this study. Finally, they can provide indications on how to develop the human resource in a way that will best prepare the organization for the adoption of VR technology, and perhaps even promote a broader view towards other advanced technologies.

Overall, while VR holds significant promise for improving work processes and training outcomes, its successful adoption requires a strategic and structured approach. Organizations should carefully evaluate their readiness for VR integration and invest in education and change management efforts to support its effective use.

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INTERNAL AUDIT AND ARTIFICIAL INTELLIGENCE: A BIBLIOMETRIC ANALYSIS

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ABSTRACT

Purpose / Objectives of the study: In the modern era of digital transformation, the traditional role of internal audit has undergone a radical transformation, shifting its focus from a purely regulatory nature to a strategic function primarily determined by the effective utilization of accounting data. In these surroundings, the research interest is oriented toward enhanced audit effectiveness through the contribution of artificial intelligence (AI), including anomaly detection, predictive analytics and continuous monitoring.

Design / Methodology approach: A bibliometric analysis of academic literature was conducted regarding the implementation of AI into internal audit practices. The analysis was performed on 189 peer-reviewed publications derived from the Scopus database (2011–2024) using Biblioshiny and VOSviewer to map thematic trends, intellectual structures and international collaborations.

Findings: The results denote a steep increase in scholarly work, especially in the last five years, demonstrating the increasing use of AI in the audit domain. The keyword co-occurrence analysis performed disclosed three principal thematic clusters related to AI applications in internal auditing, technological innovations in accounting and the connection between machine learning, audit quality and governance. The factorial analysis high pointed key concepts such as learning systems, risk and perception, recognizing at the same time nascent subdomains including deep learning. The co-citation network illustrates a diverse academic foundation spanning accounting, information systems and data science. Furthermore, the patterns of international collaboration emphasize strong global research links, notably among the United States, the United Kingdom, Malaysia and various countries in the Middle East.

Originality / Value / Contribution: The study contributes to a deeper understanding of AI's transformative role in internal audit and underscored the need for integrative frameworks to guide the ethical, effective and coherent implementation of AI.

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Keywords: Internal audit, artificial intelligence, AI, accounting, bibliometric analysis, Biblioshiny, VOSviewer, business, management.

INTRODUCTION

Undoubtedly, in an increasingly complex and volatile business environment, the role of internal audit has evolved from a narrow, compliance-based function into a dynamic, strategic tool that reinforces organizational integrity, risk management and accountability (Elnakeeb and Elawadly, 2025). Internal auditing in the present era stands as a key pillar of effective corporate governance, underpinning the reliability of financial information and supporting the achievement of organizational objectives (Shazly *et al*., 2025). No longer confined to traditional financial checks, internal audit encompasses a comprehensive approach to assessing the efficiency of internal audit systems, information flows, operational procedures and adherence to regulatory frameworks (Bani Kinana and Arabiat, 2025).

In contrast to the established functions of the simple control and compliance mechanism and subsequent evaluation, internal audit now constitutes a cornerstone of strategic governance in business contexts. It is able to identify potential risks, improves the functioning of the control mechanism and enhances transparency at all organizational levels. Its action is always aligned with the international COSO standards, with its main concern being the effective management of risk, the identification and elimination of fraud (Brokešová and Ondruška, 2025).

Given the modern requirements of ensuring valid results in a short period of time, with great accuracy and with practical application, the use of new technologies and especially artificial intelligence has influenced the internal audit sector in various ways. Some of the advantages of its use are the limitation of manual work and errors, the possibility of continuous control, the ability to learn, form and calculate predictive patterns (Betti and Sarens, 2021).

The work is not only focused on process automation or operational business efficiency, on the contrary, it tackles artificial intelligence in the academic disclosure as a strategic asset capable of reshaping audit logic, redefining auditor roles and catalyzing changes in risk management methodologies. By synthesizing academic trends, the research underscores the transformative contribution of artificial intelligence to audit objectives, transforms established paradigms and suggests new opportunities for assurance professionals (Lamboglia *et al*., 2021).

In continuation of the above and according to the Institute of Internal Auditors (IIA), a key concern of internal audit is the establishment of clear reference lines within the organization, acting both preventively and correctively. The main objective of the internal audit function is the early detection of potential risks, the detection of anomalies and deviations in the accounting statements, the

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strengthening of the control mechanism in order to avoid the occurrence of fraud phenomena and the elimination of possible structural organizational weaknesses (Hazaea *et al*., 2023). The conjoint of internal auditing with the capabilities offered by artificial intelligence regarding process automation, machine learning and intelligent data processing systems is nowadays able to overcome the limitations of the approaches in accounting practice to date (Bertacchini *et al*., 2025).

LITERATURE REVIEW

According to global literature, AI is not seen as an auxiliary tool with a peripheral role, but rather redefines on a subversive basis the way internal auditors work with regard to risk assessment and interpretation. Of course, AI's ability to faithfully simulate human reasoning in rapid decision-making, to a degree that goes beyond the ordinary, is considered decisive. With these capabilities offered, AI is able to analyze data not only selectively, but also from large populations in order to form predictive models (Tiron-Tudor and Deliu, 2022).

Furthermore, the introduction of machine learning into data analytics allows the analysis of even unstructured datasets and the detection of misstatements and operational inadequacies. Unlike classic auditing practices that are based on predefined rules, machine learning embraces the flexible and adaptive mindset of decision-making based on probabilities, bringing to the fore issues such as audit quality, accountability and the role of auditor judgment (Lehner *et al*., 2022).

In addition to the above, AI deploys natural language processing (NLP) using anomaly detection algorithms to flag deviant transactions and robotic process automation (RPA) to perform re-checks. In this way, the internal audit function becomes more accurate and effective, allowing the detection of latent patterns and the timely provision of targeted approaches to management. As is evident, the audit practice becomes more flexible and adaptable to new organizational threats (Akpan, 2024).

What is more, auditors are now able not only to perform audits on previous transactions, but also to make future key proposals and to actively participate in the assessment of the company's risk. AI applications in auditing practice allow for predictions even regarding audit failure, strengthening auditors' advisory role to management and their constructive participation in board-level discussions (Awwad *et al*., 2024).

In this light, internal audit is not just concerned with ex post verification, but consists a real-time strategic function that enables dynamic adaptation based on constantly evolving organizational behavior. Internal audit is now integrated directly into the business operation with an ongoing nature, thereby reducing delays and improving immediate response to potential risks (Huang *et al*., 2025).

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Taking into account the international literature and specific bibliometric analyses, the main research topics range from AI-supported fraud detection and algorithmic assurance systems to ethical issues in decision-making. However, the absence of unified models that combine the technical, administrative and ethical components constitutes a challenge in both the theoretical research and applied business fields in terms of establishing a unified framework for action (Lacmanovic and Skare, 2025).

At this point we could not fail to mention the "black box phenomenon". Deep learning systems are able to produce results requested by auditors, without however making it completely clear how they have arrived at this decision. Unfortunately, dimensions and functions of internal audit such as traceability, transparency and replicability, which are considered crucial for its reliability, are thus undermined and questioned (Luthra *et al*., 2025).

For all these reasons, it is necessary to develop protocols regarding the use of AI in the conduct of internal audit, by establishing procedures for verifying the models applied, monitoring and managing algorithmic bias, professionally supervising and reviewing the decisions made using interactive systems. Consequently, the internal auditor is called upon to perform a dual, hybrid role, combining both the advantages of advanced technology and the critical evaluation of the conclusions (Agnese *et al*., 2025).

It is also appropriate to mention at this point the gap in resources and capacity to integrate AI into audit practice between multinational firms and smaller, public-sector entities. The latter are likely to be unable to afford the costs, staff training and lag behind in data quality. This two-tier audit environment that is taking shape raises issues of equity, audit consistency and regulatory standardization (Bin-Nashwan and Li, 2025).

The integration of interactive systems in internal auditing requires significant investment in digital infrastructure, training and restructuring of the internal audit practice and in the readjustment of ethical standards. Issues that arise such as transparency, data privacy and the correct interpretation of results should be developed holistically and institutionally, forming the appropriate regulatory frameworks for the exercise of effective internal audit. (Argento *et al*., 2025).

Notably, a bibliometric analysis of this emerging body of work provides valuable insights into dominant themes, influential publications and the intellectual structure of the discourse, exploring implications of the adoption of AI for the internal audit profession. It also highlights existing gaps in the literature, such as the need for empirical evaluation of AI tools in real-world audit environments and the ethical implications of automated judgment (Marcoux, 2025).

Nonetheless, while the body of academic literature has expanded significantly, it remains relatively fragmented. Future studies are called upon to build integrative theoretical models that

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connect AI capabilities with fundamental auditing principles, such as evidence sufficiency, materiality, audit risk and independence. There is also a significant absence of longitudinal empirical data demonstrating the measurable impact of AI adoption on audit effectiveness, fraud detection rates and stakeholder trust. The existing research provides a strong conceptual foundation; however, empirical validation and industry-specific case studies are necessary to bridge the gap between theory and practice (Kotb *et al*., 2020).

Finally, the aim of this article is to map international scientific production, including time trends, leading authors, journals, institutions and countries. Key issues of concern to the scientific community and any scientific gaps could be detected through keyword analysis. The impact of research is assessed, emerging technologies are identified and the results could guide researchers, internal auditors and policymakers in evaluating new technological tools and in shaping education and training policies.

METHODOLOGY

In this study, a bibliometric analysis was conducted using data retrieved from the Scopus database on June 15, 2025. During the identification stage, following the PRISMA protocol as outlined by Birkstedt et al. (2023), the search terms used were ("AI" OR "artificial intelligence") AND ("internal audit"), with search filters adjusted to categorize results by abstract, title and keywords. Throughout the screening process, the inclusion criteria were limited to open-access journal publications within the disciplines of business, management and accounting. To maintain objectivity and minimize linguistic bias, the search was confined to English-language sources, thereby excluding publications in languages other than English (Farooq *et al*., 2024).

The time frame of the review was restricted to studies published within the past fifteen years, reflecting the intensified scholarly interest in the topic since 2010, a trend that is obviously observed due to rapid technological progress. Articles published in 2025 were excluded due to potential data incompleteness, as production at the beginning of the year may not be representative of the total volume Indexing delays in academic databases are, of course, a common phenomenon, which could lead to incomplete representation. In addition to the above, an observed low number could be indicative of a plateau in bibliographic interest or be a result of external factors (e.g. shifts in funding, policy changes or global developments etc.) and these components should be taken into account when interpreting trend-related visualizations.

In the eligibility phase, keywords and titles were carefully screened to ensure relevance and error-checking procedures were applied to verify data integrity. At last, in the inclusion stage, the

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dataset was refined and studies lacking thematic relevance or methodological rigor were removed, ameliorating in this manner both the validity and clarity of search.

For our research, Biblioshiny and VOSviewer have served as powerful tools, enabling visualizing research networks, mapping co-authorship and identifying key citation patterns, influential studies and thematic clusters. The examination of keyword co-occurrence pointed out emerging topics, reinforcing the claim about the effectiveness of these softwares in management of large datasets from multidisciplinary databases, supporting in general a comprehensive understanding of the intellectual landscape (Aria and Cuccurullo, 2017).

FINDINGS

From the initial 1,656 documents found without limiting to the aforementioned criteria, after applying the demanded research restrictions, a final total of 189 relevant documents was retrieved in 114 journals during the timespan 2011 – 2024, with an annual growth rate of 37.19%, document average age of 2.86 and an average citation per doc 19.91. The references are 14,767 and the remaining data are as follows: 741 authors' keywords, 211 additional keywords, 590 authors, 23 authors of single-authored documents and 3.42 co-authors per document (author collaboration) and international co-authorship at 33.33%.

Performance analysis

Publications trend

Rationally, the publication count is expected to increase when a community demonstrates a growing interest in a particular topic. As it is depicted in Figure 1, an upward trend is observed starting with 1 document in the beginning (2011) and reaching 61 in 2024. The indicator has been continuously growing since 2011, with 92.06% of papers published in the last five-year period (2019 - 2024).

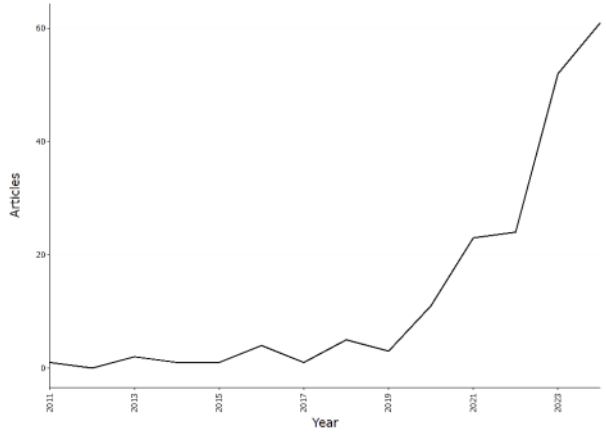


Figure 1. *Annual scientific production*

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Word analysis

Complementary to the above, the use of keywords facilitates the analysis of trends and the identification of potential research gaps. Keywords selected by authors play a crucial role in tracing the flow of scientific studies and evaluating the dissemination of information. Figure 2 presents the most frequently used keywords in the literature on artificial intelligence in internal audit. The top five keywords are artificial intelligence (6 occurrences), decision making (5 occurrences) and deep learning (4 occurrences). At the same level, algorithmics, block(-)chain, business process, costs, cyber security and data analytics follow with two occurrences each.

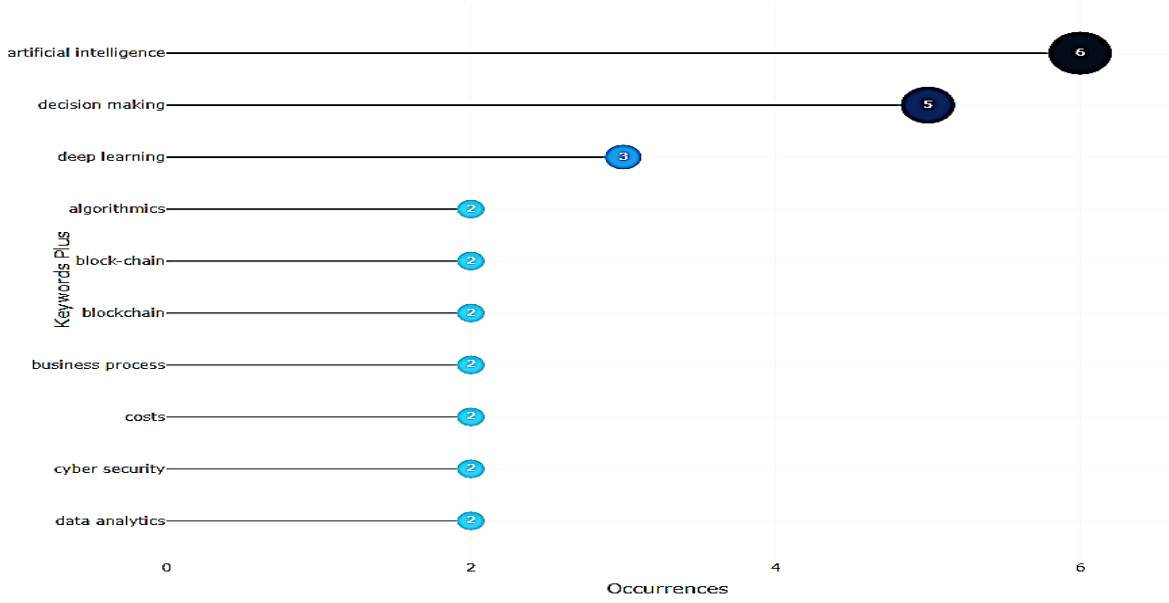


Figure 2. *Most relevant words*

Science mapping

Keyword Co-occurrence Network Analysis

The keyword co-occurrence network visualizes the thematic structure of research linking artificial intelligence and internal audit. Based on term frequency and clustering analysis, it displays keywords as nodes and their co-occurrence as connecting edges. Node size reflects prominence, while color-coded clusters represent distinct, but interrelated research areas.

The thematic map generated reveals three major clusters reflecting scholarly discourse on the intersection of internal audit and artificial intelligence. The red cluster centers on the integration of AI into auditing practices, underscoring its role in enhancing internal audit, risk management, decision-making and cybersecurity, thereby indicating a strong research focus on AI's utility in strengthening audit functions. The green cluster explores technological innovations in accounting, including blockchain and bibliometric analysis, suggesting a broader transformation of financial and accounting

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practices through digital tools. Meanwhile, the blue cluster highlights the relationship between machine learning, audit quality and corporate governance, underscoring the growing interest in how AI-driven methods contribute to regulatory compliance and the effectiveness of oversight. Collectively, these clusters demonstrate the evolving academic interest in leveraging artificial intelligence to reinforce internal audit functions and governance mechanisms, showing at the same time the interconnections among the fields of interest.

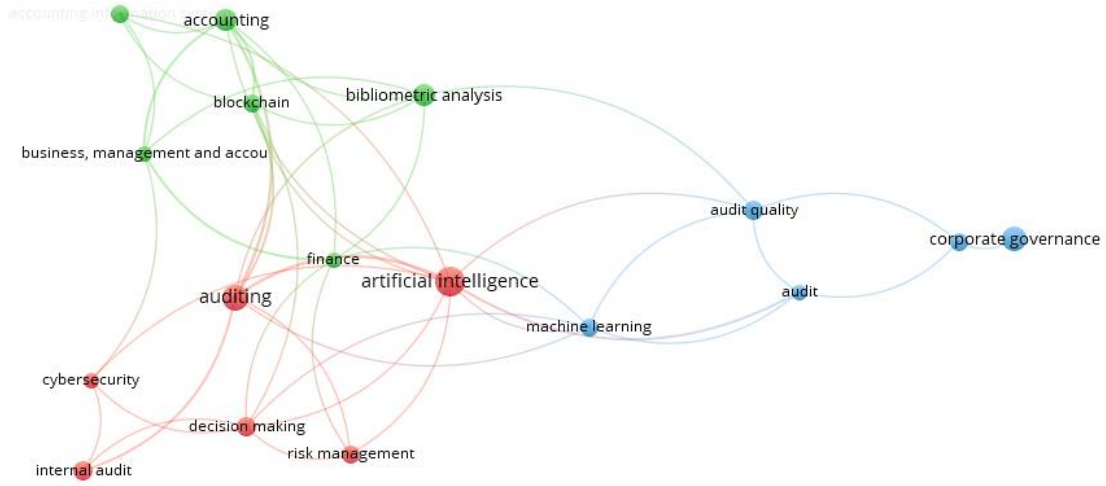


Figure 3. *Keyword co-occurrence network - Network visualization*

Factorial analysis

Word map

The factorial analysis map illustrates the conceptual structure of research linking internal audit and artificial intelligence, revealing a multidimensional distribution of key terms. The concentration of terms such as learning systems, perception, risk and artificial intelligence near the origin suggests a central thematic focus on cognitive and technological dimensions of AI in audit processes. The peripheral positioning of terms like "analytic", "deep learning" and "smart grid" indicates emerging or specialized subthemes with lower co-occurrence density. This distribution reflects an academic landscape where core concerns involve integrating AI into professional and organizational auditing contexts. At the same time, more technical or advanced applications remain less central, but increasingly relevant.

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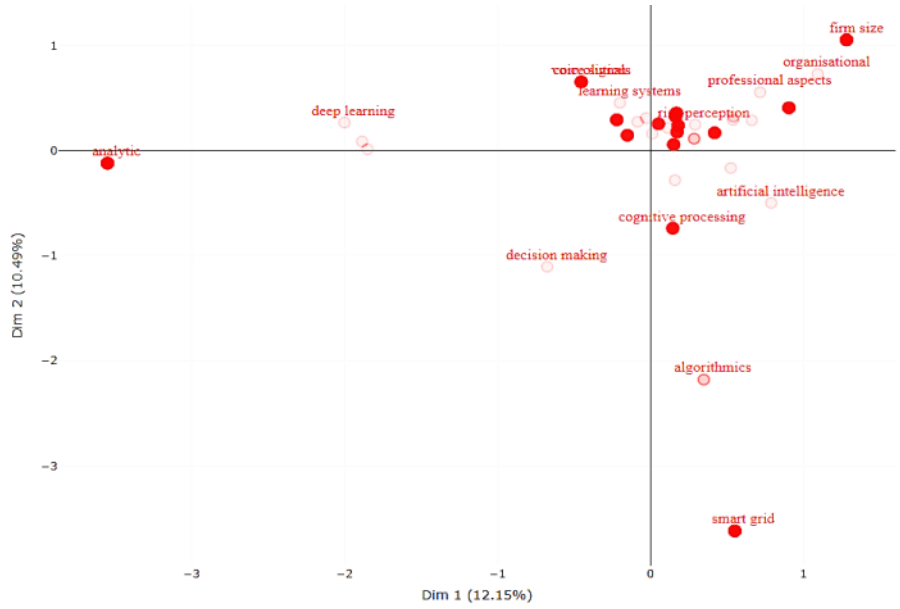


Figure 4. *Factorial analysis - Word map*

Intellectual structure

Co-citation network

The intellectual structure visualized through the co-citation network reveals a diverse and multidimensional academic foundation underpinning the intersection of internal audit and artificial intelligence. Distinct clusters represent coherent research communities, each contributing to the development of theoretical, methodological or applied knowledge in the field. Central nodes, marked by higher citation frequencies, indicate influential works that serve as intellectual anchors, while peripheral clusters suggest emerging or specialized areas of research. This structure highlights the interdisciplinary nature of the domain, drawing on literature from accounting, auditing, information systems and data analytics.



Figure 5. *Intellectual structure – Co-citation network*

Social structure

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Countries' Collaboration World Map

The countries' collaboration map illustrates the international research connectivity on internal audit and artificial intelligence, with notable collaboration links between countries such as the United States, the United Kingdom, Malaysia and various nations in the Middle East and Europe. Darker shades represent higher research output, while connecting lines indicate active co-authorship networks, reflecting a growing trend toward cross-national academic partnerships. This global collaboration pattern underscores the interdisciplinary and international relevance of the topic, promoting the diffusion of knowledge and the development of more globally informed audit and AI practices.

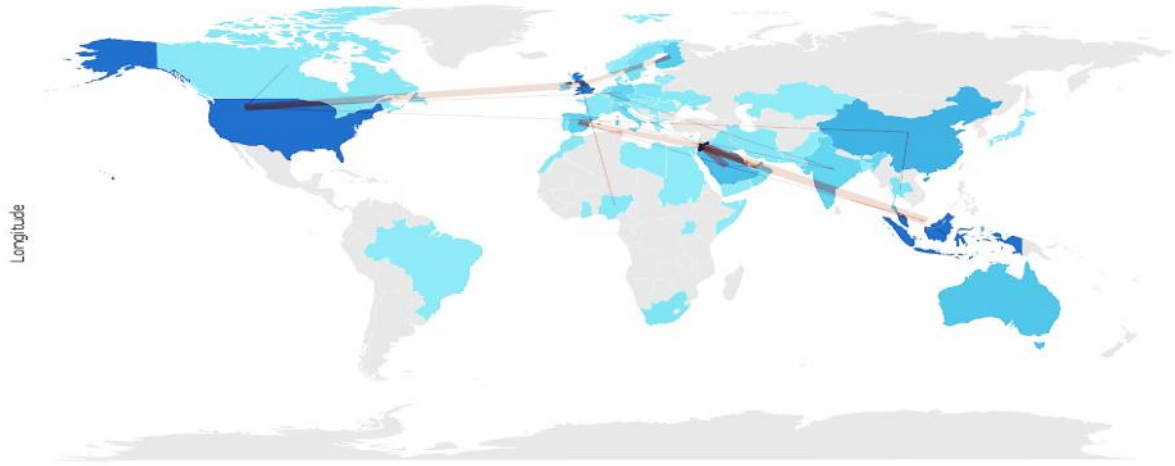


Figure 6. *Countries' Collaboration World Map*

THEORETICAL AND PRACTICAL IMPLICATIONS

The present study provides a comprehensive bibliometric analysis of the evolving relationship between artificial intelligence (AI) and internal audit, revealing a significant increase in academic interest and publication output over the past decade. The findings underscore a robust research trajectory, with the majority of contributions concentrated in the last five years - an indicator of the field's increasing strategic and technological relevance. Thematic cluster analysis uncovered three core areas of scholarly focus: the integration of AI into audit practices, broader technological innovations such as blockchain, data analytics and the role of machine learning in enhancing audit quality and corporate governance. These clusters illustrate the expanding conceptual landscape in which AI is no longer perceived as a support tool but as a central driver of audit transformation.

The factorial analysis confirms that foundational concepts, such as learning systems, risk and perception, remain central, while more advanced applications, like deep learning and smart grids, are emerging as future research frontiers. Co-citation mapping further revealed an interdisciplinary intellectual base, integrating insights from accounting, information systems and data science. Such

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diversity supports the development of a multidimensional understanding of AI's audit implications, but also showcases the current fragmentation in the literature. International collaboration patterns, particularly among countries such as the United States, the United Kingdom, Malaysia and several Middle Eastern nations, reflect the global academic momentum and the need for harmonized governance approaches.

Regarding theoretical ramifications, this study conducts a generative taxonomy by identifying the major fields of academic and professional interest. Potential gaps in the literature are spotted and the foundations are laid for further broadening of research horizons, expressing expected challenges from the current use of AI in the performance of internal audit and in accounting practice in general. By synthesizing the most widespread themes, a knowledge mapping is carried out which discloses the structure of the domain, the evolution over time, the dominant themes and emerging trends. Besides, cross-disciplinary linkages are illustrated and further development of socio-technical systems and institutional theories is promoted.

On a practical level, this research highlights useful tools for applying AI to accounting, encourages professional education, addresses AI-ethics issues and promotes program development within businesses. This in-depth analysis also provides valuable policy and regulatory insights accompanied by empirical evidence to shape a framework for constructive use of AI in audits. This paper raises awareness of audit quality, supports ethical assessment and exercise, encouraging at the same time the development of governance structures to manage AI-related risks.

Concluding, the bibliometric evidence suggests that AI is reshaping internal audit into a more dynamic, predictive and data-driven function. However, practical implementation still faces challenges, including issues of model transparency, ethical accountability and unequal institutional readiness. To move forward, the academic community should work toward integrating empirical validation with conceptual development and advocate for governance frameworks that ensure the responsible adoption of AI in audit contexts. Eventually, this study contributes to this effort by mapping the current research landscape and identifying the foundational elements and future directions for scholarly and professional engagement.

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EXPLORING KNOWLEDGE TRANSFER IN VERTICALLY COORDINATED WINE SUPPLY CHAIN NETWORKS

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ABSTRACT

Knowledge transfer between firms in a supply chain network can significantly influence network success, particularly when adopting disruptive technologies. This study investigates how knowledge about the perceived benefits of such technologies is transferred within vertically coordinated wine supply chain networks, using blockchain as the research object. The literature review guided by PRISMA identified knowledge transfer models, where most emphasize codified, explicit knowledge, often overlooking tacit dimensions relevant to disruptive technology adoption. Building on these insights, a qualitative study using the Gioia methodology was conducted with key stakeholders in the wine supply chain. Findings emphasize the importance of trust and communication at the dyadic, absorptive capacity and innovation readiness at the firm, and governance and coordination mechanisms at the network level. The study contributes to theory by framing knowledge transfer as a governance mechanism, integrating dyadic, firm and network perspectives, as proposed by Gulati. It offers practical guidance for managers seeking to facilitate knowledge exchange as prerequisite in digitally enhanced networks. Integrating all three analytical levels represents a novel contribution, an approach rarely applied in the agri-food literature. Future research should develop a conceptual model for operationalization within multi-agent modeling to simulate the dynamics of knowledge transfer over time.

Keywords: Knowledge Transfer, Tacit Knowledge, Supply Chain, Blockchain, Knowledge Management, Innovation Management, Wine Industry

INTRODUCTION

This study focuses on the transfer of knowledge about the perceived benefits of blockchain technology within vertically coordinated wine supply chain networks. The objective of the study is twofold: first, to conceptually review and analyze existing knowledge transfer models relevant to vertically coordinated agri-food and wine supply chain networks, focusing on how these models address tacit and explicit knowledge exchange, and second, to empirically identify and analyze key factors

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impacting the transfer of knowledge about the perceived benefits of blockchain, serving as the research object, among firms in the supply network.

Industries are currently undergoing a profound transformation as digital technologies impact business models, processes, and organizational dynamics with the objective to enhance efficiency and competitiveness. While the adoption of disruptive technologies in the agri-food sector is growing (Leader et al., 2020; Fiocco et al., 2023), there is a current lack in widespread adoption in the wine sector (Knitsch and Welz, 2021; OIV, 2021; Bastard and Chaillet, 2023; Adamashvili et al., 2024). Among these digital technologies, blockchain has emerged as a promising disruptive innovation, increasingly deployed in agri-food supply networks to address challenges of transparency, authenticity, and coordination (Zhao et al., 2019; Kamble et al., 2020; Kramer et al., 2024). However, the potential of blockchain depends on effective knowledge transfer, a critical enabler of technology adoption (Rogers, 2003), especially in the context of blockchain applications (Wang et al., 2019). As competition between supply networks grow, knowledge becomes a strategic asset for responding to consumer demands and co-creating value (Vijayan et al., 2016). The wine industry, a traditionally conservative sector with slow adoption of digital technologies (Knitsch and Welz, 2021), represents a critical case for exploring how knowledge is transferred in vertically coordinated supply chain networks. This is particularly relevant as digital disruptive technologies such as blockchain are still experiencing slow adoption (Adamashvili et al., 2024; Kramer et al, 2024). Furthermore, there is limited understanding about how knowledge about perceived benefits of these technologies is transferred between interacting firms and whether existing knowledge transfer models adequately address the specific characteristics of the wine industry. To address this gap, this study examines how knowledge is transferred in vertically coordinated wine supply chain networks, focusing on factors that impact the distribution of knowledge as a prerequisite of technology adoption. To guide this study, the following research questions have been formulated:

RQ1: What knowledge transfer frameworks exist for vertically coordinated agri-food and wine supply chain networks?

RQ2: What are key knowledge transfer factors, particularly in the context of digital disruptive technologies?

To address the first objective, a structured literature review following the PRISMA methodology was performed to systematically identify and categorize existing knowledge transfer models in agri-food and wine supply chain networks (Page et al., 2020). To address the second objective, an exploratory qualitative study was conducted and data qualitative content analyzed following the Gioia methodology (Gioia et al., 2013). The study makes two key contributions, using blockchain as the object of analysis to examine knowledge transfer in agri-food supply chain networks. First, it provides

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a structured literature review of existing knowledge transfer models relevant to agri-food and wine networks, highlighting their limitations regarding tacit knowledge and inter-firm dynamics. Second, it provides empirical data from qualitative interviews with key stakeholders from wine supply chain networks by identifying factors that facilitate or hinder knowledge transfer in the context of digital disruptive technology adoption. The originality of the study lies in its approach to consider three analytical levels, which are dyadic, firm, and network as proposed by Gulati (1998), an approach rarely applied in agri-food and wine research. Findings highlight the role of tacit knowledge across dyadic, firm, and network levels.

The manuscript is structured as follows: section 2 provides the theoretical foundation followed by the methodology and results of the structured literature review and qualitative research. The subsequent section offers a discussion followed by implications. The article concludes by positioning the study as a foundation for subsequent conceptual knowledge transfer model development and operationalization through multi-agent-based simulation.

THEORETICAL FOUNDATION

According to the knowledge-based view of the firm (Grant, 1996), knowledge is a strategic asset essential for innovation and sustainable competitive advantage. Within this framework, the ability of a firm to generate, absorb, and share knowledge becomes central to innovation diffusion and the effective adoption of new technologies. Knowledge is typically divided into explicit knowledge, which is documented and tacit knowledge, which is embedded in skills and experience, making it more difficult to codify and transfer (Polanyi, 1997, Davenport and Prusak, 1998; Collins, 2019). Therefore, the mechanisms that determine how these two knowledge types are transferred play an essential role in determining successful innovation implementations. Given the strategic importance of knowledge, understanding how it is transferred between firms becomes increasingly important, particularly in the context of the ongoing digital transformation impacting the structure and coordination of supply chain networks. This study is based on the knowledge-based view of the firm (Grant, 1996), which emphasizes knowledge as a key resource for achieving competitive advantage, network theory (Gulati, 1998), which underlines the role of interorganizational ties and social capital in enabling the flow of knowledge, and chain management framework (Hanf and Dautzenberg, 2006), which focuses on coordination and cooperation mechanisms across dyadic, firm, and network levels in agri-food supply chain networks.

Knowledge transfer refers to the process through which expertise, information, and capabilities of ana entity are transformed into a format that other entities can absorb, assimilate, and use (Ipe, 2003; Castaneda and Cuellar, 2020). It is particularly relevant in supply chain networks for driving

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innovation and enhancing value co-creation among firms (Ajmal and Kristianto, 2012; Wang and Hu, 2020). The exchange is typically facilitated through various communication channels, interactions, and platforms (Kogut and Zander, 1992; Polanyi and Sen, 2009; Nickols, 2013). In the context of supply chain networks, knowledge transfer plays a critical role in enabling operational coordination, innovation, learning, and strategic adaptability (Argote and Ingram, 2000; Nonaka and Takeuchi, 1995).

Agri-food supply chains have transformed from vertically integrated systems into vertically coordinated networks with a focal firm often coordinating activities and aligning stakeholder actions (Hanf and Dautzenberg, 2006). Wine, together with olive oil, fruits, dairy, and ham is considered part of the agri-food sector (Fait et al., 2019; FAO, 2024). Within this context, the wine supply network can be described as a strategic network, which aligns with the agri-food industry, where often a focal firm is vertically coordinating stakeholders to facilitate knowledge exchange and achieve operation objectives that are aligned such as ensuring product safety and quality standards (Bitsch and Hanf, 2022). Previous literature has primarily focused on explicit transfer mechanisms in such networks, while tacit knowledge transfer has received limited consideration albeit it constitutes a substantial share of organizational knowledge (Botkin and Seeley, 2001; Wang and Yang, 2015). This gap has been identified in prior work as a critical limitation (Tounkara, 2013), as it underestimates the mechanisms that impact the adoption behavior toward disruptive technologies in complex networks, suggesting the need for an integrated approach that considers both dimensions. The adoption of disruptive technologies such as blockchain in agri-food networks depends significantly on the distribution of knowledge about their perceived benefits across firms in the supply chain network. Unlike traditional information technologies, which often require the exchange of codified and explicit information, the adoption of disruptive technologies often relies on interpersonal knowledge sharing that involve tacit knowledge (Senker, 2008, Kucharska et al., 2023; Hung et al., 2024). This view is confirmed by Bruni et al. (2025), who find that interdisciplinary experts play an essential role in supporting SMEs in the adoption of new digital technologies, particularly by facilitating the transfer of tacit knowledge. Similarly, Del Soldato and Massari (2023) show that knowledge transfer related to innovative digital technologies is most effective when integrated in collaborative, informal, and relational processes. These findings highlight that how knowledge about technology is shared depends on the specific context and the individuals involved. Therefore, effective knowledge sharing plays a relevant role in the strategic adoption of blockchain and disruptive technologies, highlighting its value not only as an operational technology but as a strategic asset (Galati et al., 2021). Furthermore, knowledge transfer in supply chain networks involves processes at the dyadic, firm, and network levels, which must be jointly considered to understand how interorganizational knowledge is generated and disseminated

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(Gulati, 1998). While Gulati focuses in his research on strategic alliances and inter-firm networks, findings can be applied to supply chain networks as both share similar attributes relevant to achieving cooperation and coordination. Such attributes include trust, absorptive and disseminative capacities, and reliance on relationships, characteristics that are also highly relevant in inter-firm knowledge sharing (Arnulf et al., 2005; Skilton at al., 2020; Salam and Bajaba, 2023). Building on this foundation, Hanf and Dautzenberg (2006) developed a management framework that incorporates the dimensions of cooperation and coordination across the three analytical levels of firm, dyadic relationship, and network, offering a structured lens through which to analyze knowledge transfer in agri-food supply chain networks as both a strategic and relational process. Nevertheless, a framework integrating the three perspectives remains absent (Duysters et al., 2004), a gap that exists until today as unveiled by the findings of the literature review. Addressing this gap is highly relevant given the complexity and dynamics of digital transformation which directly impacts how the benefits about new technologies are understood, accepted, and adopted by interacting firms in supply chain networks. To address the identified research gaps, the study first conducts a structured literature review using the PRISMA methodology to identify and map existing models. Building on this, a qualitative study utilizing the Gioia methodology explores how explicit and tacit knowledge transfer influences the adoption of digital technologies in vertically coordinated wine supply chain networks.

METHODOLOGY

Structured literature review

The study utilizes a structured literature review to identify relevant literature on knowledge transfer models. The review utilizes the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) method (Moher et al., 2010; Vrabel, 2015; Page et al., 2020). The objective was to examine existing models of inter-organizational knowledge transfer in vertically coordinated networks, particularly focusing on how tacit knowledge supports technology adoption. A strategic approach was chosen to focus on top quartile (Q1) journals relevant to supply chain theory and to agricultural economics in the GEWISOLA-ÖGA Ranking and Rating (Gesellschaft für Wirtschafts- und Sozialwissenschaften des Landbaues e.V.; Society for Economic and Social Sciences of Agriculture e.V.) with more than 100 evaluations (GEWISOLA, 2009). The reason for focusing on journals with more than 100 evaluations lies in their impact and importance, as these journals are recognized for their academic quality. Furthermore, to complement the identification of existing theories, top quartile (Q1) journals from the supply chain field were added as key sources to gather relevant findings pertaining to knowledge transfer in supply chain networks. These journals include but are not limited to Journal of Operations Management, Supply Chain Management: An International Journal, Journal of Business

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Logistics, and Production and Operations Management, and Journal of Supply Chain Management, Strategic Management Journal, complemented by Academy of Management Review. Additionally, data from open access databases JSTOR, ScienceDirect, and Google Scholar was included. The search string employed first addressed core concepts of the research "knowledge transfer", "knowledge sharing" or "knowledge exchange", "disruptive technologies", “strategic network”, and "supply chain", which are central to the research question. Following this, the secondary focus revolves around the relational aspects and added the refinement term "inter-firm" to address the transfer between firms as supply chain research often focuses on dyadic relationships with only less than two percent of research addressing the network level (Roehrich et al., 2020). To ensure that the aim of the research question is comprehensively addressed, the different perspectives of analysis, dyadic, network, and firm perspective were added to ensure their coverage, complemented by theory, model, and framework, terms that ensure that the search identifies theoretical models. As a result, the following search string was applied: ("knowledge transfer" OR "knowledge sharing" OR "knowledge exchange") AND ("strategic network” OR “vertical coordinated” OR “vertical cooperated”) AND (“disruptive technology” OR "disruptive technologies” AND "supply chain" AND “inter-firm” AND ("dyadic" AND "network" AND "firm") AND (model OR framework OR theory). In cases where sites are not indexed, and the site-specific search function is limited in terms of the number of acceptable Boolean operators or search string length, the following first order concept search string was applied: ("knowledge transfer" OR "knowledge sharing" OR "knowledge exchange") AND ("disruptive technology" OR "disruptive technologies") AND "strategic network". The review included peer-reviewed literature published between 2000 and January 2025. After removing duplicates, titles and abstracts were analyzed, followed by a review based on inclusion criteria. Studies were selected if they addressed knowledge transfer processes in vertically coordinated or networked organizational contexts, particularly in multi-level supply chain networks.

Qualitative data derived from expert interviews

The structured literature review is complemented by qualitative data which were collected through semi-structured interviews with stakeholders from the German wine industry with the aim to provide insights into current knowledge transfer processes and key factors relevant for knowledge exchange in these networks. 23 firms were approached, resulting in 14 individuals from 11 firms participating in the interviews, which aligns with Guest et al. (2006) who found that in studies with relatively homogeneous populations, similar interview structure, and same set of questions, thematic saturation often occurs within 6 to 12 interviews conducted, which is also confirmed by Baker and Edwards (2012). This further aligns with Malterud et al. (2016) who propose the concept of information power, where the richness of data determines the number of participants. The interviews were conducted as

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semi-structured interviews allowing participants to flexibly express their views and opinions, which provided additional information (Gioia et al., 2013). The interviews, which were conducted at the firm of the interviewee, lasted between 35 and 90 minutes. The sessions were recorded and transcribed with participants agreeing to the conduct. Interview data was anonymized and is kept confidential. Data was qualitative content analyzed following the Gioia methodology (Gioia et al., 2013). The sample was chosen based on the multi-tier structure of the wine supply chain network to ensure that stakeholders from different stages are included. The selection of interviewees was based on three key criteria: first, the interviewees hold a position in one of the stages, second, are senior managers responsible for business decisions, and third, possess operational knowledge about information technology.

RESULTS

From the literature review a total of 216 articles matched the search string (Figure 1). Redundant articles were eliminated resulting in 209 eligible articles. Following, the search was refined to identify only findings meeting the inclusion criteria (Table 1), which resulted in 14 articles.

Inclusion	Exclusion
The article is written in English language	The article is written in other than English language
The article includes knowledge transfer models or frameworks relevant to vertically coordinated supply chains	The article does not present knowledge transfer models or frameworks relevant to vertically coordinated supply chains
The article focuses on multiple stages in the supply chain network	The article focuses on a single stage without inter-firm interaction within the supply chain network
The article proposes a theoretical framework, model, or theory	The article does not propose a theoretical framework, model, or theory
The article investigates knowledge transfer pertaining to digital disruptive technologies	The article focuses on general knowledge transfer
The article was published until January 2025	The article was written after January 2025

Table 1. *Inclusion and exclusion criteria (Source: Developed by the authors)*

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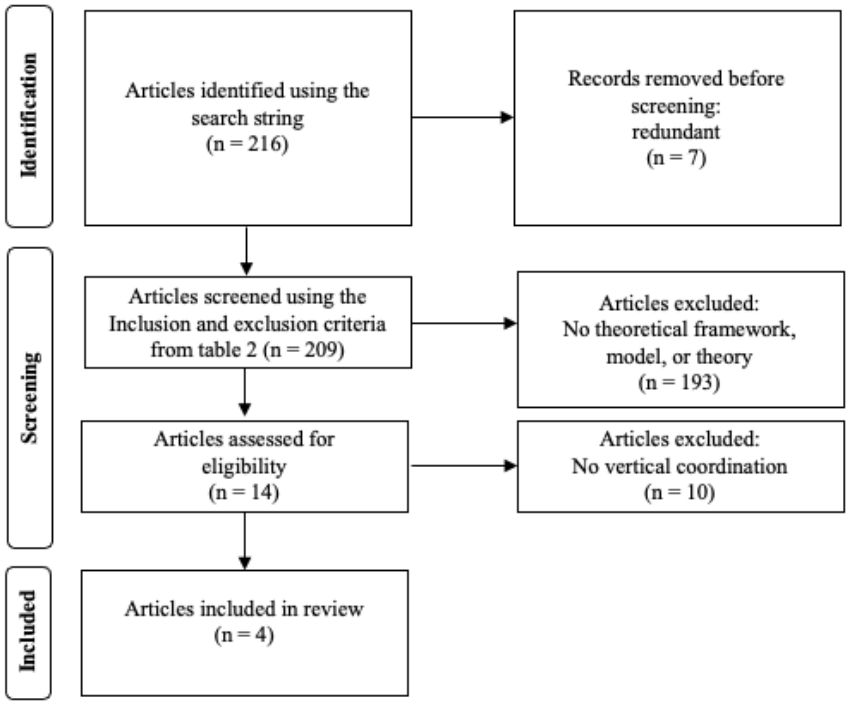


Figure 1. *PRISMA data collection flow chart for multi-agent simulation in the wine supply network (Source: Elaboration of the authors)*

Source	Manuscript Title
He et al., 2011	Knowledge transfer: the facilitating attributes in supply-chain partnerships
Loebbecke et al., 2017	Managing inter-organizational knowledge sharing
Su and Li, 2020	Simulation Analysis of Knowledge Transfer in a Knowledge Alliance Based on a Circular Surface Radiator Model
Inkpen and Tsang, 2005	Social Capital, Networks, and Knowledge Transfer

Table 2. *Articles included in detailed review (Source: Elaboration of the authors)*

He et al. (2011) proposes a conceptual inter-firm knowledge transfer model that identifies enablers of knowledge sharing such as trust, commitment, interdependence, shared meaning, and balanced power. Loebbecke et al. (2017) present a conceptual paper for inter-organizational collaboration involving knowledge sharing. They identify four configurations of knowledge transfer involving uni- and bilateral, explicit, and tacit dimensions. Su and Li (2020) introduce a knowledge transfer model for alliances based on the theory of acoustic waves. A circular surface radiator is proposed as part of the conceptual framework. The model uses three key variables, which are number of enterprises in the alliance, frequency of knowledge transfer, and the distance between stakeholders and demonstrates that they correlate. The theoretical framework is based on the theory of acoustic waves for

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understanding inter-firm knowledge transfer focusing on absorptive capacity and proximity of stakeholders. The contribution of Inkpen and Tsang (2005) investigates how different dimensions of social capital impact knowledge transfer in different network types. They unveil that social capital aspects such as trust and shared objectives need to be considered in addition to network structure so that networks function effectively to enable knowledge transfer.

Findings demonstrate that most existing knowledge transfer frameworks emphasize explicit knowledge and variables such as trust, proximity, and absorptive capacity. Even models that mention tacit knowledge, e.g., Loebbecke et al. (2017) tend to treat it conceptually rather than exploring how it applies in adoption scenarios especially regarding disruptive technologies. This gap is particularly evident in literature related to the adoption of disruptive technologies, where the diffusion of knowledge often depends on interpersonal trust, collaboration, and absorptive capacity. The results of the review underline the need for understanding of how knowledge transfer the perceived benefits of emerging technologies. These insights informed the design of the subsequent empirical study and highlight the relevance of qualitative approaches capable of capturing tacit and context-dependent forms of knowledge exchange. To conclude, the literature review unveiled that the identified articles, and particularly the reviewed four articles on inter-firm knowledge transfer do not consider the integration of dyadic, firm, and network perspectives. Moreover, the critical role of sharing knowledge about the benefits of disruptive technologies as prerequisite of technology adoption has not yet been addressed. Finally, the statement of Duysters et al. (2004) regarding the lack of a knowledge transfer framework integrating the three perspectives persists, as revealed through the structured literature review.

Data from the qualitative interviews show that the overall knowledge of the interviewees about current digital technologies is at an average of 4.2 with individual results oscillating between 2 and 7 on a 7-point Likert scale where 1 indicates little knowledge and 7 expert knowledge. This indicates on average a moderate understanding of the interview topic, including blockchain technology. However, when asked specifically about their practical experiences with blockchain, the majority has little experience with the technology. This finding relates specifically to experience which is understood as the practical application of knowledge about blockchain, whereas knowledge is abstract and shareable information (Siliquini-Cinelli, 2024). Interviewees hold moderate knowledge about information technology. However, the majority lacks practical long-term experience with blockchain technology. While this seems to be a limitation it aligns with the objective of the study to identify key factors relevant for knowledge exchange. Therefore, the chosen sample provides valuable insights into the mechanisms, drivers, and barriers of diffusion of technology. The result also mirrors Rogers' (2003) diffusion of innovation theory and highlights the existing gap in blockchain technology knowledge within the

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interviewees. However, their involvement in coordinating supply chain processes ensured that they would provide detailed insights into how knowledge about digital disruptive technologies is shared between firms. The sample was chosen based on the multi-tier structure of the supply chain network to ensure that stakeholders from all three stages are included while examining how knowledge about blockchain technology evolves within a vertically coordinated supply chain network. Following the Gioia methodology, first order concepts were identified from the interview data. These were then structured into second order themes which serve as the basis to identify several aggregate dimensions, complementing the development of the new theoretical knowledge transfer framework. The first order concepts, second order themes, and aggregate dimensions derived from qualitative data are summarized in figure 2. The interviews resulted in five aggregate dimensions. In discussing network structure and the way knowledge is distributed by the focal firm *Knowledge flow and social dynamics* emerged as aggregate dimension. Interviewees highlighted the significance of knowledge leaders in the knowledge transfer process as interviewee K stated: "I mean, of course, if you have such an alpha animal in the middle, then there are actually significantly more contacts that come from it."

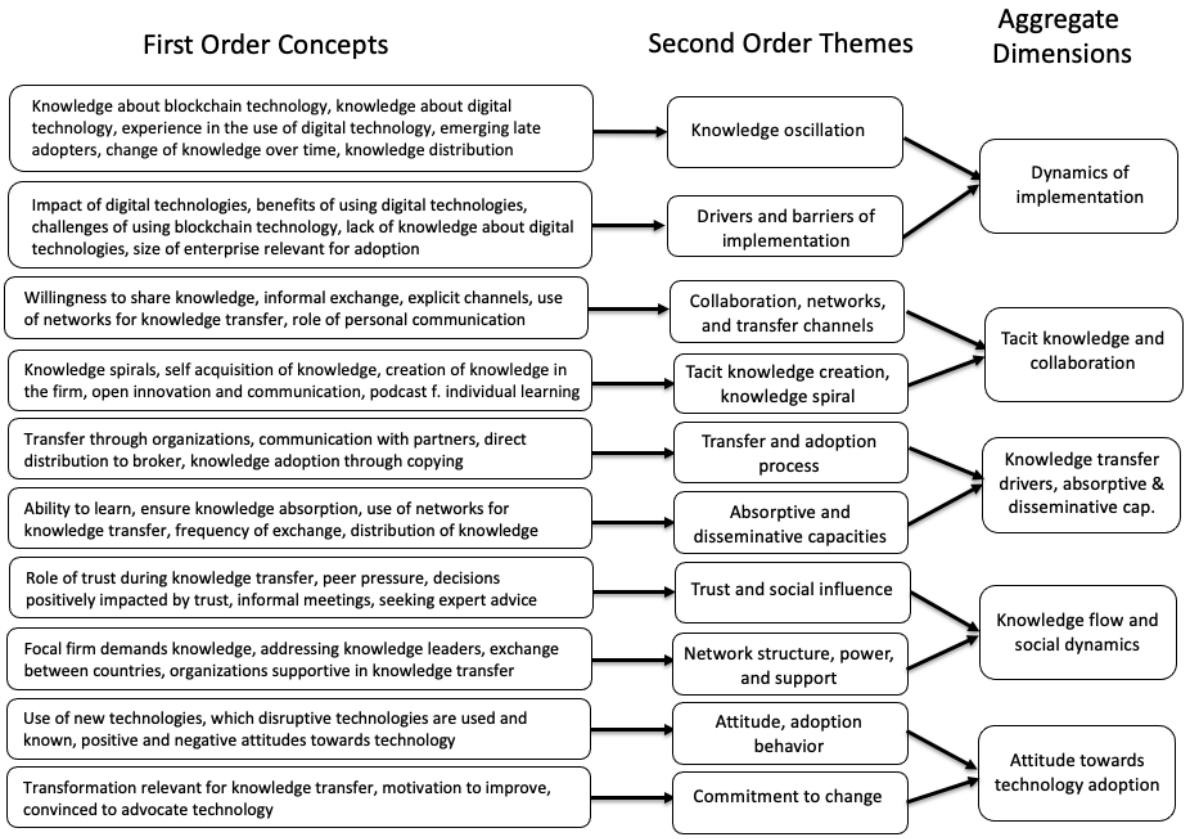


Figure 2. *First order concepts, second order themes, and aggregate dimensions derived from qualitative data (Source: Elaboration of the authors)*

This points towards the scale-free nature of the supply chain network characterized by influential firms performing knowledge distribution tasks. Furthermore, informal knowledge exchange results in

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dynamically reassigning new connections as interviewee F confirmed: "You also talk on a confidential level, you make small talk.", interviewee N: "I think the exchange of information works very, very well anyway. From the regular tables to personal meetings, trips, whatever.", and interviewee E: "Most of it takes place in an informal way, if you learn it just by doing it." The scale-free network architecture demonstrates how rewiring influences network structure which can amplify social dynamics such as peer influence in decision making. It was further found that peer-pressure acts as key driver in decision making reflecting the significance of the triadic closure effect. As interviewee J stated "But if many people are already using it, then you're more likely to believe the majority. Yes, they made the right decision." Data from interviews indicate that the overall perception of peer-pressure is highly relevant as the average of 4.8 on a 7-point Likert scale indicates, with 1 indicating strong disagreement and 7 strong agreements that peer actions significantly impact their own adoption decisions. The consideration of the triadic closure concept is also confirmed by Tselenti and Danas (2016), as it builds tight clusters essential for knowledge exchange, a crucial concept in acquiring knowledge about disruptive technologies as per Nelson and Winter (1982) and Witt (2006). Trust emerged as a major driver as stated by interviewee K: " I think, first of all, that trust comes first or it requires a lot of trust to release or pass on the knowledge on the other side." Discussing the *Dynamics of implementation* dimension, all interviewees confirmed that knowledge is unequally distributed among firms in the supply network but varying knowledge levels exist as interviewee K stated: "After all, the firms are not all at the same performance level. Exactly. It's very different." The *Tacit knowledge and collaboration* dimension reiterates the significance of informal networks for knowledge transfer. Informal interactions between stakeholders facilitate the exchange of tacit knowledge which is transformed into explicit knowledge enabling a continuous creation and exchange of knowledge (Nonaka and Takeuchi, 1995), supporting the application of the SECI knowledge spiral (socialization, externalization, combination, internalization). The contribution of first order concepts to the SECI knowledge spiral is depicted in figure 3, demonstrating how these concepts contribute to the knowledge exchange process. Within the tacit to explicit phase, the focal firm converts tacit knowledge into explicit format to provide consistent knowledge, which is distributed unidirectional to brokers. Brokers structure, harmonize, and distribute relevant explicit knowledge unidirectionally through selected communication channels. Within the explicit to tacit phase wine producers integrate explicit knowledge into business processes and convert it into tacit knowledge over time. In the final tacit to tacit phase tacit knowledge is exchanged in informal meetings, discussions, collaborations, enhancing the collective knowledge. The *Knowledge transfer drivers, absorptive & disseminative capacity* dimension underscores the relevance of absorptive and disseminative capacities in the knowledge transfer and absorption process. Disseminative capacity is

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the ability and willingness to share knowledge as illustrated by interviewee H: "We like to share what we do in the hope that we will find like-minded people who will also share their ideas with us." However, interviewee N added the effect of age to disseminative capacity: "I do believe that the somewhat younger generation in the current or current environment are also happy to share their knowledge." Pertaining to absorptive capacity interviewee N stated: "But what I am currently recognizing, especially in young dynamic companies, is this desire to understand better." The findings align with Lichtenthaler and Lichtenthaler (2010) who suggest that knowledge dissemination is critical for successfully transferring knowledge, also confirmed by Edwards (2014). From the interviews three distinct characters emerged, each of them representing a specific attitude of stakeholders towards technology adoption: positive, neutral, and negative. As interviewee N noted: "But what I am currently recognizing, especially among young, dynamic companies, is this desire to understand better." Reflecting a positive attitude. The neutral attitude was observed in the statement of interviewee C: "…and others completely ignore it." And interviewee H: "But the wine industry is much, much more cautious compared to other industries." Finally, the negative attitude to-

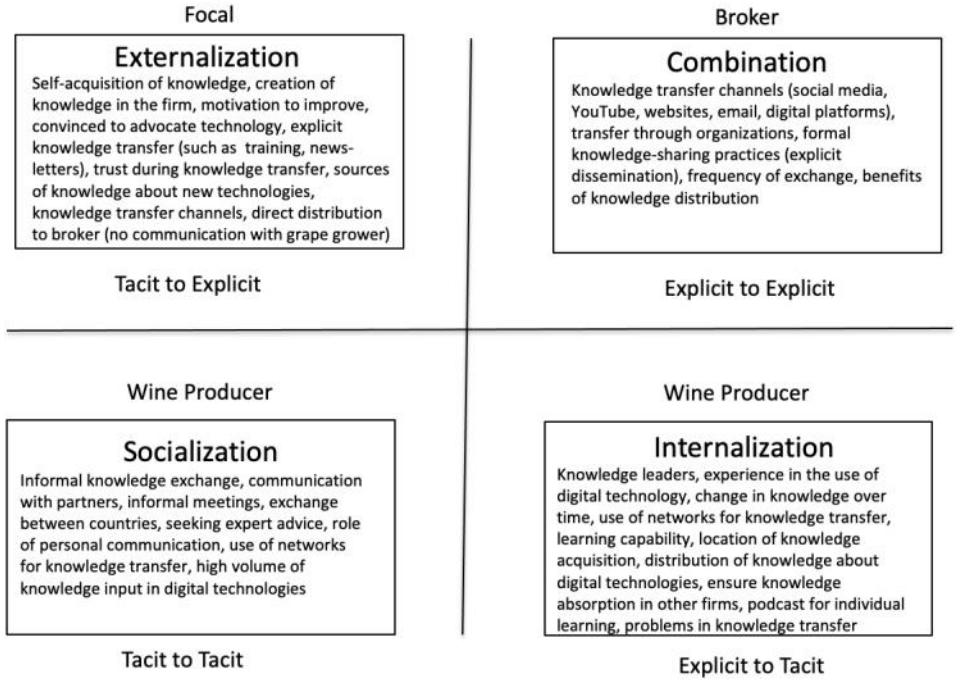


Figure 3: *Alignment of first order concepts to the SECI knowledge spiral (Source: Elaboration of the authors)*

wards technology adoption was illustrated by interviewee C: "…those who are less digitized, of course they also have reservations, they don't want to have anything to do with it anymore." To conclude, the interviews identified three distinct attitudes of technology adoption behavior each representing different engagement with technology which aligns with Rogers (2003). Findings are summarized in the aggregate dimension *Attitude towards technology adoption.* Results confirm the need

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to consider dyadic, firm, and network levels in knowledge transfer models. They reveal that trust and communication on the dyadic level, absorptive capacity and innovation readiness on the firm level, and governance and coordination mechanisms on the network level jointly impact knowledge transfer aligning with Gulati (1998).

DISCUSSION

This study aims to identify applicable knowledge transfer models and explore the factors that shape knowledge transfer in vertically coordinated wine supply chain networks. By combining a structured literature review with qualitative empirical data, this dual approach enabled a more comprehensive understanding of available knowledge transfer models and the factors influencing their practical application, particularly for adopting disruptive technologies such as blockchain. In answering research question 1, the literature review demonstrates that existing frameworks mostly emphasize codified, explicit knowledge and focus on dyadic or intra-firm flows (Becker and Knudsen, 2006). Although tacit knowledge is acknowledged (Polanyi, 1997; Nonaka and Takeuchi, 1995) its application remains underrepresented in supply chain literature, especially in vertically coordinated or strategic networks. Addressing research question 2, empirical findings partially confirm and extend these models, suggesting that codified knowledge such as formal training is necessary for technology adoption confirming Galati et al. (2021). However, interviewees emphasized that successful knowledge transfer also depends on tacit dimensions, including hands-on experience, trust, and context-specific interpretation which aligns with Senker (2008). These elements are often transferred through informal interactions, mentoring, or interpersonal communication. Interviewees highlighted that tacit knowledge is essential to adoption of disruptive technologies. These findings challenge models that overemphasize codified transfer mechanisms and aligns with critiques such as Senker (2008), who argue for more relational and informal perspectives on knowledge sharing. This perspective is also supported by Bruni et al. (2025), who emphasize the need of interdisciplinary experts to support SMEs in adopting new technologies, particularly through tacit knowledge. Moreover, Del Soldato and Massari (2023) demonstrate that effective knowledge transfer about digital technologies is achieved through collaborative, informal, and relational processes. The five identified aggregate dimensions (figure 2) serve as foundation for the development of a conceptual knowledge transfer model. All five dimensions are interrelated and together describe key factors determining how knowledge is transferred within wine supply chain networks. “Dynamics of implementation” reflect how knowledge transfer evolves over time, influenced by oscillating knowledge levels and implementation challenges. “Tacit knowledge and collaboration” highlight the importance of trust and informal networks in exchanging knowledge circulating between stakeholders. “Knowledge

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transfer drivers, absorptive and disseminative capacity" influences how knowledge is acquired, shared, and adopted by stakeholders. "Knowledge flow and social dynamics" emphasize how interpersonal trust, social influence, and network structure impact the dynamics of knowledge transfer in vertically coordinated wine supply chain networks, while "Attitude towards technology adoption" demonstrates how mindset and commitment of stakeholders impact their openness and willingness to engage with new technologies. Together, these dimensions describe how knowledge transfer evolves in vertically coordinated wine supply chains, influenced by trust, collaboration, capabilities of stakeholder, network structures, and attitudes toward technological change. Furthermore, the network graph presented to the interviewees was confirmed as accurately reflecting the architecture of wine supply chain networks. This validation supports the view that knowledge flows in these networks are not evenly distributed and are influenced by a few influential firms. Moreover, the aggregate dimensions reflect the consideration of dyadic, firm, and network perspectives when modeling knowledge transfer which aligns with Gulati (1998), enriching the understanding of inter-firm knowledge governance. These findings help to explain how knowledge dynamically evolves between firms, the role of tacit knowledge in the context of disruptive technologies and addresses a knowledge gap rarely explored in the existing literature. To conclude, the interviews provide insights about explicit knowledge serving as prerequisite for technology adoption (Garcia et al., 2023), while its effectiveness is limited without the complementary tacit dimension. Traditional knowledge transfer models insufficiently address this dimension (Tounkara, 2013), despite scholars noting that most of the organizational knowledge is inherently tacit (Botkin and Seeley, 2001; Wang and Yang, 2015; Zait, 2021; Miton and DeDeo, 2022). Future models should therefore aim to integrate both explicit and tacit dimensions.

IMPLICATIONS

The study contributes to theory by confirming that tacit knowledge is underrepresented in current knowledge transfer models. While prior models acknowledge the importance of trust, proximity, and absorptive capacity, few consider the dynamic, interpersonal processes involved in the transfer of knowledge about disruptive technologies. The study offers evidence that tacit knowledge is essential in disruptive technology knowledge transfer. Moreover, findings highlight that knowledge transfer operates simultaneously at dyadic, firm, and network levels. This is critical for developing a more accurate understanding of interfirm knowledge flows. For managers, the findings highlight that successful adoption of blockchain requires a tacit dimension and the consideration of dyadic, firm, and network levels.

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CONCLUSION

This study provides insights into knowledge transfer in vertically coordinated wine supply networks by combining a structured literature review with qualitative data analyzed using the Gioia methodology. It identifies a critical gap in existing models, which often prioritize explicit knowledge while overlooking the relational and tacit dimensions essential for adopting digital disruptive technologies such as blockchain. Empirical findings confirm the relevance of trust, absorptive capacity, and coordination mechanisms across dyadic, firm, and network levels. The study contributes to theory by drawing on the framework of Gulati addressing dyadic, firm, and network perspectives to analyze strategic knowledge transfer, an approach rarely applied in agri-food research. For managers in the wine industry, the findings highlight the need to address relational capabilities and view knowledge transfer as a governance mechanism to support technology adoption as part of digital transformation efforts. While the study offers valuable insights, its focus on the German wine market, and analysis of blockchain as a representative disruptive technology may limit the generalizability of findings. Future research is encouraged to build on this foundation to develop conceptual models of knowledge transfer that consider the identified factors. Multi-agent simulation approaches may further support understanding of how knowledge transfer evolves over time within complex networks.

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THE STRATEGIC PLANNING APPROACH OF A LARGE FAMILY FIRM – A SINGLE CASE STUDY

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ABSTRACT

Strategic management and strategic planning are important for the competitive situation and success of companies, although we live in turbulent times that are characterized by constant changes and high volatility. Strategic planning approaches can support companies to increase their flexibility and ability to adapt to these dynamics. We have conducted a single case study of a large family firm to increase our understanding of the strategic planning approaches and procedures. We have found that the strategic planning approach appears quite formal but also in tendency operational. Our study contributes to the literature by providing an in-depth case and detailed information on the procedures, applied instruments as well as associated challenges of the strategic planning approach.

Keywords: Strategic Management, Strategic Planning, Long-term Planning, Procedures, Instruments, Challenges, Case Study

INTRODUCTION

The business world nowadays is characterized by constant dynamic changes and volatility, which can hardly be foreseen (Kitsios & Kamariotou, 2018). This can be exemplified by the new US administration, which fundamentally changes conditions that have been agreed on for decades. This comes in addition to crises, which companies have faced in the last years, such as the COVID-19 pandemic or the attack on Ukraine by Russia, massively violating international law. Strategic management and planning, however, is not becoming obsolete due to these developments, as previous studies have confirmed a positive impact of strategic planning on firm performance (Kitsios & Kamariotou, 2018; Wall, 2023). Others highlight the importance of strategic planning in times of crisis for the flexibility and adaptability of firms to respond to these changing circumstances (Vargo & Seville, 2011).

Much of the previous research has examined firm performance relevant aspects of strategic planning and explains the performance impact under various conditions (Habbershon & Williams, 1999; Kitsios

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& Kamariotou, 2018; Kosmidou & Philip, 2023; O'Regan et al., 2007; Wall, 2023). To a lower extent, organizational and procedural aspects as well as the application of strategic planning instruments has been addressed (Kalkan & Bozkurt, 2013; O'Regan & Ghobadian, 2002; Stonehouse & Pemberton, 2002). The objective of our study is to address this gap and contribute an in-depth, detailed understanding of the strategic planning approach of a specific firm to the scholarly discussion.

The subsequent section of this paper aims to give an overview of the literature on strategic planning in a family firm / SME context. Then the applied case study approach will be presented. Subsequently, we present and discuss our findings with a focus on procedures, applied instruments, and challenges associated with strategic planning. This paper ends with a conclusion.

LITERATURE REVIEW

Strategic planning has been intensively addressed in literature (Daspit et al., 2017; Hillbrand, 2006; Sharma et al., 1997; Stonehouse & Pemberton, 2002; Thrassou et al., 2018) nevertheless there remain important gaps. While the impact of strategic management and planning on firm performance has been studied quite intensively (Lindow et al., 2010; O'Regan et al., 2007; Raviv et al., 2009; Wall, 2023), questions regarding the applied tools, procedures, responsibilities, IT support etc. remain still open, especially as the research field tends to be fragmented in regard to large firms, SMEs, family, non-family firms and various geographical contexts.

Kraus et al. (2008) highlight that strategic planning defines guidelines and programs, which allow a firm to achieve its goals and visions, developed in the strategic management process, and prepare for future contingencies to adapt to the dynamic changes of the environment. Here, the development of different scenarios can be done. The literature also emphasizes the usefulness of formalized planning approaches, which support firms in developing a better understanding of their environment and capabilities and therewith also the competitive situation of the firm (Gibbons & O'Connor, 2005). While typically strategic planning is concerned with long-term oriented time horizons of three years and more, operational planning and budgeting deals with shorter time horizons of less than three years, typically one year (Kraus et al., 2008). However, the transition of strategic and operational planning seems to be fluent (Stonehouse & Pemberton, 2002).

Previous research found that strategic, long-term management and planning and underlying management control systems have a positive impact on the performance of family firms (Wall, 2023). In a similar vein, O'Regan et al. (2007) confirmed that strategic planning has a positive impact on financial firm performance. According to Vargo & Seville (2011), especially in times of crisis, effective

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planning supports a flexibility to adapt to changing circumstances, which includes having inspiring leaders, a good company culture, plans and decision-making based on reasonable structured processes as well as employees capable of integrating this information in their behaving. Interestingly, Gibbons & O'Connor (2005) found that entrepreneurial firms tend to have a higher degree of formalization in their planning procedures than conservative firms, explaining this with the curiosity of entrepreneurial firms to constantly question their competitive situation. Contrary to that, Kallmuenzer et al. (2018, p. 666) describe the strategic planning process of the examined family SMEs as an 'on-going, incremental and long-term oriented process rather than a planned or structured one.' Mazzarol et al. (2009) found that formal written business plans positively affect several processes within SMEs, such as the development of partnerships, formal quality assurance as well as the ability of employees to deal with changes. The findings of O'Regan & Ghobadian (2002) indicate that subsidiary firms are more likely to have formal strategic planning procedures compared to independently owned firms. Khan et al. (2020) emphasize the role of social capital in the strategic renewal of SMEs.

Kalkan & Bozkurt (2013) found that strategic planning tools are less common in SMEs and explain this with a lack of financial and employee resources. Applied tools were, among others, human resources analysis, total quality management, customer relationship management, but also to a lower extent, vision / mission, PEST, and benchmarking. Stonehouse & Pemberton (2002) found in their study that the financial analysis of the own firm as well as the SWOT analysis were mostly used.

Sharma et al. (1997) remind us that family firms are not a homogenous group of companies. While this is certainly also true for non-family firms, it nevertheless motivates us to examine firms in this context in an in-depth way to understand why a firm is behaving as it is. This serves as a rationalization why further case studies contribute to the field. However, we focus on the internal organization and procedures and understand family firm primarily as a context and do not study the family influence. Moreover, Sharma et al. (1997) propose to address the implementation of strategies and methods. When looking at the literature, the implementation of methods of strategic and operational planning is still characterized by a limited understanding, to which we want to contribute.

RESEARCH DESIGN AND METHOD

Case study research has developed towards an established research approach in social science research (Cavaye, 1996; Eisenhardt, 1989; Hancock & Algozzine, 2006; Yin, 2017). We have decided to conduct a case study to better understand the strategic planning approach of a specific company.

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According to Schoch (2020) case study research analyses a specific event, person, place or organization and if there are more cases the number is typically small. Strategic planning is a complex organizational function. As case studies allow the description of real-life phenomena and they hence are especially suitable in such complex contexts (Cooper & Morgan, 2008; Gustafsson, 2017; Rashid et al., 2019). Therefore, it can be argued that case studies specifically allow the generation of an in-depth understanding of the phenomena under research in this study (Eisenhardt, 1989; Rowley, 2002). From a management control perspective, Otley & Berry (1994, p. 50) argue that this is especially true for single case studies, which demonstrate 'the deep complexity of accounting and control in organizations'.

Typically, case study research involves multiple sources of data, primary and secondary ones, such as interviews, surveys, observations or documents, internal and external ones to develop an understanding of the internal workings and interactions of an organization (Schoch, 2020; Verleye, 2019). From a research philosophical perspective, our research is rooted in an interpretivist tradition, primarily using qualitative methods, which contributes to the research objectives of developing a detailed and in-depth understanding of behaviors within the context of the case study company (Cooper & Morgan, 2008; Otley & Berry, 1994). Rashid et al. (2019) remind us that in interpretive research the involvement of the researcher in data collection is crucial, this also includes building rapport and trust between the researcher and participants. Using an interpretive case study approach allows to analyze the phenomenon in its natural context and accounting for the complex relationships as well as the individual experiences and perspectives of those involved.

Semi-structured interviews are a common method in case study research (Darke et al., 1998; Harrison et al., 2017). Hence, our case study approach relies heavily on the data based on the conducted interviews with participants (Kvale & Brinkmann, 2009). In line with the research objective, we have interviewed participants from a large family firm, which is operating in the manufacturing sector to better understand how strategic planning is applied within such contexts. The family firm characteristics of the case company serves rather as context and the family influence on strategic planning is not specifically analyzed within this research. Due to the sake of confidentiality, we only provide rough details on the company. The case study company generates roughly 1 billion EUR of revenues and employs around 5,000 employees. As a complementary data source, we have used documents, however it must be noted that there are little formal process documentations etc. on the strategic planning process due to the informal management style applied in the company. Data analysis has been done by a flexible thematic coding approach (Braun & Clarke, 2006; King, 1998, 2012). In total, we have conducted three interviews with employees from the management control

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department that are heavily involved in the planning procedures of the company. Details on the interviewees can be found below in Table 1.

Case	Industry	Function
A	Manufacturing	Head of Management Control
		Finance Business Partner
		Finance Business Partner

Table 1: Interview participants (created by the authors)

The interview guide considered four thematic categories. Overall, open questions were asked during the interviews and then probing allowed to generate the data needed to address the research question (King & Horrocks, 2010; Rubin & Rubin, 2012). At the beginning of each interview, general questions are asked about the company, the interviewee and their activities. The questions are asked considering the various professional backgrounds of the interviewee.

- Warm-up and introduction
- Status quo of management control (role of strategic controlling, organizational issues, structure and processes)
- Challenges (factors influencing strategic controlling and relevant challenges)
- Possible solutions (approaches to overcoming the challenges, further tools to be used in the future, the expansion of management control and benefits)
- Developments (developments, concluding remarks, open issues)

The generated data allowed in-depth and rich descriptions on the planning and budgeting approach of the case study company.

RESULTS AND DISCUSSION

Overview on the strategic planning procedures

The sample company adopts a top-down opening of the strategic planning procedures followed by a series of top-down bottom-up coordination during the development of strategic planning. In line with traditional approaches, here also the strategic planning procedures precede the operational procedures. A time frame is developed to organize these procedures. The approximate planning

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period is between September and December. For a time horizon of three years, explicit plans are made for all divisions from sales to earnings. This is in line with the results of Stonehouse & Pemberton (2002) who found in their study that 72 per cent of their sample adopted a planning horizon of one to three years. However, on the sales side, in our study a planning horizon of five years is defined. The data used is based on figures from previous years. The company analyzes past developments followed by an analysis of the macroeconomic environment. Based on this data, trends are identified by the division heads, sales managers and managing directors. Strategic areas of focus can then be derived from these trends. This approach brings together data from previous years and future-oriented information. Before the strategic goals are finalized, a preliminary consultation is carried out with the divisions and the managing directors. This enables an exchange in which both top-down and bottom-up ideas about sales, turnover and earnings can be exchanged. Once the strategic goals have been determined, they are communicated to the divisions. The divisions receive targets and planning assumptions that they must achieve in subsequent planning phases. Strategic planning is carried out through coordination within the divisions and between the divisions. The strategic objectives are ambitious and seen as important to be achieved by the management. The motivational aspect for the divisions is also an important aspect by following this approach. The divisions plan their area with the help of the given guidelines and then present their plans to the management. The dialogue with the management enables further adjustments to be made to the planning and targets. It is important to note that the figures are not planned by the management control department, which means that the specific figures are prepared by the individual divisions. The management control department serves as a coordinative and support instance in this process. This also includes critical validations of the planned figures.

Actual reports are an essential component of the planning foundation. The required figures are taken from the SAP system and Microsoft Excel reports. Regarding the personnel data there is another system available, which is used to extract data. So, the company is characterized by a heterogenous system landscape. The quality of the data plays an important role. Only with a sufficient data quality the figures provide a reasonable basis for making long-term forecasts. The company currently introduces SAP S/4 HANA and the quality of the data is constantly reviewed and adjusted at the same time. In addition to the data from the systems, market developments and competitors are analyzed manually.

The planning procedures were currently based entirely on Microsoft Excel, despite Microsoft Excel being "very error-prone and very complicated", it still offers a flexible approach. Due to the introduction of SAP Analytics Cloud (SAC) and the current implementation of SAP S/4 HANA, it is

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planned to mostly conduct the planning procedures in SAC in the future. However, Microsoft Excel will be additionally used alongside SAC, as SAC does not have all functionalities. For instance, SAC shows a superordinate compressed level in which the individual cost plans are summarized in just a few lines, which reduces the level of detail. However, SAC offers the option of always being able to access the latest version of the planning and assigning different authorizations to users, which is an important functionality due to data security reasons.

Currently, SAP Business Planning and Consolidation (BPC) is used by the company to obtain an overall, consolidated view of the company. There is great potential seen in introducing Big Data analyses, which allow analyses to be created automatically on a larger data basis. SAP S/4 HANA can also be used to create not only historic analyses, but also future-oriented analyses. As this can be done directly in the ERP system, this can be seen as a major advantage also for the planning procedures. A considerable amount of time currently goes into MS Teams meetings to exchange and coordinate information within the company. While documents can be edited in parallel, the latest version is freely accessible to all participants and changes can be tracked it is a very time-consuming exercise. However, an advantage of using Microsoft Teams is the reduction of email traffic.

The key figures summarize important internal and external relationships as well as the economic situation of the company. The following key figures, among others, are used for strategic planning: Return on Sales (ROS), Earnings before Interest and Tax (EBIT), sales, personnel (head count), CAPEX (investments), Cash Flow (inventories, receivables, liabilities) and material costs. These key figures are given to the divisions as planning assumptions. The divisions are responsible for achieving the specified targets within their planning.

Our sample company provides a vivid example of the rigidity of planning procedures and the prevalent perspective to consider annual years in the planning approach. Especially when looking at longer time periods the anticipation of changes and crises is increasingly challenging and impedes maintaining targets developed during the planning activities. If the plans deviate too strong from actual developments, adjusting these plans might be necessary. This also indicates that the planning procedures must not be overly static but rather a recurring process including flexible elements which allow an adjustment. As planning is a tool that defines objectives and monitors the achievement of set targets, it is well positioned to measure developments in various areas of the company. However, planning is confronted with problems when due to crises, defined targets are no longer achievable. This can be seen as a major burden when defined targets loose relevance as they cannot be considered as relevant anymore. Participants report on addressing this by implementing a rolling planning

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approach, which leads to more frequent planning iterations. However, it is also critically described that the amount of work involved in this is too high and available resources are not sufficient.

Participants also report heavily relying on standardized planning procedures for the individual divisions of a company and that these procedures support preparing the planning data. To do so, a common planning scheme describes data preparation, and this is seen as a helpful tool to standardize the planning process and support the employees in charge to fill out the planning templates. Moreover, participants report that the procedures could also be simplified by consolidating the system landscape so that functionalities currently covered by various systems are transferred into one system. Currently, several systems are used to collect, prepare and enter planning data. The case company strongly puts an emphasis on the next year and medium-term planning, which supports the operational character of medium-term planning activities, which is supported by the findings of Stonehouse & Pemberton (2002).

Applied strategic controlling instruments

While strategic controlling is seen as an important function by the company, operational instruments seem to play a more important role. The BCG matrix, scenario calculation and business cases are explicitly mentioned to be used as strategic controlling instruments. Interestingly, the environmental analysis was addressed when presenting the planning procedures, it was not explicitly addressed here. Business cases are not used by all divisions throughout the company but there is some kind of transformation office which provides a high-level overview of projects and developments. Future projects, strategic goals and trends are monitored, and measures are determined, such as the personnel and necessary competencies that are required, or which new digital systems are needed to sustain competitiveness on the market.

The BCG matrix is used to categorise the individual product groups in a slightly modified way. The classic BCG matrix is divided into four quadrants representing questions marks, stars, cash cows, and poor dogs measured by the relative market share and market growth. The product life cycle is used as an underlying logic. The company categorises products according to the matrix, but they do not explicitly use the name BCG matrix for the tool. While the scenario calculation tends to be categorised as an operational instrument, it can also be used in a strategic context as done by the company. Different scenarios of the future can be calculated based on historical data. One example mentioned by the participants is the selection of a new production site. The instrument is used to simulate potential effects of changing environmental indicators and thus the results provide a rough estimation of possible developments. The scenario calculation is implemented in Microsoft Excel. It is based on the

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income statement and balance sheet. Adjustments can be made for almost every item in the Profit & Loss (P&L) statement and the effects can be shown. Based on this, measures can be developed to reduce potential negative effects. In addition, also short-term trends are analysed, which exemplifies a rather operational application of the scenario calculation. For example, quantity effects, price effects or personnel changes are simulated by means of the scenario calculation.

Business cases are used in some divisions of the company. A P&L view is created at project level and the progress of the project is presented. The time horizon is usually ten years. By visualising the entire timeframe, it is possible to show whether a product will be profitable or not at the end of its life cycle. Participants emphasize that the advantage of the instrument is that it can provide a rather quick overview on the success of a project. While frequently the application of instruments is considered burdensome and time-consuming, regarding business cases the benefits seem to outweigh the efforts to apply the instrument.

In general, the application of specific strategic instruments seems to be limited, which is strongly supported by the literature (Kalkan & Bozkurt, 2013; Stonehouse & Pemberton, 2002). Operational topics seem to dominate the agendas of many firms and strategic instruments are often seen as too complex.

Experienced challenges within the strategic planning procedures

The participants report on several challenges they experienced when developing a strategic plan. These challenges include challenges inherent to strategic planning activities as well as organizational and administrative challenges. These are shown in Table 2:

Challenges experienced during planning	
Volatile market environment	-
Resources	Estimation of costs for materials, personnel, investments, etc.
	Employee qualification and attitude towards change
	Time constraints
Availability of data	Data quality and timeliness
	Maturity of digitalization
	Level of detail

Table 2: Challenges during strategic planning (created by the authors)

The highly volatile market environment poses severe challenges on the strategic planning process of the company. Crises such as the subprime mortgage financial crisis, COVID-19 or the war in Ukraine

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considerably complicate the definition of long-term targets. As crises can only be hardly anticipated, it is challenging to adapt planning for such a potential crisis. The COVID-19 pandemic was, for instance, addressed by the participants. The pandemic caused severe supply restrictions, which led to the fact that long-term plans could not always be considered as realistic anymore. Participants specifically pointed out that in volatile market environment contexts, it is crucial to be able to recognize changes quickly and adapt to them. According to one participant this process still takes too long.

The costs for personnel, materials, and energy are the basis for determining and calculating future sales, prices and profits. A high reliability of planning is therefore eminent. The discussions with participants show that an increase in costs means that targets are more difficult to achieve, even resulting in an adjustment of strategic targets. Personnel can be seen as a company's most important resource. Depending on the industry, personnel costs are often a major cost item and is therefore highly relevant when determining strategic goals. Employees must also possess an adequate qualification, and they must also accept and support the procedures and processes within the firm. Employee acceptance is essential, especially in contexts of transformation and change. The participants vividly described how it is a challenge to convey an understanding to the employees after processes have been changed. Changes are not always met with immediate acceptance, especially when employees have developed routines over several years and when there is a lack of understanding why a change is necessary. Additionally, the additional workload necessary to change processes can result in negative attitudes towards change. Participants report on an example of changing figures used as a planning foundation and management control was responsible for communicating the benefits of the change, the procedure and for providing general support. The new figures are not only necessary for planning, but also the performance of the divisions is monitored based on them. The figures should help responsible employees and division heads to plan their products better and to be able to monitor the achievement of plans. A profound understanding of the figures is essential as management control only provides support and that the divisions must calculate figures by their own. In the context of strategic planning, organizational or procedural changes can be a frequent outcome, so supporting such changes can be considered as an important element of strategic planning. Strategic planning requires a considerable amount of time and binds employee and management capacity during the planning process. The participants describe the time required to prepare the strategic plan as challenging. The strategic planning process usually takes about three months. During the planning phase all information is collected, validated, harmonized and plans developed. The effort involved is hence considered appropriate by the participants.

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Quality of data is of high importance in strategic as well as operational planning. Due to the introduction of SAP S/4 HANA data cleansing was on the agenda of the sample company. By doing so, data was analyzed, and it was decided which data will be imported into the new system. The process of data cleansing is extremely time-consuming and in the case of the sample company it is expected that this takes one to two years. After the cleansing, the data quality should be ensured, and reliable actual reports and other analyses should be retrieved based on the corrected data basis. Here it is important to note, that data management is an on-going task and clear responsibilities should be defined. Otherwise, the quality of data will subsequently erode. Not only quality, but also timeliness is crucial when analyzing figures. The timeliness of data is linked to the volatility of markets and resulting changes on the market. Due to the long planning horizon, the planned values can lose their up-to-dateness and deviate significantly from current developments and actual values. Participants report that data tends to be outdated as soon as it is entered into the system and a point in time must be found where no more new data entries are allowed as the coordinative process is too far advanced. This shows that it is already challenging to take actual data into account during planning, for instance planning premises. However, despite this, actual figures are less likely to substantially deviate too much from previous figures. It is important to not drag out the process to ensure more up-to-date figures, as these can also change on an hourly basis. It is important to find a balance whether it is worthwhile for the quality of the planning to take new values into account if they deviate significantly from the previous ones. Finding this balance is a challenge. Unexpected events or developments cause major deviations in the plans, which means that the data is no longer up to date. Such changes can have an impact on an entire industry, individual companies, divisions or the global economy.

Participants also report that digitalization in general represents a challenge. Older IT systems can only create analyses based on historical values. More current IT systems allow a certain degree of prediction by simulating future figures. However, the implementation of new IT systems is seen as extremely time-consuming and resource intensive. As a result, the implementation of new systems lasts several months to years and the full potential of new systems cannot be utilized in the early stages of the implementation.

Moreover, participants emphasize that the level of detail applied in the planning logic also is seen as a challenge. According to them it is important to understand what the levers are that have a major impact on planning. To plan all items to the last detail is seen as too resource-intensive and would not offer many benefits in terms of planning accuracy. It is important to focus on the drivers that have a strong impact on the key planning data and develop a detailed understanding on these and the effects. The level of detail in the case company has been adjusted and optimized in recent years

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according to feedback rounds. Upcoming planning rounds will be analyzed whether the level of detail is sufficient for the company or further adjustments are necessary. This also shows that strategic planning in all its facets is not a static process but might be adapted to develop the most appropriate planning approach for the company.

Participants elaborate on the process of implementing a more data-driven management approach. While in the past planning activities were partly based on gut feeling of division heads and managing directors it was intended to implement a decision-making approach that relies on valid data and reasonable analytic approaches rather than assumptions. Consequently, the level of detail was also continually adapted based on continuous feedback. When changing procedures and approaches, participants emphasize that it was realized that not every important detail could be considered in the past leading to inaccurate planning outcomes. Implementing changes here is a continuous process and feedback rounds help to recognize problems and adapt the process. Participants evaluate the implemented developments as positive, but further optimizations will be implemented when necessary.

CONCLUSIONS

Our study provides an interesting case of the strategic planning approach of a large family firm and contributes detailed insights into the procedures and application of strategic planning instruments. While the company sees a high relevance of strategic management and planning, the overall approach appears in some points rather operational. For instance, the planning horizon is three years and there is a strong focus on the annual year perspective, which becomes typically less relevant in long-term oriented planning. On the other side, rather formal planning procedures seem to be implemented, which limit the flexibility in dynamic contexts. An important issue addressed by the participants lies in IT systems, data availability, and quality. The system landscape is described as heterogenous, and the availability of up-to-date and correct data is seen as central challenges during the planning procedures.

Our findings provide several important theoretical and managerial implications. It still seems to be the case that the application of most of the strategic planning instruments is seen as too complex and resource intensive. So, the development of pragmatic tools may provide an important contribution to theory and practice. Moreover, it is recommended to implement homogenous IT systems throughout entire firms to have a seamless integration of systems and data, reducing manual tasks, side calculations increasing effectiveness and efficiency of planning procedures.

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Our study is characterized by several limitations, as every research activity. We have conducted a single case study, so generalization of findings might be limited. Moreover, our findings rely mostly on interviews with employees responsible for planning. Hence socially desirable answering could be a problem, however, we also received a very critical view into the internal procedures, for instance challenges experienced during strategic planning. Further research could increase our understanding of the IT and data related aspects of strategic planning. Moreover, more case studies could complement our findings.

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NETNOGRAPHY ON THE BACKGROUNDS AND CHALLENGES TOWARDS MINIMALISM

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ABSTRACT

The rise of digital communities has amplified the Minimalism movement, and it has emerged as a response to consumerism and the complexity of modern life. While often associated with a simplified aesthetic or lifestyle, minimalism encompasses deeper behavioural, emotional, and psychological dimensions that reflect changing consumer values and priorities. Despite its growing popularity, minimalism remains a complex and evolving phenomenon that is still not fully understood from a consumer behaviour perspective.

This study explores the multifaceted journey towards initial minimalism, using an innovative dual methodology approach supported by Generative AI to achieve an adequate understanding of consumer behaviour with an unprecedented volume of data. The data collected allowed a bidirectional analysis: manual categorization combined with machine learning categorization using large language models (LLM). This approach accelerated data processing in some cases by more than 1300 % compared to the manual method and allowed for a more adequate interpretation of all the associated factors and complexities.

Keywords: Minimalism, Consumer Behaviour, Netnography, Machine Learning, Artificial Intelligence, Innovation, Productivity.

1. INTRODUCTION

Consumer behaviour has been changing over time. According to Pangarkar et al. (2021), consumers are increasingly influenced by sustainable consumption practices and are aware of the benefits of the minimalist lifestyle. This transformation represents a profound change in consumer behaviour, moving away from traditional consumption patterns, making it essential to explore and analyze the foundations of this transformation.

The minimalist view began gaining momentum in the mid-1960s, significantly impacting various aspects of consumer culture, such as architecture, home design, and corporate advertising (Pracejus et

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al., 2006). Minimalism is associated with a lifestyle paradigm and philosophy that seeks to simplify and organize daily life practically, offering individuals a life free from significant worries (Black & Cherrier, 2010). Lee and Ahn (2016) also characterize Minimalism as a simplified lifestyle centred on owning less and reducing consumption.

Over the past decades, the concept has evolved considerably, particularly in technology, fashion, and web design (Wilson & Bellezza, 2022). Several authors have identified critical moments of change concerning Minimalism over the years. For instance, Moran (2015) points out that significant technology companies abruptly drove Minimalism in the mid-2000s by adopting sleeker and more organized designs. Freestone (2020) highlights a shift in the fashion world of the 1990s, marked by a simple aesthetic with monochromatic colour schemes. More recently, we can observe that COVID-19 and the resulting financial concerns have increased the population's interest in this lifestyle (Pangarkar et al., 2021).

Although there are several studies on the foundations and impacts of Minimalism, most focus on general aspects. There is a lack of in-depth analysis that explores how consumers interact with minimalist practices and how this affects people's daily lives in a synthesized way from various approaches. This research aims to fill this gap by offering a detailed perspective on the background of Minimalism and the challenges consumers face.

This research aims to identify the antecedents that motivate consumers to adopt a minimalist lifestyle and understand the main challenges consumers face during their journey towards Minimalism. The aim is to answer the following research questions: What are the antecedents of Minimalism, and what are the main challenges minimalist consumers face?

This research adopts a qualitative approach, resulting in a sequential exploratory study based on a netnographic approach to analyze qualitative data from interactions in specific online Reddit[1] groups. Subsequently, the data analysis is carried out first through manual categorization. Additionally, Generative AI models have been applied to analyze large volumes of data, thus identifying patterns and relations that are not evident through traditional methods. This innovative approach allows for a detailed analysis of a large volume of data and provides more profound and precise results on the behaviour of minimalist consumers.

[1] Reddit -Dive into anything. (n.d.).Reddit

Reddit. (2005). Reddit. Reddit.

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2. LITERATURE REVIEW

Although there are several studies on the foundations and impacts of minimalism, most focus on general aspects. This literature review aims to identify the antecedents that motivate consumers to adopt a minimalist lifestyle and understand the main challenges consumers face on the journey towards minimalism. It aims to answer the research questions regarding the antecedents of minimalism and the main challenges that minimalist consumers face.

2.1. Antecedent

Minimalism, as a philosophy of life, has received significant attention in recent years, having been adopted by individuals seeking a simpler and more meaningful life. Literature indicates that this type of consumer has backgrounds that play an important role in adopting this lifestyle, such as psychological, social, economic, environmental, and digital factors and the perception of value. Schiffman and Kanuk (2000) state that the awakening of this lifestyle may be motivated by internal stimuli found in the individual's physiology, emotional/cognitive processes, or external stimuli. Recent research by Jain et al. (2024) highlights that minimalistic consumption practices significantly enhance well-being among Generation Z, with satisfaction and happiness acting as mediators. This supports the psychological and emotional motivations for adopting minimalism. Chen and Liu (2023) further explore how consumers emotionally and cognitively respond to minimalist practices, emphasizing the role of internal motivations and perceived value in driving minimalist behavior. Mittal et al. (2023) provide a meta-analytic perspective on how customer satisfaction and value perception influence long-term loyalty. These insights are particularly relevant to minimalist consumers who prioritize quality and purpose over quantity.

In the digital scenario, the influence of social media is significant in modern consumption behaviour, as online and digital consumption behaviours have become increasingly relevant (Chen & Liu, 2023; Malik & Ishaq, 2023; Duong, 2023). Cal Newport (2019) introduced the concept of digital minimalism and described it as a technology philosophy where the time spent online is reduced to activities that genuinely optimize and value our principles, adding the happiness that this can bring us. He also highlighted the need to adopt a technology usage philosophy that provides clear answers about which tools to use and how to use them. For Aylsworth and Castro (2024), digital minimalism is a behavioural practice aligned with the Aristotelian notion of virtue as a habit. That is, how users avoid problematic technology use and prevent it from conflicting with their goals. Digital minimalism is a growing approach, with more and more studies investigating practices that help limit technology usage (Skivko et al., 2020). Skivko et al. (2020) identify three ways to regulate technological

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consumption on digital devices: temporary usage reduction, filtering the amount and content, and avoiding prolonged use. These authors also identify three types of digital disconnectors: digital diet (reducing technological consumption for a specific period to improve the quality of certain activities), digital detox (more intense than the digital diet, aiming for a "system restart"), and media asceticism (total denial of the use of digital devices). Within this disconnection logic, digital minimalism offers various approaches that help control digital presence and improve the quality of personal and social interactions, progressing towards greater privacy and reduced stress (Skivko et al., 2020).

In conclusion, minimalism reflects pursuing a simpler and more meaningful life, which may be driven by psychological, social, economic, environmental, and digital variables. These factors demonstrate the complexity and challenges generated by this phenomenon in society. The perception of value and quality of products plays a fundamental role in consumption choices and the preference for experiences over material goods (Wilson & Bellezza, 2022; Pangarkar et al., 2021; Chayka, 2020). Thus, in the everyday (material) context or the digital context, many consumers prioritize experiences that provide personal satisfaction and emotional enrichment over what is more fleeting and transient.

2.2. Challenges

Minimalism, as a lifestyle, offers notable benefits, but it is not without significant challenges. Chen and Liu (2023) also identify emotional resistance and social comparison as key barriers to maintaining minimalist practices, particularly in digital environments.

Social and cultural resistance represents one of the main obstacles to adopting minimalist consumption; many individuals find it difficult to resist the pressures of excessive consumption prevalent in modern society (Hutter & Hoffmann, 2013; Pangarkar et al., 2021). McCracken (1986) emphasises that material goods are used to generate and maintain a specific personal and social identity and highlights that people learn to define themselves through these material goods from childhood.

In materialistic societies, people see consumption as a means of gaining social acceptance and avoiding rejection. Rose and DeJesus (2007) state that this behaviour is a significant obstacle to adopting minimalist practices, mainly since consumption expresses group identity and belonging to specific cultures. In a context where the amount of material goods mediates this, minimalism can be interpreted as a threat to the social identity built over time. Thus, social and cultural resistance to minimalism is deeply rooted in the consumption pressures that permeate modern society (McCracken, 1986).

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Financial management can also be challenging, especially for those who must balance their minimalist aspirations with their economic realities (Wilson & Bellezza, 2022; Lastovicka et al., 1999; Pangarkar et al., 2021). Craig-Lees and Hill (2002) highlight that those who choose simple lifestyles are individuals with access to independent financial resources, can earn a high income, and are more educated. However, the minimalist individual is not restricted to high-class people, nor is there, in fact, any restriction regarding social class (Cruz, 2019). For those who do not possess such high economic power, Kasser (2003) suggests budgeting strategies that align spending with personal values and needs, thereby avoiding unnecessary expenses that may contribute to greater stress. The author also states that these individuals should prioritise enriching experiences over material goods.

Another significant challenge is maintaining a minimalist mindset over time. There is constant exposure and pressure to consume, with social media and advertising playing a prominent role here. These pressures can hinder adherence to minimalist principles (Chen & Liu, 2023; Malik & Ishaq, 2023; Duong, 2023). The constant comparison with trends is evident, intensified by advertising, sponsored products, and peer ownership (Mamede, 2021). Malik and Ishaq (2023) and Duong (2023) agree with other authors, noting that social media intensifies social comparison and promotes trends incompatible with minimalist principles. They also emphasise that advertising creates artificial desires and fosters a culture of excessive consumption.

Developing a new relationship with material goods and redefining the value of possessions can be emotionally challenging (Pangarkar et al., 2021). Schor (1999) highlights that excessive consumption is often driven by emotions we are feeling in the moment. Redefining the value of material goods involves a precise emotional process in which individuals must reassess the emotions associated with their acquisitions (Schor, 1999). Heath and Potter (2005) point out that the redefinition of the value of material goods may be related to social differentiation, meaning that individuals need to understand how their consumption choices may be associated with the desire to be authentic.

2.3.Conclusion

In summary, minimalism as a lifestyle offers a promising approach for those seeking a balanced and meaningful life. However, it is crucial to recognize the multiple factors influencing this choice and the challenges that arise. Understanding these aspects provides a better comprehension to support individuals on their journey toward a minimalist life (Pangarkar et al., 2021; Wilson & Bellezza, 2022; Chen & Liu, 2023; Malik & Ishaq, 2023; Duong, 2023). Overall, there is a consensus that minimalism is based on pursuing a simple lifestyle/quality of life, which involves reducing excessive consumption

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and significantly impacts social relationships, physical and mental health, and financial stability (Rojas & Mocarzel, 2015).

3. METHODOLOGY

Our proposal follows a sequential exploratory study, a scientific approach suitable when there is little prior knowledge about the topic. The initial phase serves to familiarise with minimalist groups to understand the subject better.

Data was collected from interactions with users on the Reddit application, specifically in the groups [1]r/minimalism and r/digitalminimalism. The first step was to select all necessary information about what motivates consumers on this journey towards minimalism, what challenges are inherent to this change, and what results have been achieved.

In the first phase, data categorisation was performed manually, supported by the Nvivo software, which allows for data import and organisation from various sources and the definition of categories.

In the second phase of the analysis, Generative AI was employed, with the assistance of a GPT Model. This analysis tool makes it possible to analyse large volumes of data, as it possesses increasingly advanced analytical capabilities. This is one of the significant advantages of using artificial intelligence.

After the information was provided through the previously mentioned processes, a comparative analysis of the results obtained between artificial intelligence models and the manual model (Nvivo) was conducted. This entire flow was organised based on the CRISP-DM methodology, a widely used model in data science processes.

The choice of this process was a challenge, primarily due to the uncertainty about the type of responses that would be obtained, as all comments are gathered spontaneously and informally. This also contributes to making the entire process innovative.

4. RESULTS

To answer the research questions, what are the antecedents of minimalism and what are the main

[1] r/minimalism. (n.d.). Reddit. https://www.reddit.com/r/minimalism/

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challenges faced on this journey, we applied the defined methodology.

4.1. Exploratory Data Analysis

The Nvivo tool helps with manual categorization and was the first to be carried out so that the data provided by ChatGPT-4o would not bias the investigator's perception, influencing the manual analysis. At this step, two Reddit[1] groups, minimalism and digital minimalism, were analyzed, with the minimalism group being the first subject of study. This manual categorization process in the two groups under analysis resulted in 128 results (see Table 1).

Subsequently, the analysis was conducted using the AI tool ChatGPT-4o and a document was downloaded containing all the information generated by the script in Python, as previously described. In this process, questions were posed to the tool to identify in the document all occurrences responsible for the antecedents of minimalism and the challenges of this process, and it also identified subcategories associated with each of the factors. As a result, 800 posts (300,553 words) were downloaded and analyzed, leading to 610 occurrences identified by this tool (see Table 1).

Regarding the prompts used in ChatGPT-4o, for the initial categorization, "Identify in the attached document which factors precede minimalism," occurrence of factors, "Besides these factors you identified, are there no further evidence throughout the document? As well as the total number of occurrences for the identified factors and perform a final analysis of the attached file to check if you missed any relevant information," categories and subcategories "create categories and subcategories of the identified factors and the total occurrences in each of the factors," verification of results "Among the identified factors, is there any that fits better with the information extracted from the attached file."

Table 1 – Final Data divided by research group.

Final Dataset

	Nvivo	ChatGPT-4o
Backgrounds		
Psychological Factors	12	75
Social Factors	11	57
Economic Factors	6	29

[1] Reddit -Dive into anything. (n.d.).Reddit

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Environmental Factors	3	35	
Digital Interactions	15		40
Perception of Value	17	60	
Educational Factors	8		15
Family Factors	2	24	
CHALLENGES			
Social and Cultural Resistance	10	71	
Financial Management	5	35	
Consistency of Minimalist Mindset	15	55	
Development of a New Relationship with Material Goods	13		38
Digital & Technological Challenges	11	76	
Total of Interactions	128	610	

Through this framework, it is possible to understand better the differences in everyday minimalism, as well as the differences in results that cannot be seen together, making the analytical process more precise.

4.2. Nvivo Results vs ChatGPT-4o Results

At this point, an individual descriptive analysis was conducted on the results obtained from each tool used, Nvivo and ChatGPT-4o. At this stage, an analysis was also carried out on the intersection of the data obtained from the two analyses to verify possible connections between factors and methodologies. In addition to the factors mentioned in the literature review, two more antecedents (education and family) and one more challenge (digital and technological), which emerged from the data, were also analyzed.

4.2.1. Nvivo Results

About the Nvivo analysis, as far as antecedents are concerned, the most significant factors included Psychological Factors related to emotional and cognitive aspects that influence the adoption of minimalism, Social Factors, the influence of the social environment and perceived value, how consumers perceive the value of material goods and experiences as motivations for minimalism. Digital interactions also emerged as the most relevant antecedent in this analysis, especially in digital minimalism, which is intrinsically related to the increased use of technology.

Consistency of the Minimalist Mentality stood out as the most significant challenge, reflecting difficulties in maintaining a minimalist approach consistently over time. Another major challenge was developing a new relationship with material goods related to changing perceptions and attitudes towards material property. Digital and Technological Challenges were also notable, relating more

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particularly to digital minimalism, highlighting issues such as technological dependency and digital information overload.

Overall, the Nvivo analysis recorded a total of 128 occurrences, with 74 related to antecedents and 54 to challenges. The results highlighted psychological and social factors and the perception of value as central antecedents to minimalism, as well as digital interactions, the latter being an increasingly present phenomenon, while the main challenges were maintaining a minimalist mentality and developing a new relationship with material goods. The challenge that obtained the least results was financial management, corroborating what other authors have said in the past that this type of consumer or this decision-making is often not made because of the economic difficulties a person is going through. This data provides a deeper understanding of the motivations and obstacles faced by minimalist consumers, emphasising the complexities involved in adopting and maintaining a minimalist lifestyle.

4.2.2. ChatGPT-4o Results

Regarding the final data provided by the ChatGPT-4o tool, as previously mentioned, this tool not only identified occurrences in the provided document but also subcategorized all the collected information, allowing for a more detailed analysis of the final information.

For the antecedents of minimalism, psychological factors were the factor that registered the most occurrences, especially related to aspects such as mental health, well-being and a philosophical approach to reducing material accumulation. Perceived value emerged as another important antecedent, particularly related to appreciating quality over quantity and influencing lifestyle choices. Social factors also played an important role, including influences such as generational attitudes towards consumption, cultural movements that encouraged a simpler lifestyle, as well as the rejection of advertising and mass consumption. The fields of digital interactions and family factors were also interesting, namely by linking the impact of technology on family dynamics and children's well-being.

Regarding challenges, the ChatGPT-4o analysis revealed social and cultural resistance as the biggest barrier related to social pressures and significant expectations that complicate the adoption of minimalism. Next, the consistency of the minimalist mentality also emerged as a significant challenge, reflecting the ongoing struggle to maintain minimalist habits while avoiding constant external pressures and personal limitations. However, digital and technological challenges registered the highest number of occurrences, pointing to issues such as managing the use of technology, balancing

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personal and professional life, and the intentional use of technology and overcoming technology addiction.

The results highlight the role of psychological and social factors as key motivators for adopting minimalism while emphasising the significant challenges posed by cultural expectations and digital dependence. Value perceptions provide an understanding of consumers' motivations and obstacles on the road to minimalism, emphasising the transformative role of psychological resilience and social adaptation in sustaining a minimalist lifestyle.

In addition to these results, the prompt was also used in ChatGPT-4o to understand the relationships between some specific backgrounds and certain challenges and to perceive some interconnections.

As a result of this prompt, ChatGPT-4o related the antecedent of psychological factors to the challenge of maintaining a minimalist mindset, stating that "psychological factors such as stress, anxiety, and the need for control are often motivators for individuals to adopt minimalism, as they drive the desire for a simpler and less cluttered life." It was also mentioned that "several users noted the difficulty in maintaining minimalist habits due to underlying psychological issues."

ChatGPT-4o also related the antecedent of social factors to the challenge of social and cultural resistance, justified by "social factors include the influence of family, friends, and cultural norms, which can both support and hinder the adoption of minimalism. Cultural resistance often results from social expectations and norms prioritising material wealth and consumption," adding that "several users discussed the difficulty of maintaining minimalism when surrounded by a culture that does not understand or support minimalist values".

The antecedent of digital interactions is related to digital and technological challenges, according to ChatGPT-4o, as "digital interactions are a significant factor for those seeking digital minimalism. The challenge lies in balancing technology use, avoiding digital clutter and dependency," as some users "highlighted issues such as the addictive nature of social media and the need for a digital detox to better manage their digital environments."

Lastly, it linked the antecedent of value perception with the challenge of developing a new relationship with material goods, justified by "the perception of value shifts from material goods to experiences and intrinsic values in minimalism. This shift requires developing a new relationship with material goods, focused on utility and emotional connection rather than quantity," with "many users

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describing their journey of valuing experiences over possessions and the initial challenges they faced in redefining their sense of value and worthiness."

Through these interconnections identified by ChatGPT-4o, the potential for analysis of this tool is evident; it can create complex analyses from large volumes of data through prompts.

4.3. Discussion

The results obtained in this research show a clear difference in the occurrences identified through the Nvivo and ChatGPT-4o tools. While Nvivo presented 128 interactions, ChatGPT-4o identified 610 results, showing a superior analytical capacity; however, the number of data analysed was also much higher and needed less time. This contrast is evident in the analysis of the antecedents and challenges of minimalism. Regarding antecedents, psychological and social factors and the perception of value stood out as the main drivers for adopting minimalism. As for the challenges, the consistency of the minimalist mentality and developing a new relationship with material goods were the most prevalent. Digital and technological challenges were more relevant in the digital context, reflecting the growing concern about the impact of technology on the minimalist lifestyle. In addition to these aspects, the results highlight the importance of advanced data analysis tools to understand minimalist consumers' behaviours and motivations better, as explored in this study.

4.3.1. Backgrounds

Regarding the factors of the backgrounds of minimalism, in terms of psychological factors are one of the reasons people opt for a more minimalist life "as a response to the stress and anxiety caused by clutter and excess possessions." However, "reducing the use of digital devices is seen as a way to improve mental health" because "the constant pressure to stay connected is causing an increase in levels of anxiety and depression," similar to the effects of excessive tangible goods. These results align with Kasser (2003), who noted that people focused on material goods and acquiring wealth often experience higher levels of depression, anxiety, and dissatisfaction.

In summary, the most prominent antecedents of daily minimalism were found in psychological factors and value perception. For digital minimalism, the most significant antecedent was found in digital interactions, followed by psychological and social factors. When analysing which background is most important on the journey towards minimalism, there appears to be a balance in the analysis groups regarding social factors, followed by psychological factors, leading to the conclusion that these play a fundamental role in the antecedents in both contexts.

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4.3.2. Challenges

Regarding the challenges and social and cultural resistance, the extracted results showed the same trend in both groups analysed, with some users mentioning that minimalism is often “a strange kind of competition rather than something to connect us and offer advice and support.” In contrast, others resist this philosophy, highlighting that minimalism “makes being poor fashionable, so people compete to see who can be poorer.” This thinking may be linked to the need to maintain a certain personal and social identity, where people tend to define themselves through material possessions (Hutter & Hoffmann, 2013; Pangarkar et al., 2021).

Finally, the digital and technological challenges that emerged from the data (not identified in the existing literature) show a clear superiority of recorded interactions. Users highlight that the intentional use of technology "involves actively choosing tools that add value and eliminating those that cause distractions," as well as overcoming technology addiction as one of the major challenges to be addressed on the path to digital minimalism, which "requires a conscious effort to limit screen time and find alternative activities." Another obstacle to be overcome mentioned relates to balancing personal and professional life, as some users stated that "balancing personal and professional life in a digital environment requires discipline and the ability to disconnect from work after hours.".

In conclusion, analysing in general terms, the challenges with the greatest prominence towards minimalism were the consistency of the minimalist mindset and social and cultural resistance, appearing to show greater balance in both groups analysed, suggesting their importance in both contexts. Financial management recorded the fewest occurrences in the two analyses, representing a less prominent challenge. Upon reviewing the total interactions, the main challenges seem to be related to digital and technological issues and social and cultural resistance.

4.4. Comparison of the two methods

The comparison between the two analysis processes manual and machine learning revealed fundamental differences in terms of analysis time, data volume, and depth of insights.

In the manual process conducted using Nvivo, approximately 15 hours were required to analyze and categorize 60 posts. One of the main challenges of this method was the subjectivity of the responses, which required greater attention from the researcher to understand nuances, irony, and subtleties in communication. However, this subjectivity also represented an advantage, as human analysis allows

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for a deeper and more contextual interpretation of the messages, often involving implicit elements that are difficult to capture through automated methods.

In contrast, the automated process, conducted with ChatGPT-4o, took approximately 3 hours to analyze a total of 800 posts. The main advantage of this method was the ability to process large volumes of data in a significantly shorter time, with substantially increased efficiency. Moreover, artificial intelligence could perform detailed subcategorization, generating additional insights that would be highly labor-intensive to obtain manually. The automated analysis proved particularly effective in identifying complex patterns and performing meticulous categorization, providing a holistic data view.

Regarding productivity, ChatGPT-4o analyzed approximately 1300% more posts than the traditional method. Regarding the number of results obtained, Nvivo identified 128 results, while ChatGPT-4o obtained 610, indicating that automated analysis was about 476% more productive. When broken down by category, the productivity rate of ChatGPT-4o compared to Nvivo for minimalism antecedents was approximately 370%, while for challenges, it was 671%. The productivity in relation to time was 500%.

The average productivity of both methods can be summarized as follows:

$$Average\ productivity\ (\%) = \frac{500 + 1333{,}33 + 476{,}56}{3} = 769{,}96\ \%$$

Therefore, using artificial intelligence tools, such as ChatGPT-4o, has proven to be highly advantageous for large-scale analyses, not only significantly reducing the time required for analysis but also increasing the depth, detail, and scope of data categorization. The ability of AI to handle large volumes of information efficiently and identify complex patterns provides a substantial contribution to consumer behaviour analysis, surpassing many of the limitations of traditional manual analysis methods.

5. CONCLUSION

This study highlights the innovative methodologies used to analyse the antecedents and challenges of minimalism, combining traditional qualitative techniques with advanced machine learning tools. The dual approach ensured a comprehensive exploration of the data, uniting the depth of human interpretation with the efficiency and scalability of artificial intelligence.

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The key results highlight the value of this hybrid methodological approach. While Nvivo offered detailed interpretations based on human expertise, making it easier to perceive the subjectivity of the responses obtained, ChatGPT-4o expanded the volume of analysis, providing deeper data on digital interactions, perceptions of value and challenges such as technological dependence and social resistance. The synergy between the two methods provided a multidimensional understanding of minimalist behaviour, underlining the importance of methodological innovation in contemporary consumer research.

The intersection of technology and consumer behaviour analysis not only helps companies stay ahead of the curve, but also promotes innovation in customer-centric strategies. These conclusions emphasise the importance of continuous alignment with technological advances and consumer needs to remain relevant in the ever-changing market landscape.

However, although this research is innovative in many aspects, it presents some limitations that must be acknowledged, and with this, we propose some directions for future investigations. Among them is the impact of minimalism on well-being and happiness, segmentation of minimalist consumers based on different factors, exploring the financial impact of minimalist practices in the long term, practical strategies to overcome the identified challenges, a more detailed analysis of the influence of digital culture on minimalism, determining the different types of minimalist consumers, as well as a geographical sample of each of them and understanding whether the journey towards minimalism is worthwhile or not.

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THE ROLE OF GREEN MARKETING PRACTICES IN ENHANCING CONSUMER LOYALTY AND PROMOTING ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

Green marketing is a sought-after marketing strategy that enables businesses to address environmental concerns of consumers, in a quest for establishing powerful loyalty relationships.

This paper examines the contribution of green marketing practices of wood and furniture companies in customer loyalty and environmental sustainability using a sample of 604 individuals. In a quantitative study, data were collected using a Likert scale questionnaire, focusing on green purchasing behaviour, purchasing decision determinants, and green marketing practices.

The result shows there is a stronger environmental consciousness among consumers and a willingness on their part to support firms using green marketing strategies. In addition, environmental impact, price, and quality play a critical role in supporting green marketing. The usage of green strategies, for example, using environmental-friendly raw materials, eco-labelling, branding, and environmental-friendly advertisement, improves customer trust and loyalty. At the same time, there is a problem of additional costs of using sustainable practices, along with a threat of greenwashing, which can reduce business credibility.

The study is of great practical utility, and it is suggested that companies make investment in creative and sustainable marketing practices in an attempt to enhance customer loyalty. The study contributes to literature in its provision of evidence on environmental sustainability and its nexus with green marketing. The study outcomes point towards highlighting customer education and awareness and provide guidance for subsequent studies in this regard.

Keywords: green products; consumer awareness; green marketing; GPB; loyalty; consumer awareness; green marketing,

INTRODUCTION

This study aims to investigate the influence of selected green marketing strategies on increasing consumer loyalty and sustainable consumption. The study focuses on how eco-branding, eco-labeling,

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green visuals, and green advertising influence consumer attitude and loyalty toward environmentally responsible companies while also identifying the practical implications of the practices for sustainable brand-consumer relationships.

One of the greatest concerns of current civilization is environmental sustainability, as human activity on Earth is reaching alarming heights (Steffen et al., 2015). Since the industrial revolution, indiscriminate utilization of natural resources and environmental degradation have led to extreme changes in ecosystems, compromising living standard and biodiversity (Rockström et al., 2009). Consumers have, in this respect, become highly responsive to environmental aspects of consumed products and businesses they support (White et al., 2019).

Green marketing is now a point of interest for businesses in a quest to make business operations adhere to concepts of sustainability (Leonidou et al, 2013). Green marketing is a set of practices for producing, marketing, and delivering environmental-friendly products (Peattie & Crane, 2005). Besides its contribution towards environmental conservation, green marketing enhances corporate image, customer loyalty, and business competitiveness (Rahbar & Wahid, 2011).

Evidence suggests that environmental-friendly practices in businesses can positively contribute to consumer behaviour (Nguyen et al., 2021). However, a lack of awareness of green practices and green products leads to a gap between corresponding strategies being practiced and consumer demand for it (Gleim et al., 2013). This study attempts to identify the role of green marketing of wood and furniture products, in customer loyalty improvements by examining customer preference and attitude, along with strategies for supporting environmental sustainability. At the same time, it attempts to address firms' barriers in adopting these practices and provides solutions for a firm relationship of trust among consumers.

Green Purchase Intention (GPI) is highly influenced by the attitude and perception of green products, along with environmental concerns of consumers. Green product purchasing intention is, in particular, among the strongest predictors of green purchasing behaviour (Jaiswal & Kant, 2017). Some of the key determinants of green purchasing behaviour include environmental awareness, social values, and perception of green advertisement and eco-labeling by consumers (White et al., 2019).

Increased demand for green products has led firms to incorporate green strategies in business. Green marketing practices give firms a competitive advantage and customer loyalty since they assure transparency in environmental communications (Leonidou et al., 2013). However, there have been concerns about the genuineness of green products and production costs (Chen & Chang, 2013).

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This study is an effort to examine green marketing practices and their contribution to customer behavior and loyalty. The study is based on evidence gathered through field research and provides practical and theoretical suggestions for linking green marketing with sustainable development.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

Introduction to Green Marketing

Green marketing, or environmental marketing, is a process of producing and marketing products and services in an environmentally friendly manner. This approach includes practices that minimize business environmental footprints in response to increasing consumer concerns about sustainability (Alkhatib, S. et al., 2023, Kumar et al., 2025).

The market for green products in the wood and furniture sector is constantly growing, as consumers place increasing emphasis on the origin and sustainability of materials. The need for responsible management of natural resources and protection of biodiversity has led to the development of new wood processing technologies that contribute to the sustainability of the industry (Schubert et al., 2022). Consumers now have a clearer understanding of the environmental impact of their purchasing decisions, which is driving demand for sustainable products (Chen & Chang, 2013). Since the 1990s, studies have documented a rise in consumer awareness of environmental issues, leading to increased interest in products with eco-friendly attributes (Erickson & Kramer-Leblanc, 1991). This trend has accelerated over the following decades as ongoing environmental challenges, such as climate change and biodiversity loss, have further fueled demand for sustainable products (Harris, 2006; Tantawi et al., 2009).

Businesses, recognizing this shift in consumer attitudes, have begun adopting green marketing practices to align their products with growing expectations for environmental responsibility (Polonsky, 2011). Green marketing can involve developing new, greener products, utilizing sustainable materials and production processes, and effectively communicating these efforts to consumers through marketing strategies (Peattie & Crane, 2005). Green marketing practices, aside from being an environmental necessity, also present a business opportunity. By emphasizing the value of sustainability, businesses can differentiate themselves in the market and strengthen customer loyalty (Ottman, Stafford, & Hartman, 2006). This section summarizes the literature on green marketing, its connection to consumer loyalty and sustainability, and the challenges associated with greenwashing.

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Green Marketing Strategies

Green marketing strategies include the promotion of products that are designed to be sustainable throughout their life cycle, from raw material supply to disposal. Using certified materials and production processes, such as Forest Stewardship Council (FSC) certification, which proves that timber comes from responsibly managed forests, is one of the most important green marketing strategies. (Rametsteiner & Simula, 2003). Papadopoulos et al. (2010) demonstrate that consumers in Greece are willing to pay up to 6% more for environmentally certified wood products.

Another crucial ingredient of green marketing involves the use of green technologies and new manufacturing processes that are efficient at saving resources and minimizing the output of carbon. Companies use communication strategies for the marketing of green products by employing the use of green reports, packages, and ads for elevating the consumer knowledge and admiration of green products (Hartmann & Ibáñez, 2012).

The green marketing strategies include product modification, adopting sustainable production methods, green promotion, and using eco-friendly packages (Kumar P.& Ghodeswar B., 2015). Businesses implement various green marketing approaches, including:

- Developing sustainable products: Firms invest in environmentally friendly production methods, using recyclable materials and reducing energy consumption (Leonidou, et. al, 2013). The integration of biodegradable materials and sustainable supply chain practices is essential to reducing environmental impact (Dangelico & Pujari, 2010).

- Green marketing techniques: using environmentally responsible methods to promote products and services (Kontogianni & Kouthoeris, 2011).

- Promoting environmental awareness: through educational campaigns and transparent communication practices, companies enhance consumer awareness (Peattie, 2001).

Impact of Green Marketing on Customer Loyalty

Consumer loyalty is a complex term that suggests that the consumer prefers a brand or the product over competing products despite the presence of the latter. Green marketing boosts consumer loyalty by highlighting the company's green commitments and the consumer expectation for greenness levels (Ottman, 2011; Singh, & Singh, 2025).

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Consumers with green orientation are likely to be attracted by and remain loyal to firms that embrace green principles in operations. The genuineness and sincerity of green messages that firms send within the context of Ethical Corporate Communication are likely to build consumer confidence and subsequent loyalty (Parguel et al., 2011). Consumers purchasing green products are likely to be committed to firms that actively practice green practices. The practice should be transparent since greenwashing practices are likely to be counter-productive (Chen & Chang, 2013). Consumers are likely to turn disloyal if they feel that firms are greenwashing since it creates negative word of mouth and brand harm (Delmas & Burbano, 2011).

Consumers are likely to patronize enterprises that adopt green practices, as indicated by research. Simultaneously, the lack of knowledge of green practices holds back extensive utilization of green products. Green marketing practices are likely to enhance consumer loyalty, as indicated by the study. Of particular note are enterprises that adopt green practices that form positive attitudes with customers that ultimately enhance satisfaction and loyalty (Kavitha, 2023). Satisfaction with the environment has also been indicated to be crucial for consumer loyalty (Suki, 2019).

Consumer Behaviour and Green Marketing

Shifting consumer awareness about the environment is triggering consumption behavior alterations. Consumers are more likely toward products and services that are perceived to be green, and it influences the marketing strategies of firms. Green Purchase Intention (GPI) is determined by a number of psychological, social, and economic determinants including green awareness, perceived quality of green products, and social influence (White et al., 2019; Jaiswal & Kant, 2017).

Increased awareness of the environment has led the way for the new consumer that cares for products and services with negligible environmental impact (Peattie, 2010). The new consumer is prepared to spend more for products that cause less pollution, conserve resources, and are environmentally friendly with fewer carbon emissions. Further, consumer reliance on eco-labels has changed consumer thinking by reducing the importance of brand name. Consumers are now opting for third-party endorsements as the sign of credibility that has become the new form of brand allegiance that contrasts with the traditional brand allegiance (Testa et al., 2019).

Studies indicate that eco-friendly customers have a higher tendency to develop strong brand loyalty with those companies that actively address the concerns of sustainability (Rahbar & Wahid, 2011). Additionally, providing clear and accurate information about the green attributes of the

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product enhances the consumer perceptions of the company's authenticity and credibility (Parguel et al., 2011).

Mechanisms of Green Marketing Impact on Sustainability

Not just does green marketing reinforce consumer loyalty but it directly assists with making the environment more sustainable. Businesses that adopt green practices eliminate negative externalities such as pollution, overexploitation of resources, and wastage (White, Habib, & Hardisty, 2019).

Consequently, the promotion of green products increases the demand for green products, encouraging more businesses to embrace environmentally friendly practices. The demand triggers the supply of more green products, ultimately bringing positive contributions for the environment (Leonidou et al., 2013).

Green marketing contributes to sustainability in several ways:

• Education and Consciousness: It enhances consumer awareness of the environment, resulting in heightened ecological awareness (Chea, 2024).

• Green Product Promotion: Enables the utilization of products with fewer environmentally negative impacts, reducing pollution and the use of resources (Alkhatib et al., 2023).
• Shaping consumer behaviour: Positively affects consumer attitudes by enhancing consumer confidence and transparency regarding the green performance of products (Rahbar & Wahid, 2011).

• Green Purchase Intention (GPI): Has the ability to increase consumer purchase intention if the information conveyed is credible and accurate (Leonidou et al., 2011).

Greenwashing: challenges and risks

While green practices and green marketing are expected to build consumer loyalty and ensure the sustainability of the environment, they are filled with great implementation difficulties for businesses. The most prominent challenge for businesses entails the cost of developing and manufacturing environmentally friendly products. To offset these challenges, businesses tend to adopt three core green marketing strategies that are green innovation, green organization, and green alliances (Cronin et al., 2011).

Conversely, customers are likely to find it difficult to differentiate between genuinely green businesses and greenwashing businesses owing to the latter's deceitful marketing practices and the

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company's lack of transparency (Gleim et al., 2013). The greenwashing practice of presenting green credentials while being environmentally irresponsible puts the consumer at the risk of serious consequences and compromises the company's ability to thrive over the long term. Empirical analysis points out that 45% of customers struggle with differentiating between green businesses and greenwashing businesses (Delmas & Burbano, 2011). To mitigate such practice, increased transparency and third-party certification are required.

Research Hypotheses

From the analysis of the literature and the empirical evidence, the hypotheses are the following: **H1**: Green marketing practices are highly successful at raising consumer allegiance and promoting eco-friendliness.

H2: Environmental advertising and eco-labelling increase consumers' purchase intention and consumer confidence in wood and furniture products.
H3: Educating and informing customers regarding green products increases demand and the premium they are willing to pay for green products.

Findings of the Literature Review

Literature identifies the ability of green marketing for enhancing consumer loyalty and sustainability. Companies that adopt green practices and market green products are likely to be trusted by the consumer and build brand loyalty. Green practices are advantageous for the company, consumer and the world despite the challenge they are facing. But it solely depends upon the sincerity of practices and transparency of the company firm. The aim of the study here is to progress the knowledge by exploring the position of green marketing with the perspectives of consumer behaviour and market practices.

Research Method

It employed the study design that was quantitative with the administration of the standardized questionnaire. The population of 604 subjects were sampled by random sampling for population representation purpose. The six-point Likert scale questionnaire was administered for the measurement of environmental awareness, green consumer behaviour, and consumer loyalty.

Reliability of the measurement tools was confirmed by Cronbach's alpha with the tool scales demonstrating good reliability (>0.85) for excellent internal consistency. Statistical methods were

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employed in analyzing the data comprising the demographic attributes and the principal variables through descriptive analysis and structural equation modeling (SEM) for the testing of the study hypotheses. Statistical procedures were carried out with the SPSS computer program. This methodological approach enabled the collection of reliable data, facilitating an in-depth understanding of the relationship between environmental awareness, green consumer behavior, and loyalty. The findings provide valuable insights to support sustainability efforts."

RESULTS

The outcome of this survey is based on statistical analysis of the data obtained from a sample of 604 participants. Aims are to measure the influence of green marketing practices on consumers' behaviour, loyalty and support for green practices. The research hypotheses were tested by tabulation descriptive statistics and inferential analysis techniques.

The findings present robust linkages between perceived corporate environmental responsibleness (PCER) and goal loyalty, but also reveal several constraints and barriers. Findings reveal positive relationships between perceived corporate environmental responsibility and consumer loyalty, but expose barriers and challenges.

Demographic characteristics

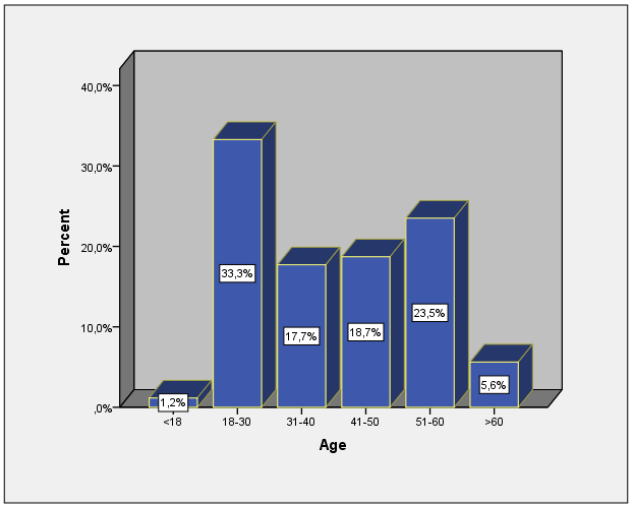
Sample (N=604): 66.4% of the participants were females and 33.6% were males. Most were aged 18-30 years (33.3%), and had the lowest income category <500€.(42,9%).

Behaviour of Green Buying

Consumers' green product attitudes were assessed using several different items of the Likert scale.

48.8% agreed that they are environmentally mindful of the products they buy.

58,4% reported that they don't buy products with negative impacts on the environment.



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38,7% bought products solely due to the green characteristics of the products.

Positive green consumption attitudes were present but were hindered by the lack of accessible information and cost perceptions.

Green Marketing and Sustainability

Participants of the sample were asked to rate the severity of the environmental problems using a five-point Likert scale. The environmental problems are listed by descending mean. All the problems are labeled as being highly serious if they contain a mean value of more than 4.

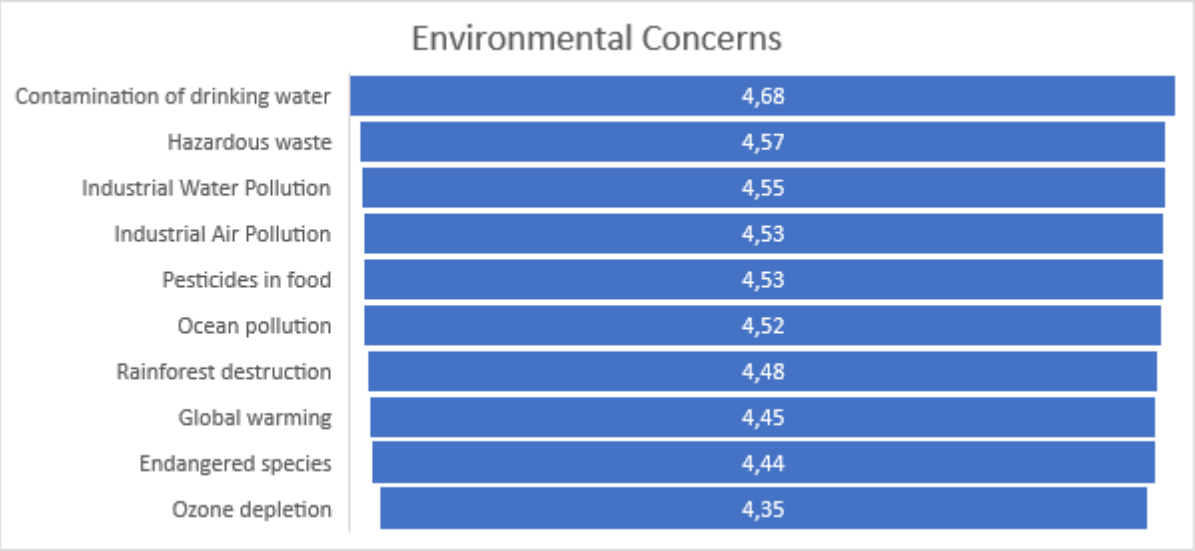


Figure 2. Environmental Concerns

Contribution of green marketing toward sustainability was explored with 19 questions. The result identifies that:

- Disposal of wastes environmentally responsibly enjoyed the most acceptable rate of Marketing practice (m.t. = 4.27).

- Implementation of alternative energies and personnel training were scored highly (m.t. > 4).
- The use of eco-labelling and advertising had the lowest acceptance (m.t. = 3.69).

Impact of Green Practices on Customer Loyalty

1. Customer Loyalty toward Green Businesses

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From the study outcome, 58% of the participants indicated that they are more likely to purchase again from environmentally responsible operation firms. In addition, 63.5% of the participants indicated that they are committed customers of environmentally responsible operation firms (waste minimization, material recycling, etc.).

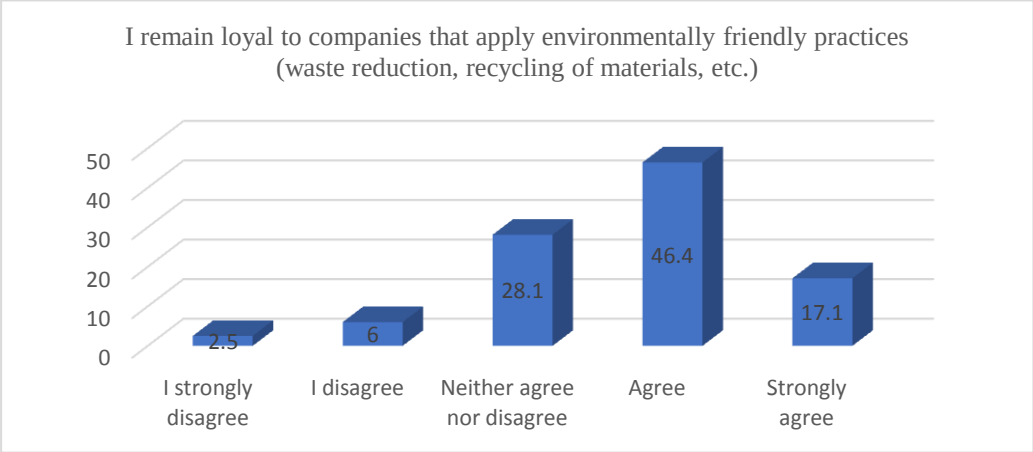


Figure 3. Brand loyalty

47% of the participants stated that they actively recommend these enterprises to individuals within their society, highlighting the importance of word of mouth marketing. 62.3 % of the interviewees stated that they recommend eco-products to friends, relatives, etc.

I recommend to others (friends, relatives, etc.) environmentally friendly products that can be repaired, rebuilt, reused or recycled after use.					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I strongly disagree	24	4	4	4
	I disagree	58	9,6	9,6	13,6
	Neither agree nor disagree	146	24,2	24,2	37,7
	Agree	248	41,1	41,1	78,8
	Strongly agree	128	21,2	21,2	100
	Total	604	100	100	

Table 1 Support for Green Products.

A new hypervariable describing Green Marketing Practices was created, whose values are calculated as the average of the responses to nineteen component questions.

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The table gives the correlation coefficients of the Green Marketing Practices variable with the questions of section 8 concerning consumer loyalty and the overall hypervariable Intention to purchase products with a post-use fate (as the mean of the questions of section 8)

A statistically significant positive correlation at a significance level of 1% (r=0.514, p=0.000).

There is a statistically significant positive correlation at 1%. significance level (r=0.419, p=0.000) between green marketing practices and the statement "I remain loyal to companies that implement environmentally friendly practices (waste reduction, recycling of materials, etc.)".

Intention to purchase products that can be used after their initial use	Green Marketing Practices	
Knowing that a wood and furniture product can be recycled, reused or repaired after I have used it is a reason for me to buy that particular product	Pearson Correlation	,467**
	Sig. (2-tailed)	,000
I remain loyal to companies that apply environmentally friendly practices (waste reduction, recycling of materials, etc.)	Pearson Correlation	,449**
	Sig. (2-tailed)	,000
If there is an alternative, I prefer wood and furniture products that cause less pollution	Pearson Correlation	,419**
	Sig. (2-tailed)	,000
When choosing between two wood and furniture products, I always buy the one that has the least impact on people and the environment	Pearson Correlation	,403**
	Sig. (2-tailed)	,000
Recommend to others (friends, relatives, etc.) environmentally friendly products which, after use, can be repaired, rebuilt, reused or recycled	Pearson Correlation	,390**
	Sig. (2-tailed)	,000
Intention to purchase products that can be used after their initial use	Pearson Correlation	,514**
	Sig. (2-tailed)	,000

Table 2. Relationship of Green Marketing Practices to consumer loyalty and the promotion of environmental sustainability.

2. Perceptions of eco-branding, eco-labelling, environmental advertising of wood and furniture products.

51.9% of participants said they would be influenced to buy the wood and furniture products advertised in the environmental advertisements. 59.1% said they liked environmental advertising on television and 48.5% liked print advertising. The mean value of the degree of influence for buying products advertised in environmental advertisements is 3.27 with a standard deviation of 1.039 (indicating a moderate beta).

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Using factor analysis, the existence of common factors (hyper-variables) between the individual components-questions of section 9.1. of the questionnaire that explore the perceptions for Green Marketing tools of the participants was investigated.

Five factors (hypervariables) emerged, which have as components the individual dimensions measured by the questionnaire and explain 67.543% of the total variance, which is considered very satisfactory.

The correlation between the Green Purchasing Behavior variable and the five factors was investigated. Pearson's correlation coefficient was used for testing.

Correlations

	F1 Eco-Label	F2 Advertising	F3 Quality	F4 Eco-Brand	F5 Eco-Color
Purchase intention of products with a fate after use	,566**	,495**	,605**	,584**	,341**

Table 3 Purchase intention of products with a fate after use **. Correlation is significant at the 0.01 level (2-tailed).

There is a moderate positive correlation between the Purchase Intention of products with post-use fate and Quality of green wood and furniture products (F3) (r=0.605), Eco-Brand (F4) (r=(0,584) and Eco-Label (F1), (r=0.566) and less so with Environmental Advertising (F2) (r=0.495) and Eco-Label Color (F)5 (r=0.341).

3. Purpose of green products purchase

The test of correlation with education level, using one-way ANOVA, at 5% level of significance, reveals a statistically significant difference in Green purchasing behaviour in relation to education level (F=8.775, p=0.000). Specifically, using Post-hoc Tests, those who are primary school graduates show worse purchasing behaviour compared to the rest.

Individuals in the survey sample were asked to answer how important the eco-label logo, product quality, price, availability, packaging, company branding, advertising and the environmental impact of the product were as influencing factors in their decision to buy green products. Their responses are expressed on a five-point Likert scale, as shown in the table below, where the reasons for purchasing are ranked by decreasing mean value and therefore by decreasing importance.

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Reasons for buying green products	Minimum	Maximum	Mean	Std. Deviation
Product quality	1	5	4,33	,830
Product quality	1	5	4,21	,891
The environmental impact of the product	1	5	3,96	1,073
Availability	1	5	3,79	,942
Packaging	1	5	3,40	1,074
Brand name of the company	1	5	3,36	1,151
Eco-label logo	1	5	3,30	1,108
Advertising	1	5	3,24	1,160

Table 4 Reasons for buying green products

The most important reason for influence is the quality of the product, followed by the price of the product.

Participants reported that:

- 38.1 percent of people are willing to spend more for green products.

- Among them, 30% would pay 6-10% extra.

The quality and environmental impact of the good is very important, but cost is also proving to be a decisive factor.

Statistical testing of the hypothesis

Regression analysis revealed that the implementation of green practices by firms strongly forecast consumer loyalty ($\beta = 0.45$, $p < 0.01$). Particularly:

- 35% of consumer loyalty variance is attributed by transparency of environmentally responsible actions.

- The positive purchase experience of green products increases customers' intention of loyalty by 18%.

Conclusion of the Case

It finds that the hypothesis that "the implementation of green practices by firms enhances consumer loyalty" holds generally true but that greenwashing and cost are the obstacles that need to be eliminated for the positive impact of green practices to be maximized. Companies that invest

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resources in credible and transparent green practices are likely to be successful at acquiring consumer loyalty over the long term.

DISCUSSION

Check and confirm or refute the study hypotheses.

Hypothesis 1: Connecting Green Practices with Customer Loyalty

Green marketing practices help develop consumer relationships by increasing satisfaction and consumer loyalty.

These results validate hypothesis 1 because the highest percentage of customers has positive attitudes towards companies that exercise responsible practices. Specifically, 58% of respondents reported that they are willing to buy again from companies that exercise responsible green practices while 47% actively recommend the same to the society they belong to. The same results are reported by the research of Martínez (2015) and Gleim et al. (2020), with the latter showing that green practices enhance customer trust and satisfaction.

Hypothesis 2: Consumers' trust increases with eco-labels and green advertisement and affects consumer intention to purchase products. Consumers perceive eco-labels as credible and associate them with purchase intention. The study finds that the presence of eco-labels is positively related with green purchase intention ($r = 0.58$, $p < 0.001$).

Still, green marketing did not have such a great effect since the subjects trusted more concrete green practices including the disposal of waste and the use of green energy. Delmas and Burbano (2019) study reinforces the above by highlighting that the sincerity of the green strategy weighs more than marketing communication.

Hypothesis 3: The effect of education and knowledge about demand and the willingness of people to spend more for green products The above hypothesis is correct since 38,1% of the population stated that they are willing to spend more for green products while 30% stated that they are willing to spend 6-10% more for green products. Information alters the consumer behaviour since 48.8% of the subjects stated that they are positive about green products. The above findings are consistent with past studies (Nguyen et al., 2021), stating that education for the environment and proper consumer education are likely to generate demand for green products and that consumers are willing to pay up to 6% more for environmentally certified wood products (Papadopoulos et al., 2010). The literature emphasizes that

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more investments need to be placed in education programmes for the aim of making the environmentally responsible society that it ought to be (Peattie, 2001).

Comparison with prior work

These findings are consistent with the findings of previous studies because the correlation between corporate environmental responsibility and consumer trust is still positive and significant (Leonidou et al., 2017). At the same time, the research confirms that the fact of greenwashing practices has negative effects and supports the demand for greater transparency of business activities (Delmas & Burbano, 2019). In turn, consumer education and information are found to be amongst the most influential determinants of consumer intention to buy green products, with clear proof of the study conducted by Nguyen et al. (2021).

In short, the research demonstrates clear evidence that green practices are good for consumer loyalty and sustainability. The success of the practices lies mainly with the transparency of the company, education of the consumer about the environment and avoiding greenwashing practices that are deceitful. Companies that invest resources into green practices that are transparent and authentic are likely to build consumer trust, retain consumer loyalty for the long term and become competitive within the market.

THEORETICAL AND PRACTICAL IMPLICATIONS, LIMITATIONS AND FUTURE DIRECTIONS

The study results are of great theoretical and practical importance. Theoretically, they confirm the green purchase intention models' validity (Jaiswal & Kant, 2017). Practically, they present insight for the green marketing practice optimization with the necessity of transparency and the effect of the impact of social influence.

Despite the worthwhile contribution of the study, it suffers from few limitations. The study utilized self-reported scales that are likely to elicit socially desirable responses. The study was conducted with a specific consumer population that limits the generalizability of the results. Future research should examine the effect of green marketing with varying cultures and use experimental designs for increased robustness of the results.

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THE IMPORTANCE OF NON-VERBAL COMMUNICATION IN PRACTICE IN THE CONTEXT OF WORK ORGANIZATION IN SMES IN THE REGION OF SOUTHERN SLOVAKIA

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ABSTRACT

The aim of the study is to examine how job applicants relate to nonverbal communication, its significance, and its application in the context of job interviews in Hungarian populated areas of Southwest Slovakia. In the theoretical part of the study, communication, job interviews, nonverbal communication and its importance and dimensions are briefly discussed. This is followed by the methodology. Preliminary data collection was carried out using the snowball method. The results show that there is no significant difference between men and women in terms of whether they perceive themselves as having made a really good impression during a job interview, but there is a significant difference in terms of how confident they feel when attending a job interview. Both sexes consider it very important to have a good knowledge and mastery of non-verbal communication at the job interview. The practical importance of this research is that, to our knowledge, no survey on this topic has been carried out in the Hungarian populated areas of Southwest Slovakia, analyzed by gender among small and medium enterprises in practice.

Keywords: Business communication, nonverbal communication, job interview, job search.

INTRODUCTION

Understanding communication is a fundamental part of human knowledge (Szőköl, 2020). People transmit information through non-verbal "tools" and verbal messages (Forgó, 2011). Non-verbal symbols used in most communication can be divided into two groups: symbols that are used involuntarily and are difficult to modify or change, and symbols that are used knowingly, are easier to notice and can be changed when necessary (Horváth, 2011, online).

In this paper, we look at this form of communication, non-verbal communication, in a specific situation: job interviews.

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The main aim of the study is to identify the importance that women and men attach to non-verbal communication in job interviews in Hungarian populated areas of Southwest Slovakia. The secondary objectives that were set to achieve the main objective are:

- to investigate the extent to which the women and men participating in the research consider themselves confident in a job interview and whether they admit to having already made a good impression;
- to identify how the women and men in the study learn about non-verbal communication in relation to job interviews;
- to assess the extent to which the women and men in the survey consider non-verbal communication at the job interview to be important.

We thought it was important to address this topic because a job interview is a situation in which our performance can have a big impact on our lives, both positively and negatively, and therefore it is very important to be well prepared, including knowing and using the non-verbal cues that are beneficial in a job interview.

THEORETICAL BACKGROUND

Selection plays a major role in human resources, as every company seeks to find the employee who will make the greatest contribution to productivity and thus to its success (Guion and Highhouse, 2006; Frauendorfer and Mast, 2015). As much as a successful selection can lead to good results, a poor selection can have negative effects (Frauendorfer and Mast, 2015). The most widely used tool in employee selection is the interview (DeGroot and Gooty, 2009; Heimann and Schmitz-Wilhelmy, 2025), including its face-to-face form (Macan, 2009; Proost *et al.*, 2020).) Interviewing can be single-round or even multi-round (Karoliny and Poór, 2019).

Job interviews are situations in all of our lives that are of great professional and personal importance (Naim *et al.*, 2018). One of the primary goals of job interviews is to test the applicants' communication skills (Lashkari and Cheng, 2023), as good communication is key to successful business operations. Nowadays, it is not uncommon for companies to attach so much importance to nonverbal communication that it is also an assessment criterion in the job interview (Susanti and Nova, 2022). Feiler and Powell (2016) pointed out that several studies (DeGroot and Motowidlo 1999; Russell et al., 2008; Barrick et al., 2009, Heimann and Schmitz-Wilhelmy, 2025) have shown that interviewers form opinions about applicants based on verbal, non-verbal and even vocal cues.

Job interviews are usually the first time the interviewer and the job applicant meet, so the first impression plays a central role (Nguyen and Gatica-Perez, 2015; Innes, 2017), as it can influence the outcome of the candidate's assessment (Frauendorfer and Mast, 2015). This is of great importance for

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both parties as they both want to "sell themselves" (Borgulya and Somogyvári, 2016). In order to make a good first impression, the interviewee must look professional: well-groomed and well-dressed. The way a person dresses is the most effective means of controlling the message their appearance conveys (Maran *et al*., 2021). This is also important because, according to Riggio and Throekmorton (1988) and Hareli et al. (2025) dressing influences positive evaluations.

But what is more important during a job interview? Undoubtedly, skills, which are the result of learning and training (Mgaya, 2016), are essential, but communication also plays a big role in getting a job. Is it verbal communication or non-verbal communication that plays a bigger role? There is not complete agreement in the literature. Some sources argue that non-verbal communication plays a lesser role, and that the success of the interview depends more on the candidate's verbal communication (Riggio and Throekmorton, 1988). Other sources argue that non-verbal communication is as important as verbal communication for a successful job interview (~~Mehrabian, 1971;~~ Huffcutt *et al*, 2001; Naim *et al*., 2015). Although both forms of communication are considered important, many companies believe that adequate knowledge of both is lacking in the majority of job applicants (Olszewski *et al*., 2017). Mastrella et al. (2023) stated that preparation and composure are important in both forms of communication, as anxiety negatively affects the outcome of the interview.

Several authors in the literature have identified what is appropriate non-verbal communication in a job interview. According to early sources (Leathers, 1986; Gotcher, 1990), what was found to be necessary for success included: constant and sustained eye contact, smiling, variation in voice pitch, voice speed and volume, responding to questions without hesitation, attentive and open posture, direct body orientation, affirming head nods, hand gestures communicating high energy levels, confident gestures (Gotcher, 1990).

Years later sources, such as Susanti and Nova (2022), also described similar non-verbal dimensions, but classified them into three groups: body language (eye contact, facial expression, smile, head movement, hand tremor, sitting position), tone of voice, grooming (dressing, make-up). Dressing is important because it can reveal a lot about a candidate's personality during a job interview (Susanti and Nova, 2022) and plays a major role in the first impression that is made (Kok et al., 2022). In addition to dress, it is also worth paying attention to hairstyle, make-up and interview tools (pen, diary, notepad) (Hofmeister and Mitev, 2016). According to research by Tsai *et al*. (2010), the importance of a candidate's physical attractiveness may vary for different job opportunities, as good appearance in a job interview is less important if there is less contact with clients during the job or if the interviewer envisages a candidate of the opposite sex for the position.

Many authors in the literature (Gotcher, 1990; Van Dam, 2003; Frauendorfer and Mast, 2015; Budnick et al., 2018) agree that the candidate's non-verbal communication at a job interview influences whether or

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not he/she is hired for the position. Hebbani and Frey (2007) found in regression analyses that friendly facial expressions, maintained eye contact and leaning forward also have a positive effect on the chances of being hired. According to Naim *et al*. (2015), individuals who smile more at a job interview receive better ratings, and overall performance at the interview and the likelihood of winning the position are positively correlated with the proportion of words that convey positive emotions. Results from Ruben *et al.* (2014) also showed that smiling is an important predictor of hiring likelihood, but they called attention to the importance of moderation.

METHODOLOGY

The research is of great importance because, to our knowledge, no survey on this topic has been conducted in the Hungarian-populated area of Southwest Slovakia. In line with the main objective and the sub-goals set, the following research questions were formulated during the course of the study:

- What methods do women and men use to prepare for job interviews in the region?
- Have the men and women in the study ever made a good impression at a job interview, according to their own admission?
- How confident do the men and women in the study feel about attending a job interview?
- How do the men and women interviewed gain knowledge about non-verbal communication in job interviews?
- To what extent do the men and women in the survey consider knowledge of non-verbal communication in job interviews useful?

In our work, we formulated three hypotheses and used mathematical-statistical analyses to test them, depending on the type of variables.

- H1: Women and men differ significantly in their self-perception of having made a good first impression in a job interview.
- H2: Women and men significantly differ in how confident they feel during a job interview.
- H3: Women and men significantly differ in how useful they consider knowledge of non-verbal communication to be when attending a job interview.

Data collection

The study examines non-verbal communication in terms of gender in the Hungarian populated areas of Southwest Slovakia (Nitra, Bratislava and Trnava districts) (the number of persons of Hungarian nationality in the three districts is 305,438 according to the Statistical Office of the Slovak Republic (Statistical Office of the Slovak Republic, 2021)). The selection of the participants in the research was done by a non-probability sampling method. The snowball method was used for data collection, which

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is characterized by the fact that after the first samples are collected, they introduce more participants into the research (Naderifar *et al*., 2017).

The instrument used in this study was an online queastionnaire which was distributed in the online space using the snowball method. The use of social media for research purposes has gained increasing popularity in recent years (Cabré Olivé *et al*., 2017).

In total, we sent the questionnaire to around 65 people we know, who were asked to forward it to at least 4 people they knew. In total, 171 responses were collected using this method. All of the responses received could be evaluated. The sociodemographic distribution of the responses received is shown in the Table 1 below:

Variables	Statement	Frequencies	Percentage %
Gender	Man	43	33.69%
	Woman	128	66.31%
	Total	171	100%
Age	Under 25	70	40.94%
	25-34	47	27.49%
	35-44	30	17.54%
	Above 44	24	14.03%
	Total	171	100%
Place of residence	Village	65	38.01%
	Small city (under 28 000 inhabitants)	35	20.47%
	Big city	71	41.52%
	Total	171	100%
Education	Primary school	8	4.68%
	Secondary school	82	47.96%
	High school/University	81	47.36%
	Total	171	100%

Table 1. *Sociodemographic distribution of the sample (N=171)*

Data analysis

The responses to the questionnaire were saved in a Microsoft Excel spreadsheet and then each variable was coded. Simple male-female comparisons were visualised using charts and hypotheses were tested using IBM SPSS Statistics 25.

In order to determine which analyses we needed to perform to test the three hypotheses we had set up, we needed to determine what type of variable was involved. Since both variables for hypothesis H1 are nominal variables measured on a non-metric scale, a Chi-square test was performed. For the other two hypotheses, the relationship between a non-metric nominal variable and a metric Likert-type variable was tested. There is disagreement among researchers on the identification of Likert-type variables, and we have based our identification on Sajtos and Mitev (2007).

Hypotheses H2 and H3 could have been tested by analysis of variance (ANOVA) due to the nature of the variables, but the test conditions were checked before performing the analysis and the condition of normal distribution was not met for either hypothesis H2 or H3. The Kruskal-Wallis test is a non-

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parametric version of ANOVA and was used to test the two hypotheses. The analyses are performed with a significance level of 5% (α=0.05).

RESULTS

The first question, looking at men's and women's attitudes to job interviews, asked how candidates prepare for the interview (Figure 1). Respondents could tick more than one response option.

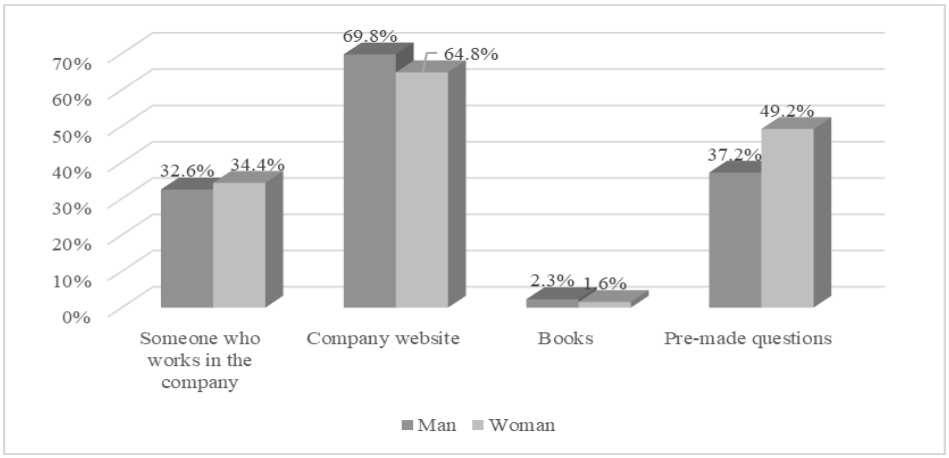


Figure 1. *Source of information for job interview preparation*

Hypothesis analysis was used to test whether the sexes differ significantly in their perception of whether they have ever made a really good impression in a job interview. Since both variables are nominal variables measured on a non-metric scale for the H1 hypothesis, a cross-tabulation analysis was performed (Table 2). Based on the results of the Chi-square test (χ2=0.899; df=2), the relationship between the variables is not significant, therefore, we reject the H1 hypothesis and accept the null hypothesis of no relationship between the variables (p=0.638; α=0.05; p>α). Looking at the results, the proportion of people who say they have never made a good impression at a job interview is almost the same for both sexes (men: 4.8%; women: 4.7%). There is a difference between those who answer yes and maybe, with a higher proportion of men saying they think they have made a good impression (men: 54.8%; women: 45.3%). For women, the maybe response option has the highest number of candidates (men: 42.9%; women: 50%).

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	.899a	2	.638
Likelihood Ratio	.900	2	.637
Linear-by-Linear Association	.894	1	.344
N of Valid Cases	171		
a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 2.01.			

Table 2. *Chi-Square Test – H1 hypothesis*

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Hypothesis H2 was analysed to find out how confident the individuals in the study generally feel during a job interview. The independent variable in this case was also a nominal variable measured on a non-metric scale, and the dependent variable was a scale-type variable. In this case, an analysis of variance should have been used to test the hypothesis, but since both the Kolmogorov-Smirnov and Shapiro-Wilk tests yielded significant ($p<0.05$) results, it is not possible to perform an analysis of variance.

	Test	Sig.	Decision
The distribution of CONFIDENCE the same across categories of GENDER.	Independent Samples Kruskal-Wallis Test	.045	Reject the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.			

Table 3. *Kruskal-Wallis Test – H2 hypothesis*

A non-parametric version of the analysis of variance is the Kruskal-Wallis test (Table 3), which results ($p=0.045$; $\alpha=0.05$; $p<\alpha$) allow us to reject the null hypothesis and accept hypothesis H2, i.e. the confidence experienced at a job interview depends on the gender of the interviewer. When examining the data in percentage terms, we find that men are the ones who show higher levels of confidence in job interviews.

During job interviews, non-verbal communication also includes appearance. Almost all of the men and women surveyed consider it important to look good at a job interview (men: 97.7%; women: 98.4%).

Our research also looked at where respondents get their knowledge about non-verbal communication before a job interview (Figure 2).

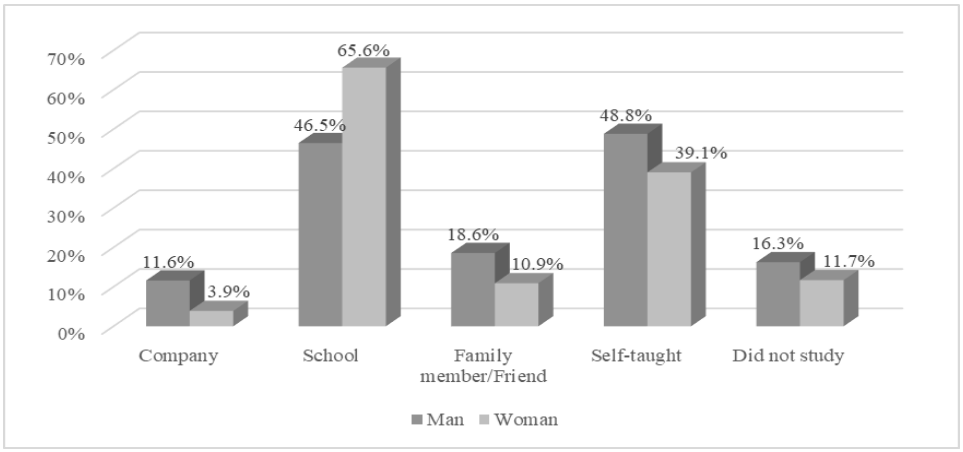


Figure 2. *Resource for learning about nonverbal communication*

Hypothesis H3 asked how useful the two genders consider knowledge of non-verbal communication to be when attending a job interview. Gender, which is a nominal variable measured on a non-metric scale, was again compared with a Likert scale question, which can be identified as a scale variable based on the Sajtos-Mitev (2007). Analysis of variance could not be performed in this case either, as the

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results of the Kolmogorov-Smirnov and Shapiro-Wilk tests were significant ($p<0.05$), so the condition of normal distribution was not met.

Based on the results (Table 4) of the Kruskal-Wallis test ($p=0.874$; $\alpha=0.05$; $p>\alpha$), we have to accept the null hypothesis and reject hypothesis H3, i.e. the importance of being informed about non-verbal communication in a job interview does not depend on the gender of the interviewer. The results suggest that the means of the two groups are very similar ($\bar{x}_{men}=4.16$; $\bar{x}_{women}=4.14$).

	Test	Sig.	Decision
The distribution of IMPORTANCE the same across categories of GENDER.	Independent Samples Kruskal-Wallis Test	.874	Retain the null hypothesis.
Asymptotic significances are displayed. The significance level is .05.			

Table 4. *Kruskal-Wallis Test – H3 hypothesis*

At the end of the questionnaire, we assessed respondents' knowledge of some nonverbal signs. For five nonverbal signs, they were given three response options and had to decide which was the correct answer (Table 5). In the case of the "dead fish handshake", men (86%) and women (85.2%) were almost equally likely to correctly identify the meaning of the non-verbal signal. There was also no problem for the majority in determining the meaning of clasped hands, but here the gender gap was greater, with a higher proportion of women (91.4%) answering correctly (men: 83.7%).

Nonverbal signs	Correct answer	Incorrect answers	
Dead fish handshake	Weak character	Dominance	Assertiveness
Clasped hands	Frustration, modest behaviour	Honesty	Lying
Hands on hips	Challenge, aggressiveness	Defensiveness, isolation	Willingness to act
Glassy stare	Disinterest, being deep in thought	Uncertainty	Confusion, boredom
Touching the face	Negative attitude, lying	Interest, acceptance	Closed-mindedness

Table 5. *Nonverbal signs and their meanings (Eggert, 2023)*

Women were also more successful than men in determining the meaning of a glassy stare (women: 64.8%; men: 41.9%) and hands on hips (women: 57.8%; men: 34.9%). Determining the meaning of touching the face was the most problematic for women of the five non-verbal signs (women: 34.4%; men: 37.2%).

CONCLUSION

In the theoretical part of the study, we first dealt with the role of communication in job interviews. There is no consensus among professionals as to what is more important for a successful job interview: verbal or non-verbal communication. In the case of nonverbal dimensions, we were able to identify both similarities and differences in the literature sources (Leathers, 1986; Gotcher, 1990; Susanti and Nova, 2022). Summarizing these, we have come to the conclusion that it is worth putting a lot of emphasis on three main groups when examining non-verbal communication during a job interview: face, voice and body. There is no doubt that non-verbal communication is an important factor for a

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successful job interview. The aim of our research was to find out how much importance women and men place on non-verbal communication during job interviews in the Hungarian-inhabited areas of southwestern Slovakia. Based on our results, both sexes consider this type of communication very important during the job interview, there is no significant difference between them.

In the case of men and women, there was no big difference in how they prepare for a job interview either, with approximately two-thirds of both sexes getting information from the company's website. The biggest difference between the two genders was that almost half of the women (49.2%) prepare for the interview with pre-formulated questions, while this represents a 12% lower proportion in the case of men.

Based on the results of the analysis of hypothesis H1, there is no significant difference between men and women in their own impression of whether they have ever made a really good impression during a job interview. On the contrary, the analysis of hypothesis H2 showed that there is a significant difference between the sexes in how confident they feel when participating in a job interview. In the case of men, there is a greater degree of self-confidence.

Hypothesis H3 related to nonverbal communication examined whether there is a significant difference between men and women in how important they consider knowledge of nonverbal communication during a job interview. During the analysis, we accepted the null hypothesis, i.e. that there is no significant relationship between the variables, because both genders consider knowledge of nonverbal communication very important. When we asked them where they get information about nonverbal communication before a job interview, we found that a high percentage of women learn about the topic at school. This may also be influenced by the choice of career, i.e. if a higher proportion of the women participating in the research studied in communication courses. Learning by self-effort is more characteristic of men, but this is closely followed in their case by learning at school. In the case of both sexes, it should be emphasized that the proportion of those who do not acquire knowledge in any way about non-verbal communication related to job interviews is over 10%, however, the cited literature sources (Rasmussen, 1984; Gotcher, 1990; Van Dam, 2003; Hebbani and Frey, 2007; Ruben *et al*., 2014; Frauendorfer and Mast, 2015; Budnick *et al*., 2018) also pointed out the importance of non-verbal signals in the job interview, so it is definitely recommended to be prepared in this area as well for achieving successful evaluation. However, it is positive that during the further examination of non-verbal communication, we showed that both sexes are aware that appearance plays a very important role in the job interview. The importance of this has already been pointed out by several literary sources (Riggio and Throekmorton, 1988; Gotcher, 1990; Buda, 1994; Susanti and Nova, 2022).

In the last part of the questionnaire, the participants had to determine the meaning of five non-verbal signs. In the case of two of the five signs, men answered correctly in a higher proportion, but only by

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0.8% and 2.8%. In the three cases where women answered correctly in a higher proportion, there was a greater degree of difference between the two sexes. However, it is not clear whether men or women are better able to interpret the meaning of nonverbal signals.

IMPLICATIONS

The results of this study provide valuable insights for both theory and practice, particularly in the context of job interviews in SMEs in Hungarian-inhabited regions of southwestern Slovakia. From a practical perspective, the study provides valuable insights for **communication professionals**, **HR practitioners**, and **educational institutions** operating in southwestern Slovakia and similar multicultural regions. As far as we know, there has not yet been a gender-disaggregated survey on this topic in the area of Southwestern Slovakia inhabited by Hungarians.

The research confirms the significance of nonverbal communication in shaping the outcome of job interviews. This highlights the need for increased attention to these dimensions in both interview preparation and professional training. The results also raise interesting questions about the **ability to interpret nonverbal signs**, as performance in identifying their meanings varied between genders without a definitive conclusion on superiority.

The **low response rate** represents a limitation that future research should aim to overcome. Broader dissemination of the questionnaire, potentially with the help of HR professionals and employment organizations, could lead to more comprehensive data. Future research might also explore sector-specific differences in the importance and perception of nonverbal communication during interviews, offering deeper insight into industry expectations and candidate experiences.

The study serves as a **pioneering gender-based exploration of job interview communication in this region**. Its findings may inform curriculum development in communication studies, enhance the services of job placement agencies, and support individuals in navigating job interviews more effectively.

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UNPACKING AI-RELATED DETERMINANTS OF LEARNERS' ATTITUDES: THE CASE OF INTERNATIONAL STUDENTS IN A STEM PROGRAM

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ABSTRACT

Purpose: In light of the proliferation of artificial intelligence (AI) tools and their pervasive use, we sought to address two timely objectives: ascertain possible AI-related dimensions and their impact on student's attitudes towards AI, and gain insights as to the scale of AI adoption amongst grade students in a STEM program. Our focus was on the international student given that non-native English-speaking students may rely heavily on artificial intelligence for assistance with translation, grammar, and writing in their academic studies.

Design/Methodology: We utilized Necessary Condition Analysis (NCA) to establish necessity conditions amongst several AI-related dimensions - awareness and understanding; usage and experience; and education, skills and training - as predictors of students' perceptions and attitudes. Our hypotheses were tested in a sample of 422 international Indian students at a southeastern university's STEM programs in the U.S.

Findings: Our results revealed a strong link between all three AI categories and learner's related attitudes. Specifically, AI-related awareness, understanding, usage, experience, skills and training emerge as significant determinants of students' attitudes and perceptions towards AI adoption and use. Students' utilization of this innovative technology has been widespread and growing.

Originality/Value: These findings enrich the relevant extant literature and appear to align well with our theoretical framework. Our findings highlight the key role that self-experimentation and self-learning play in one's proactive posture, actions and initiatives. Equally important, our findings emphasize the unique and urgent role college administrators can play in encouraging rather than suppressing students' adoption and use of AI tools. We further discuss these links along with implications for faculty and college administrators. Study limitations and directions for future research are also proposed.

Keywords: Artificial Intelligence, Educational Technology, Higher Education, STEM, Attitudes, Necessary Condition Analysis, International Students.

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INTRODUCTION

The accelerated proliferation of AI has brought to the forefront a multitude of views concerning its benefits and risks, along with mixed attitudes towards AI's adoption and use. Empirical evidence concerning user's attitudes towards AI has likewise been inconclusive, particularly when considering key predictors such as user demographics, sociocultural dimensions and personality traits, which attracted much attention in recent investigations (Bergdahl et al., 2023; Stein et al., 2024). Indeed, a cursory mention of such findings suggests that among the variables that emerge as determinants of AI attitudes are demographic factors along with personality related variables. For instance, gender differences in several studies suggest that men express more positive attitudes toward AI (Schepman and Rodway, 2022; Sindermann et al., 2022); age emerges as inconclusive factor, yet many studies reporting that younger adults, in general, express more positive attitudes toward AI (Gillespie et al., 2021; Schepman and Rodway, 2022); college education has also emerged as a predictor of positive student learning experience along with AI-related attitudes and use (MacLennan et al., 2025; Malka et al., 2025). Personality variables that are viewed as predictors of attitudes toward technology use have been the focus of other studies; such works explored links between personality traits and attitudes toward AI technology (Kaya et al., 2022; Park and Woo, 2022), with introverts appearing to have more positive attitudes towards AI (Park and Woo, 2022; Schepman and Rodway, 2022). Yet, less investigated are domain-specific dimensions such as user awareness, skills and experience and their possible links to AI-related attitudes and perceptions. With the exception of a few studies, this gap has not been sufficiently addressed (MacLennan et al., 2025; Malka et al., 2025). What makes such a link a subject for further study are findings that suggest that some user-specific dimensions appear to correlate especially well with AI-related attitudes rather than with attitudes towards other technologies (Park and Woo, 2022).

Opposing views concerning AI are not limited to the workplace but have spilled over into the classroom with more college administrators and faculty voicing their opinions against student use of AI tools. Recent findings suggest that approximately 68 percent of instructors believe that AI will have a negative impact on academic integrity (Coffey, 2024). Yet, despite such a view, the use of AI-related tools amongst students in institutions of higher learning is fast becoming ubiquitous. A recent survey indicated that 86% of university students are using AI in their studies (Kelly, 2024). Research evidence further suggests that access to AI resources can help students navigate their academic course work (Wang et al., 2023). And as relevant is the finding that over half of college graduates in a recent survey stated that they believe the lack of exposure to AI in academic programs hurt their career trajectory and left them unprepared to use generative AI tools in the workplace (Cengage, 2024). And since

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learner's behavior toward AI in general is born out of the learner's attitudes toward this innovative tool, it may well be worth studying the link between several AI-related determinants and learners' attitudes and perceptions of artificial intelligence. Thus, the purpose of this research is to examine the potential impact of AI awareness and understanding (AU), experience and usage of AI (EU), and AI skills, education and training (SET) on student perceptions and attitudes toward AI (PA). Studying a sample of 422 international graduate students from India in STEM programs at a southeastern university, we utilized a necessary condition analysis to explore necessity conditions among the mentioned set of AI-related dimensions – AU, EU, and SET - as predictors of overall students' perceptions and attitudes towards AI (PA). The emerging results suggest that all three AI-related dimensions are statistically significant conditions for higher levels of positive attitudes toward AI adoption and use. Put differently, AI categories under investigation emerged as necessary for developing more favorable perceptions and attitudes toward AI.

THEORETICAL FRAMEWORK

Self-determination theory (SDT). Of particular relevance to our study is SDT and the three legs upon which the theory stands: Autonomy, competence, and relatedness (Ryan and Deci, 2017). The first leg is autonomy which relates to one's freedom to decide their actions. The second leg is competence which relates to one's belief in their competence to execute concrete tasks for reaching specific goals. The third leg is relatedness which relates to one's ability and desire to connect with like-mind others. Taken together, the three components of SDT are a source of both intrinsic and extrinsic motivational forces that fulfil a person's basic human needs and that propel an individual to self-act and achieve a sense of completion. According to SDT, feeling autonomous and competent boosts one's self-confidence in their ability to self-experiment and self-learn and in their ability to execute and accomplish goals, particularly when interacting and collaborating with others with whom they share common interests (Ryan, 2023; Sahin and Sahin, 2022). Following this logic suggests that a person's perception of being autonomous, competent and connected to like-minded others is likely to develop positive attitudes toward various phenomena – be it work-related tasks, or in our case – mastering a technology. Indeed studies reported a strong association between a person's sense of self-autonomy, relatedness, and self-competence in the use of technology and positive attitudes toward the technology (Bergdahl et al., 2023; Kaya et al, 2022).

The Technology Acceptance Model (TAM). We also drew on the Technology Acceptance Model, given that much of the research on technology and AI has relied on the framework of the Technology Acceptance Model (TAM), which was initially developed by Davis (1986). TAM is based on three

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overarching constructs: perceived ease of use, perceived usefulness, and attitude toward using technology that could be used to predict users' motivation to adopt technologies. The TAM continues to be expanded to include emerging constructs that are widely used in educational technology acceptance studies. An Extended Technology Acceptance Model added six additional constructs related to academic contexts, including academic experience, ease of access to materials, perceived ease of use for collaborative learning, lecturer's positive response, expectation of academic achievement, and self-efficacy (Venkatesh & Davis, 2000). While specifically related to digital reading tools, their research indicated the most significant effect sizes are associated with attitudes influence on intention to use, with self-efficacy on perceived ease of use, and with the perceived ease of use on perceived usefulness. We consider TAM's emphasis on user's technology usage, awareness, experience and skills to be highly relevant to our investigation as all three concepts are also central to the AI-related dimensions in our study.

REVIEW OF THE LITERATURE

Human attitudes are a remarkably complex construct that is influenced by a multitude of factors. Playing an essential role in shaping human behavior, attitudes determinants can be broadly categorized into personal experiences, cognitive and emotional determinants, social and contextual factors, and media influence. Personal experience suggests a person's direct experience with a phenomenon or with an event may generate stronger attitudes, either favorable or unfavorable, compared to others who had no personal experience with that event or object (Brinol & Petty, 2021; Fazio, 2017). Pettigrew and Tropp (2018) in their meta-analysis of the relevant literature have found that positive experiences, primarily experiences involving cooperation and shared goals, lead to significant positive attitudes. Similar to firsthand direct experiences, cognitive variables that tend to involve information processing and belief formation shape our attitudes toward a phenomenon or a specific subject. Recent studies demonstrate the role of cognitive dissonance in shifting attitudes; Harmon-Jones et al. (2019) found that when individuals experience conflicting beliefs, they may modify one of the attitudes to restore internal consistency, showcasing how cognitive processes actively shape attitudes. The link between attitudes and the ensuing behavior is the focal point of the theory of planned behavior (Ajzen and Fishbein, 1980). The theory posits that attitude towards a behavior, along with one's subjective norms and perceived behavioral control can predict intentions, and consequently behavior itself. A recent meta-analysis by Armitage & Conner (2021) reinforced the predictive value of this theory, indicating that cognitive evaluations of the attitude-behavior link significantly affect both intention and actual behavior.

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One should also consider emotional factors. Emotions are powerful determinants of attitudes, as they influence how individuals perceive and respond to various stimuli (Lerner et al., 2015). Positive emotions, in particular, play a crucial role in attitude formation. Brüggen et al. (2020) found that emotions like joy, pride, and compassion can enhance individuals' engagement in pro-social behavior and support for community initiatives. Social or socialization likewise cannot be overlooked. Family, friends, culture, and societal norms play critical roles in shaping our attitudes. Individuals are likely to adopt the attitudes of those around them, emphasizing the role of socialization in shaping attitudes (Rosenberg & Turner, 1984). Contextual factors ought to be accounted for, as well, when considering determinates of attitudes. Contextual factors refer to educational experiences that are likely to influence attitudes by exposing individuals to new information, perspectives, and critical thinking skills. Higher levels of education are often associated with more open-minded attitudes on various social issues (Hossler & Stage, 1992; van der Veen et al., 2020). Education plays a crucial role in shaping not only knowledge and skills but also values, beliefs, and social norms. Finally, one should consider the role of media influence in shaping one's attitudes. The media, including news, social media, and advertising, can shape attitudes by framing issues in certain ways or promoting specific narratives. Repeated exposure to particular messages can reinforce or change attitudes (Tsao et al., 2021).

The mentioned determinants appear relevant to the exploration of students' attitudes towards technology, including AI. In our case, any level of mastery of AI tools on students' part is self-acquired and self-taught since no AI-related courses or workshops have ever been offered to students in our college of interest. Thus, firsthand personal experience of students with AI tools is critical for attitudes formation. But so is their AI-related belief formation and their socialization with like-minded peer groups that are likely to shape their attitudes towards AI. And not least, is the role media plays in the dissemination of information. Students' likely exposure to social media in particular, may well be their main source of AI-related news and information, and as such – a facilitator of attitudes formation. Still, regardless of the empirical weight of those determinants of human attitudes, we sought to focus on other less investigated user-specific dimensions and their influence on student attitudes.

HIGHER EDUCATION: AI-SEPECIFIC DETERMINANTS AND ATTITUDES

There is a growing body of literature that supports the positive influence of student use of AI digital technologies on learning motivation (Ali et al., 2023; Neji et al., 2023), on the desire to learn the technology (Chiu et al., 2024; Murakami et al., 2024) and on overall student learning experience

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(MacLennan et al., 2025; Malka et al., 2025). Such learning experience is highly related to attitudes toward learning and to the perceived value of what is being learned, both of which are likely drivers of a student's academic performance. Thus, one can assume that differences in students' AI-related awareness, experience, education, usage and skills are likely to result in different perceived attitudes and learning experiences.

AI-training, education and skills. A recent survey published by Inside Higher Ed indicated that 72 percent of respondents believe that higher education should be preparing them for AI use and application in their careers (Flaherty, 2024). Integrating AI training into the higher education curriculum may provide students with an overall positive learning and with the experience they need to be career-ready. Moving in that direction is critical given that by some estimates less than 10 percent of students indicated that their institution offered any training on AI (Flaherty, 2024). Data also suggests that students at public institutions were almost twice as likely to use generative AI for coursework (Flaherty, 2024). AI skills are becoming increasingly in demand in all college majors as commercial and public sectors expand their use of AI technologies (Mohnen & Lee, 2024).

AI-usage and experience in education. A recent large-scale national survey of young adults (Common Sense Media & Hopelab, 2024) found that the most commonly reported uses of AI were information gathering (53%) and brainstorming (51%). AI chatbots emerge as valuable for providing tutoring and feedback to students in real time (Xu et al., 2019). Also, consider that many non-native English-speaking students rely on AI for translation, language learning, and assistance with grammar and spelling (Ericsson, 2023; Yang & Kyun, 2022). Recent research suggests that differences in the level of AI-related experience may contribute to exclusion and educational disparities for older students (Flaherty, 2024), for women as well as for international students (Bulathwela et al., 2024). Male students and students from technology programs have been shown to have greater optimism about AI technology and thus a higher level of AI use (Joseph et al., 2024).

AI-awareness and understanding. Awareness towards AI technology has been shown to be relatively high amongst university students (Joseph et al., 2024; Ampofo el al., 2023). However, research reports that the majority of university students lacked sufficient understanding of the technology and how it could be used. Several studies explored gender differences in AI awareness. While no gender differences were identified in some studies (Malka et al., 2025), Joseph et al. (2024) found that male students in India had a stronger awareness of AI tools than their female counterparts. One can assume that students who know and understand how to use AI technologies will be more likely to apply them in academic work to enhance their learning experience. Awareness of the technology is likely to

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positively influence students' knowledge and skills, making them more likely to adopt the tool to enhance their self-learning (Shahzed et al., 2024).

AI-related perceptions and attitudes. Student usage of AI is driven in part by their perceptions and attitudes towards the technology but may also be influenced by fear of violating institutional or classroom policy. Believing that AI is used for cheating has compelled some educators to focus heavily on identifying offenders by using AI detection tools that have been shown to be unreliable with devastating consequences (Liang et al., 2023), and particularly so for the non-native English-speaking international student. Users have also indicated some concerns about the limitations of AI along with trust and ethical concerns about data privacy. Choung et al. (2023) found an indirect influence of trust on the intention to use AI. However, Menard and Bott (2024) found that concerns over both trust and risk did not significantly affect the use of AI technology.

We assert that attitudes towards AI may be influenced by the collective mix of the three AI-related categories mentioned above, and in turns influence student's use of AI which can impact their overall learning experience. Thus, reflecting on the preceding review of the literature, we formulated several hypotheses for study. Note that the phrasing we use for the three hypotheses is consistent with NCA convention and terminology (Dul, 2020):

H1 – higher level of AI-related skills and training is necessary for higher level of AI-related positive attitudes and perceptions.

H2 – higher level of AI-related experience and usage is necessary for higher level of AI-related positive attitudes and perceptions.

H3 – higher level of AI-related awareness and understanding is necessary for higher level of AI-related positive attitudes and perceptions.

METHODOLOGY

Sample. Our sample is drawn from the universe of graduate STEM students in a southeastern university. Included in our sample are active students that have enrolled in various STEM courses during the 2024 school year. The bulk of these students are international students who arrive primarily from India. With the approval of the study by our institution's IRB, we began with data collection and ceased soliciting additional surveys once we reached four-hundred and fifty returns.

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Twenty-eight surveys were found to be incomplete and were thus eliminated. Of the four-hundred and twenty-two complete surveys, two-hundred and ninety-eight were male STEM grads, and one-hundred and twenty-four were female STEM grads.

Measures and sample items. We collected data from graduate students in STEM fields using a tested pre-existed questionnaire at a single point in time. The SDSU Student AI Survey Instrument (Goldberg et al., 2023) was utilized with a slight modification. Since exploring students' ratings of AI-related dimensions and relevancy to their current learning experience is the aim of this study, we eliminated the Future Expectation of AI section. And being of little value for NCA, we also removed the optional open-ended questions. The instrument includes a total of 26 questions on AI-related awareness and understanding (AU); AI-related skills, education, and training (SET); and AI-related experience and usage (EU); and perceptions and attitudes toward AI (PA). The multiitem questionnaire employs a 6-point Likert-type scale, from 1= strongly disagree to 6 = strongly agree. The subscales of the instrument were tested for reliability with Cronbach alpha coefficients at an acceptable range between 0.69 and 0.74.

For the study's X_1-X_3, a sample of statements under the Awareness/Understanding dimension include – 1. I regularly follow news and updates about AI – 2. I regularly discuss AI topics with friends, family, or classmates. A sample of statements under the Experience/Usage dimension include – 1. I use AI-powered tools or applications in my studies – 2. AI-powered tools are essential for my academic success. Finally, a sample of statements under the Skills/ Education/ Training dimension include – 1. I am interested in receiving formal training in AI through coursework or other resources – 2. I am actively seeking opportunities to learn more about AI. For the study's Y, a sample of statements under the Perceptions/Attitudes dimension include – 1. AI has the potential to reduce human biases – 2. AI can contribute positively to social issues. A stated above, graduates rate these items, and all other items, on a six-point Likert ranging from "Strongly Disagree" (1-point) to "Strongly Agree" (6-points).

Procedure. The entire universe of recent STEM program graduates, during the preceding 2024 year, has been targeted via direct email. An online opt-in invites to take part in the early study was posted with an explanation as to the purpose of the study, as well as to the researchers' ensured anonymity and expressed interest in aggregate data only. Members who choose to participate gained access to the survey via a designated link to a Qualtrics-based questionnaire. Calculating a sufficient sample size of n = 400, we ceased solicitation once a threshold of 450 surveys were returned of which 422 completed questionnaires were confirmed.

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RESULTS

Figure 1 depicts scattered plots based on data collected from our student's sample. In essence, the figure shows plots of our three independent variables (X_1-X_3) and the constraint that each X have on students' AI-related attitudes and perceptions. A visual inspection of each one of our three scatter plots points to the existence of a noticeable empty space in the upper left corner of all plots. The size of the empty spaces vary amongst the three variables with that for Awareness and Understanding being relatively the smallest, thus illustrating relatively a lesser constraint of that variable on attitudes, our dependent variable (Y). Also noticeable is the fact that there are no cases above the CE-FDH red-dotted line, and that only a negligent number of cases are visible above the CR-FDH yellow line in our samples. Thus, suggesting a high level of X is necessary for a high level of Y as envisioned by NCA (Dul, 2020).

Using both ceiling lines with our plots supports the robustness of our analysis since it allows for the comparison of results. However, given space constraints here, and given the continuous nature of our data, we only present CR-FDH results as depicted in Table 2, the NCA quantified parameters. Results in Table 2 represent quantified parameters of our three X-variables relative to students' attitudes and perceptions. For parsimonious reasons we did not include min/max values, the scope and P-value of the samples' corresponding variables. P-values and scope values are displayed in Table 3.

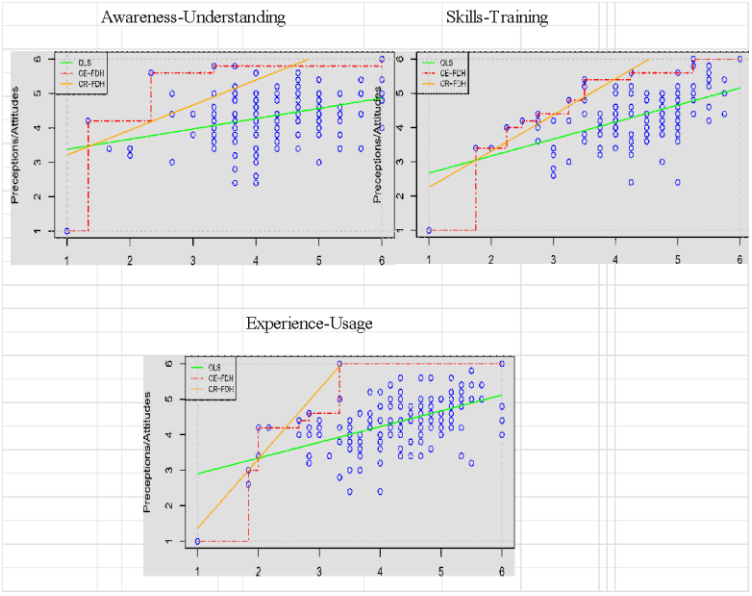


Figure 1. Scatter plots

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	Skills/ Training	Experience/ Usage	Awareness/ Understanding
Ceiling Zone	6.631	5.4587	5.348
Effect Size	0.265	0.219	0.214
C-Accuracy	93.60%	96.80%	93.60%
Fit	83.40%	80.30%	79.30%
Slope	1.057	1.96	0.726
Intercept	1.199	-0.957	2.486
Abs. Ineff.	11.737	14.026	14.303
Rel. Ineff.	46.95	56.105	57.212
Condition Ineff.	29.149	52.671	23.254
Outcome Ineff.	25.124	7.255	44.248

Table 2. NCA Quantified Parameters

Interpretation of key parameters requires an understanding of what they represent: Ceiling zone refers virtually to the empty space above the ceiling line. Effect size refers to the magnitude of the constraint that a necessary condition (X) poses on the outcome (Y) expressed by the size of the ceiling zone relative to the size of the scope. C-accuracy refers to the extent to which cases are on or below the ceiling line expressed as a percentage of all cases. The Fit score is the effect size of a selected ceiling line divided by the effect size of the CE-FDH ceiling line. Slope and Intercept are only relevant for CR-FDH given that it is a straight regression ceiling line. The necessity inefficiency parameters indicate: (1) the area of the scope where X does not constrain Y (Condition inefficiency); (2) the area of the scope where Y is not constrained by X (Outcome inefficiency); (3) the total unconstrained area (absolute inefficiency); (4) and this area as a percentage of the scope (Relative inefficiency).

For the purpose and scope of this paper we only discuss the effect size results as they are the core parameter of the NCA method. Effect size values represent the *substantive significance* of the necessity effect of X and Y. In our case, as depicted in Table 2, the values of each one of our three effect sizes are below the threshold value of 0.5 but greater than 0.20. Thus, these results are perceived as medium sizes and are deemed meaningful (Dul, 2020). For the students in our sample, AI-related skills and training, usage and experience, and awareness and understanding are sufficient and meaningful for a positive perceptions and attitudes towards artificial intelligence's adoption and use. Table 3 presents the statistical significance test *P*-value for the variables' effect size, in addition to other NCA key parameter values, respectively.

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	Skills/ Training	Experience/ Usage	Awareness/ Understanding
Ceiling Zone	6.631	5.4587	5.348
Effect Size	0.265	0.219	0.214
C-Accuracy	93.60%	96.80%	93.60%
Scope	29.5	26.3	23.4
P -Value	0.001	0.03	0.05

Table 3. Key NCA Parameters and P-value Test

Consider that we set a threshold of 0.05 for the *p*-Value. The significance test, with 10,000 permutations, suggests that the ***p***-Value of the effect size of all three variables - Skills/Training, Experience/Usage, and Awareness/ Understanding - are below, or at the set threshold of $p = 0.05$, and thus are considered statistically significant ($p = 0.001$, 0.03 and 0.05, respectively). In NCA terms, the observed effect sizes of ST, EU and AU are not caused by random chance of unrelated variables and hence are deemed statistically significant.

The bottleneck table, see Table 4 next, depicts what level of X is required for a given level of Y, and thus allows for hypothesis formulation *in degree* (in percentage range). Table 4 provides practical insight concerning the required levels of AU, ST and EU as necessary conditions for a certain level of AP. The values for the variables in Table 4 are expressed in percentages. Consider that for students in our sample, the outcome level of favorable AI-related attitudes must be at least 50 percent – a mid-range level - for all three conditions to 'kick in, overcoming a 'No Need' (NN) level. Increasing levels in all three AI categories trigger increasing levels of favorable AI-related attitudes and perceptions. Note that Table 4 also suggests that for a level of favorable attitudes and perceptions that is $\geq$ 60 percent - double digit conditions must exist in varying levels that grow with parallel increases in levels of positive attitudes towards AI.

Y	1	2	3
0	NN	NN	NN
10	NN	1.4	NN
20	NN	6.5	NN
30	NN	11.6	4.6
40	NN	16.7	14.1
50	7.9	21.8	23.5
60	21.7	26.9	33.0
70	35.4	32.0	42.5
80	49.2	37.1	51.9
90	63.0	42.2	61.4
100	76.7	47.3	70.9

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Key:		
Y Perceptions/Attitudes (% Range)		
1 Awareness/Understanding (% Range)		
2 Experience/Usage (% Range)		
3 Skills/Training (% Range)		

Table 4. Bottlenecks

Equally interesting, also note the remarkable levels of the AI-related conditions at 100 percent of positive perceptions and attitudes towards artificial intelligence; AU, EU and ST must stand at 76.7 percent, 47.3 percent, 70.9 percent, respectively. These findings are certainly well aligned with the results in previous tables regarding the essential role the study's independent variables plays in shaping students' attitudes and perceptions towards artificial intelligence.

DISCUSSION

Our findings provide empirical support for the study's three hypotheses (H_1, H_2, and H_3). AI-related skills and training ($p < 0.001$), experience and usage ($p < 0.03$), and AI-related awareness and understanding ($p < 0.05$) appear to be necessary for students' positive attitudes towards artificial intelligence. What shapes students' attitudes towards artificial intelligence is critical in light of recent evidence that suggests a strong link between students' use of AI tools and their overall positive learning experience in college (MacLennan et al., 2025; Malka et al., 2025). Moreover, these findings appear to align well with tenets of both theories mentioned in our theoretical framework stressing the key role that self-learning play in one's proactive actions and initiatives. The results stress the value of actively engaging in self-development and self-education, particularly with regard to the adoption of AI. Student's self-experimentation and usage of the technology, as reported by our study's participants, is remarkable given that no such training or skill-development has been offered in their graduate study programs. Thus, our results align well with SDT's self-autonomy and a sense of competency that were reported to increase users' positive attitudes towards technology and AI acceptance in other studies as well (Ryan, 2023; Sahin and Sahin, 2022). Similarly, our findings align well with TAM model's principle of self-efficacy with its emphasis on user's technology usage, awareness, experience and skills. Consider that all four concepts are also central to the AI-related dimensions in our study. Support for the relationship between student self-learning actions and academic self-efficacy has been reported in other works which in turn has been positively associated with positive student learning experience (Kryshko et al., 2022; Prifti, 2022).

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Overall, our findings add some rigor to the relevant literature being reviewed earlier. Referring back to that review, consider the positive influence of student use of AI digital technologies on learning motivation (Ali et al., 2023; Neji et al., 2023), on the desire to learn the technology (Chiu et al., 2024; Murakami et al., 2024) and on the overall student's positive learning experience (MacLennan et al., 2025; Malka et al., 2025). Such learning experience is highly related to perceptions and attitudes toward learning and to the perceived value of what is being learned, both of which are likely drivers of students' academic performance. Thus, shedding light on AI-related determinants of students' attitudes and ultimately on learners' behavior within academic contexts is warranted and should not be ignored.

Practical implications

Our findings point to the opportunities that open up for college administrators and faculty to zoom in on critical AI dimensions and on their degree of necessity for the improvement and enhancement of graduates' learning experience. Results emanating from the study's bottlenecks are a good starting point. Several implications are worth mentioning: First, capitalizing on students' own AI experience, usage, skills and training and on their own perceptions and attitudes toward AI, may not be sufficient per se and hence must be complemented by program directors for further nurturing graduates' familiarity with artificial intelligence technologies, tools and applications. Second, such programs should be considered as priorities for 'in-house' training and coaching. Mastery of AI technology by students in all academic programs constitute a priority that college administrators and faculty should consider. Third, general attitudes towards technology use including AI are well linked to institutional acceptance of its use as suggested by several works (Choung et al., 2023; Kelly et al., 2023). Thus, facilitating and formalizing such acceptance is critical for supporting and properly funding related initiatives. Finally, we believe this should be equally applied to the use of AI by college students and faculty for learning and for work. Harnessing the will of faculty and gaining their support for AI related initiatives would ensure both students and faculty's future viability.

Theoretical and methodological contribution

We focused on four AI-related dimensions and their impact on attitudes, an angle that has attracted only little empirical attention within the higher education context (MacLennan et al., 2025). And while attitudes were conceptually and empirically studied by several works, most reported findings have been correlational in nature (Merkley & Baker, 2025). Unlike the theoretical underpinnings and logic behind NCA (Dul 2020), correlational driven works explore the average effect of a single variable, or the average effect of a combination of related variables, on different outcomes (Bergdahl et al., 2023;

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Stein et al., 2024). Rather than measuring cause-and-effect amongst several variables, NCA - being binary in nature - establishes the necessary level that exists between one X and one Y at a time (Dul 2020). And since only a couple empirical studies have employed NCA as a methodology within the current theoretical context (MacLennan et al., 2025; Malka et al., 2025), the current study makes a modest attempt to further apply NCA to the study of students' attitudes and addresses the meager number of works on subject matter. Aside from the methodological reasoning, a practical argument can also be made; empirical findings from existing correlational studies tend somewhat to limit the usefulness of possible practical implications for organizations. For one, considering the complexity of a university setting or a firm's environment, it is difficult to apply *'averages'* that are at the core of regression models in an effort to examine relationships that can improve given conditions. It would be far easier for say a college administrator to apply empirical findings and proposed recommendations that offer specific *quantifiable* 'degrees' for improving the effect of a particular condition, as captured in NCA's bottleneck tables. Such a distinction is also theoretically significant since we offer empirically to study a research phenomenon from a different perspective and address a theoretical question with practical implications: Are single factors (i.e., awareness, experience, training, usage), studied one at a time necessary for a certain outcome (i.e., positive AI-related attitudes) when they are present at the right level, or block the outcome when this level is absent? Our study attempted to addresses this theoretical gap in addition to the practical and methodological contributions mentioned above.

Limitations and future research

Several limitations are worth mentioning. First, although fairly representative of the universe of the international student body at the targeted university (N=422), the sample reflects asymmetric gender subsamples with a tilt toward male students by a ratio of about 2 to 1 which may affect the findings. Second, limited exclusively to Indian graduate students, the responses may not be representative of the greater international graduate student population. Third, self-rater bias may exist given that the study's variables, both dependent and independent, were subjectively rated by the same participants themselves. Fourth, although at acceptable levels, the reliability scores of the instrument that was used call for caution in interpretation of results and for further testing of the research survey with additional populations. And finally, our study adopted a cross-sectional approach. Consequently, this methodology could have limited our ability to observe just how attitudes vary with possible technology and societal changes. If these effects are dynamic, any single survey might give us a misleading impression of the importance of AI-related determinants and attitudes in a rapidly changing environment. Future research should address each one of our mentioned limitations. It ought to consider samples that include other student populations; it should consider more symmetric

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gender-based sub-samples that are far larger and more balanced than the one we used. We likewise encourage exploring other tested and more reliable survey instruments. Future research should also consider objective measures to overcome self-rater bias, along with other methodological approaches with mixed-method being one alternative. Finally, assessing over time the persistence and 'durability' of effects in our study appears to be warranted. Longtitudinal methodologies are worth considering.

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DIGITAL TECHNOLOGY SERVITIZATION IN INNOVATIVE SUPPLY CHAIN

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ABSTRACT

This study, which is in progress, is part of the research fields on open innovation which broadly discussed are how different actors coordinate the degree of openness and innovation strategies in platform ecosystems to create and to capture value. The core objective of this paper is to empirically test whether competitively supply chain digitization processes, through platform projects produce better 'innovative-quality' outcomes and improve supply chain servitization thanks to the complementary involvement of the supply chain (SC) actors (macro-level changes) and in particular their ability to do research, their ability to manage and share data, their ability to industrialize new design ideas (technology-driven firm's internal changes). Although Digital technologies have massively initiated, it is challenging to achieve them, especially the most disruptive, successfully.

An interpretative, qualitative approach is chosen. 'Oriented case studies' investigate the issue within the Italian innovative supply chain with particular reference to the modern Italian chemical and agrochemical supply chain.

This study, while examining the scientific contributions provided by international managerial literature, even the most up-to-date, does not intend to represent a review of managerial theory so far produced, but also aims to provide, through the contextualisation based on highly technological case studies of companies operating in different innovative sectors (mechanics, agrichemical, digital machinery, bio-economics) some reflections and possible research directions.

Keywords: digital technologies, servitization, innovative supply chain servitization, supply chain platform.

INTRODUCTION

Digitalization and innovation are among the most relevant matters for innovative manufacturing firms, as they impact both managerial practices and the business model design in an unusual way.

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There is a research gap in understanding the impact of technological resources like R&D and production assets on service offerings and transitions in manufacturing companies (Opazo-Basáez et al., 2022; Momeni et al., 2023). It is in this context of non-conventional evolutionary improvement, as emerged in the past, that disruptive innovation is investigated in order to illustrate the evolutionary paths of supply chains. In addition, the supply chain innovation has become a critical research topic in strategic management studies (Wong and Ngai, 2022). The research and study work is under way and is part of the research fields on open innovation which broadly discussed are how different actors coordinate the degree of openness and innovation strategies in platform ecosystems to create and to capture value (Miremadi et al., 2023). This study aims to provide several key contributions to understanding the interplay between servitization, technology-enabled platforms, and service innovation in the supply chain. This study also contributes to the debate of various economic operators (entrepreneurs, R&D and governmental institutions, associations, etc.) and business management scholars on the diffusion of 'open innovation phenomena' and almost on the opportunities for growth that these offers to research intensive Italian supply chains that want to increase the economic and social wealth at the basis of new technological knowledge.

The focus of this contribution is mainly to highlight how new digital technologies, especially those implemented in production plants, in new material design and in new digital governance platforms within supply chains, represent the ideal prerequisite for allowing firms and new innovative actors (innovation communities, research centers, start upper, innovative hub, etc.). In modern and innovative, almost in non-usual way, supply chain, platforms reconfigure information flow - based (or possible through) on the supply chain platform-design: from demand perspective to offer's structure redesign. We imagine the incurrence of new meanings of knowledge flow in supply chains: we would like to investigate the transition from an 'intensive data processing' to knowledge-based business processes.

This paper investigates within the theoretical fields of the resource based view (RBV) and of the knowledge based view, the digital supply chain relationships between manufacturing producers and their suppliers, including new innovative operator, in design openness platforms and new digital servitized supply chain. An interpretative, qualitative approach utilizing selected multi-case study analysis is chosen. As regards the structure of work, in the first part the theoretical construction is articulated, then reference is made to the methodology used and finally some preliminary summary observations are presented e performance).

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THEORETICAL FRAMEWORK

Digitalization amplifies the complexity of the agrichemical and chemical supply chains.

Digital technologies allow that disruptive innovation, that is the basis of the generation of good economic performance, of the ideation of servitized forms of the supply chain. In practice, it can create new business opportunities for new companies and new supply chains. We want to focus attention on the processes of manufacturing activities and on those of R&D of firms belonging to the sectors that improve their digital evolutionary path accompanied by a very strong logic of servitization. This study aims to offer managerial support for those firms that approach to digitization (digitalization and digital transformation processes), by providing an explorative analysis of firm-level factors that could pushes firms' strategies and behaviors toward digital transformation processes and challenges from the resource-based view, together with an increasing understand of how macro-level changes translate into new firm-level behaviors and technology-driven internal changes (Liu et al., 2023). Traditional views are prone to overlook the temporal ramifications of changes in the complex interplay between multiple processes. Importantly, research from a supply chain process-theoretical perspective not only highlights the need for ongoing efforts to sustain supply chains as complex and dynamic phenomena but can also identify specific activities needed to adapt to and overcome disruptions. In short, the process research methods we explore in this article can help scholars develop a better understanding of supply chain stability, resilience, and change (Grimm et al., 2024). From a process-theoretical perspective, this paper not only highlights the need for ongoing efforts to sustain supply chains as complex and dynamic phenomena but can also identify specific activities needed to adapt to and overcome disruptions

This paper investigates within the theoretical fields of RBV and of the knowledge based view, the digital supply chain re-design relationships between manufacturing producers and their suppliers, including new ways in order to launch innovative processes that improve competitive performance such as open innovation platforms. Although the RBV places emphasis almost exclusively on the benefits deriving from collaborations based on the development of resources that are specific (unique or dedicated) to each relationship, and therefore difficult to imitate, interactions between diversified supply chains emerge with ever greater force in global competition. From the resource-based theory perspective, there is a growing emphasis on platform research within open innovation also as a result of digital firms becoming more involved in the crowds to leverage external resource (Bogers et al., 2021; Vanpoucke et al., 2022; Dai et al., 2025). Many studies have explored the evolutionary significance of the development of dynamic business skills or dynamic capabilities (DC),

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reinterpreting and enriching each time the theoretical framework of resource based view. DC are defined as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments (Teece, 2007) through the alteration of the firm's resource base (Helfat, 2022). DC can be leveraged to gain long term competitive advantage by improving existing resources configurations or to pursue a temporary competitive advantage by creating new resource configurations (Eisenhardt and Martin, 2000). The DC, always within the theoretical framework of the report-based view, are considered useful in innovative business processes. are crucial for firms as they enable adaptability, foster innovation, provide competitive advantage, enhance resilience, facilitate collaboration (Bocken and Geradts, 2020; Linde et al., 2021).

Knowledge resources are increasingly being made available by supply chain operators (manufacturers, suppliers, retailers, startuppers, etc.) in the restructuring processes of innovative production chain phenomena. The supply chain servitization made critical the study of the knowledge flow in new technological links which characterize the modern supply chains. We ask ourselves how these innovative processes impact supply chain relationships from a supply side perspective.

RQ1. We ask ourselves how these innovative processes impact supply chain relationships from a supply side perspective.

Innovation management scholars have investigated the relationship between technological innovations and innovative supply chain competitive perspectives as well as the innovative processes realization; even scholars from the domain of production management have focused on supply chain (re)configurations. In this paper we want to deepen the value that is created by the reconfiguration of the supply chain based on innovative digital processes and new relationships that are generated.

This work, within a supply chain analysis perspective, assumes strategic openness as involving the engagement of multiple actors distributed across supply chain levels and 'across different supply chains'. Research in OI has followed several different strands, giving evidence of the multidimensional nature of the concept of openness. Besides, other streams of research have taken into consideration the context of OI as for internal and external environmental characteristics, and for OI processes. The granular analysis of open innovation expands to three points. A)Open innovation, as discussed theme for some time (Chesbrough, 2018; Orgink, et al., 2023), more and more in the future regarding medium sized firms (MSFs) (Livieratos et al., 2022) and the dynamic dematerialized resources, as part of the dynamic capabilities, can help medium sized firms to reconfigure their industrial structures, rules of competition and supply chain value chain (Weaven et al., 2021). B) Open innovation that appears as a distributed (we could say participated) innovation process based

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on knowledge servitized flows pervade a multiplicity of businesses and economic operators (Barrett and Tsekouras, 2022). In practice, this results from innovative flows across firm boundaries. C)Open innovation can help firms find new ways to solve pressing problems, build positive reputations, and establish partnerships that will be useful through and beyond unpredictable turbulence (Dahlander and Wallin, 2020).

Supply chain stakeholders are becoming increasingly involved in the innovation process, particularly in the innovative SC. Scholars have used RBV to describe how firms can increase their competitive advantage and enhance their capabilities through collaboration. From the RBV perspective, external stakeholders are resources that can provide valuable knowledge for firms (Wong and Ngai, 2022).

Even though open innovation is for some time a discussed theme in managerial literature, - it is thought - has been recognized that some insights could be usefully made to the theoretical construct, especially regarding its implementation in digital processes in medium-sized firms. Less attention has been given to firm strategies that enable firms to implement and to use radical technologies that poses a significant challenge for firms (Nasirov and Castaldi, 2025). Servitization pushes firms to increase research efforts and redesign innovative relationships in the supply chains to which they belong and in the new ones that are established.

RQ2. The implementation of research-based cooperation forms through the use of open innovation increases the servitization value of innovative supply chains.

In the past decade, manufacturers have increasingly embraced servitization to gain competitive advantages, offering new value propositions through service expansion and extension (Tronvoll et al., 2020; Khan et al., 2024). We hypothesize that a supply chain servitization phenomenon represents a moment of transition from knowledge-based business processes to an intensive data processing approach.

Academics and practitioners have labelled the convergence of servitization and digitalization, “digital servitization” (Coreynen et al., 2017; Kohtamäki et al., 2019)

Digital technologies as adaptive technology-enabled process by which firms collaborate with suppliers, customers and partners to jointly create, deliver, and sustain value for all stakeholders (Gensler and Rangaswamy, 2025). They describe the evolution from products and services to solutions. They affirm that digital technologies help ‘servicize’ products and productize services’. Products can be servitized by bundling a product with various services, or a company could offer the

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functionality and benefits of a product without transferring ownership (Kramer et al., 2024; Orsdemir et al., 2019).

The servitization of the supply chain has made it critical to study the innovative knowledge that characterizes the innovative and modern supply chains, with particular reference, not usual in current management studies, new ways of connecting and transferring know-how flow across the various steps in the supply chain through digital technologies.

RQ3. The open knowledge dissemination process is a servitizated knowledge generation phenomena.

In sintesi, in questo lavoro di ricerca si predilige lo studio dei fattori tecnici ed in particolare si vuole approfondire le capacità dinamiche nel formulare strategie digitalizzate in maniera spinta. In particular, in strategic renewal processes with the rapid advancement of digital technologies, DC and digital transformation and explorative learning is deemed as a critical social factor that can boost firms' supply chain servitization (Dai et al., 2025).

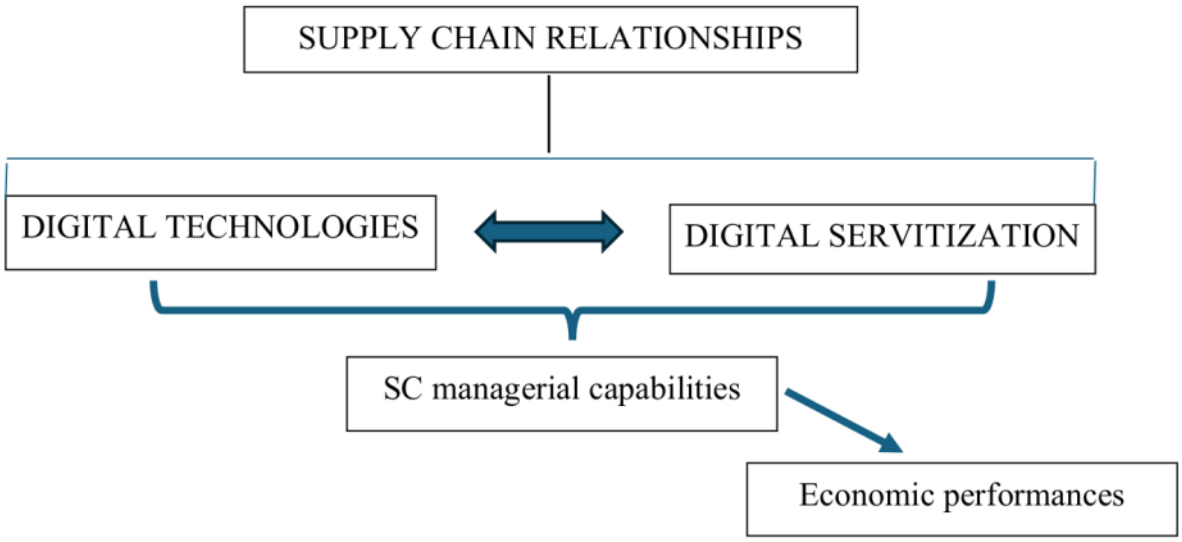


Figure 1 - Theoretical framework

Source: our own elaboration

METHODOLOGY

Qualitative research has been chosen. Through a case study methodology, it is possible to inductively analyze the theoretically derived domains and their relationships within a configuration. An interpretative, qualitative approach - utilizing selected multi-case study interviews (Mayring, 2014; Yin, 2014) - is a methodology that tends to be the preferred method, as they reveal more about the

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specific sustainable development processes of different sustainable strategic orientation, yet the universality of the results requires further validation. Scholars conducting empirical analysis and experimental studies have delved into how elements such as communication, supply chain leadership, and criticalities among partners, but these studies focus on more microscopic details (Ziegert et al., 2022; Xie et al., 2025).

The second round of data collection was conducted. There were 24 semi-structured interviews involving economic operators at various stages of the supply chain, the research consulting and the financial organizations, and representatives of technical schools and universities.

Particularly innovative are the chosen cases (see table 1) for small chemical firms which, despite their size, can carry out basic research with advanced and unusual in any case for their size.

The business cases investigated were selected based on the following factors:

A. Innovative digital technologies

B. New modes of innovation, in particular open innovation.

B.1. Open innovation, of the in-bound open innovation type

C. Which supply chain relationships are preferred in research and implementation.

D. What business performance is achieved by sustainable innovation.

E. What spillovers effects in the economic-territorial areas belonging.

Supply chain	Operations	R&D	Ecosystem
Mechanics-Chemical-agritech	Innovative 'Dynamic Driver-in-the-loop Simulator', first dynamic simulator for agricultural machines (based on real time numerical modelling of all machine systems and environments in which it operates).	Cloud-based FieldOps data platform, which 'links' agronomists and farm management areas	'Modena-industrial pole' in Italy for the development of traction systems with sustainable fuels and AI applications, robotics, design of sustainable vehicles.
Italian innovative energy supply chain	-Production of new raw material that increases the sustainability of other industrial cycles (steelworks) or production of syngas (mixture of Co2 and molecular hydrogen)	-Development of know-how in electrochemical technologies (through the production of ingredients to increase their efficiency and sustainability). -Expansion of production portfolio for decarbonized	Impact (disruptive) on 'energy-consuming districts'.

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	as an alternative fuel. -Ecological transition processes and decarbonisation of the chemical industry.	chemical carriers of renewable energies.	
Italian textile supply chain	Dyed fabrics thanks to the use of bacteria engineered with synthetic biology techniques (discipline straddling engineering and biology).	Pilot project 'start up' whit participation: Italian textile firm, textile research laboratory of the multinational fashion group, spin off Cambridge University	Textile Italian district in north Italy, R&D Laboratory UK
Precision smart farming	Supply chain interaction: with artificial intelligence from data collection to processing of information and satellite images; software and agronomic models for land management, farms, field controls.	-Acceleration start up for agricultural research and precision agriculture. -R&D internationalization	Italian ecosystems. Africa development Asia development
Agrochemical	Applies sound therapy to advanced fermentation, accelerating the growth of micro-organisms and increasing their production by up to 300%.	Under acceleration and scale up at the aim to diversify the technologies and their applicability	various Italian agronomic ecosystems and design of new ecosystems worldwide (Asia and Africa)

Table 1 - Case analysis as research laboratories

Source: our elaboration

The design of supply chain platforms

We direct the study on the evidence that platforms dematerialise supply chains and redesign evolved and open relationships in the digital economy era. Moving the observation from the single enterprise (and from the various scientific, technological and economic operators) to the supply chain, there are innovative and intangible phenomena that end up redesigning the ways in which operators relate to each other in the supply chains (including those coming from outside and perhaps present in a plurality of diversified production chains): it is the design of platforms, understood as informal, procedural and managerial structures, that although they are designed by leading companies, therefore with an established brand on the market and with a strong bargaining power in both upstream and downstream relationships, support forms of governance of relationships accepted by the actors in the supply chain. A platform can be presented as a technological support that, although constantly evolving, is adopted by interdependent companies in the supply chain. In this way, a platform serves as a hub for the supply chain within an open innovation system. They are, in fact, useful support for innovative and managerial growth, especially at the upstream or upstream, as they

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provide easier access to knowledge and technological innovation and at the same time recognize guarantees and even prizes in contractual negotiations or even allow the entry of innovators (start-ups; research centers, etc.).

It is a strategic option for the growth of modern supply chains, which can also be used by small and medium-sized enterprises that have acquired both technical and scientific skills and the ability to relate with the outside world. Each of the partners puts into practice its natural propensity to use resources from outside: the platform is a community in which it develops, and only there does it take root, the knowledge that the partners decide to share. It therefore represents an extension of the basic knowledge of each of the companies involved, without any of them having an interest in appropriating it exclusively for their own market purposes.

The digitalized supply chain appears as a 'transformation cycle of the intangible'. The supply chain platform is in practice the supply chain lowers the risks of exploration and industrialization of the innovative product-process combination (or solution). On the contrary, it makes possible, that is to say implementable, creating value and visible, multiple technological-productive solutions which can be carried out in parallel, even though the life cycle of each solution is short.

To summarize, we define the platformization pathway as the transformation process that a manufacturer undergoes to become a digital platform provider. We conclude, that there are three main elements to be explored in order to understand the platformization pathway of manufacturers as a transformation process: (i) single stages of the process from a traditional product provider to a digital platform provider, (ii) dynamics resulting in process flows and thus in single transitions between the stages driven by continuous balancing between explorative and exploitative activities, (iii) contextual factors, determining the process flows and shaping the transformation.

We contribute to literature in three important ways. First, by explaining the stages of the *platformization pathway* from the perspective of a transformation process representing a new framework for further studies in this context (Baines et al., 2020). Second, our work provides an unparalleled explanation of the intricate dynamics and fluidity observed in the transformation process. Through a continuous interplay between exploration and exploitation activities, we offer a fresh perspective that adds significant value to the evolving field of the dynamic perspective of ambidexterity research (Kohtamäki et al., 2022). Third, we contribute to the current literature stream that integrates platforms and servitization (Eloranta et al., 2021; Jovanovic et al., 2022; Lerch et al., 2024), as well as the ‘contextual’ ambidexterity literature, by providing a systematization of the

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technical, organizational and environmental factors that determine the context of the transformation process.

Supply chains are conceptualized from this alternative process perspective as dynamic phenomena rather than as connections between static entities, as always becoming rather than being. Because chains and their management are understood from this perspective as being open to a multitude of evolving contextual influences, their development over time is intrinsically complex and far from perfectly predictable

SOME CONCLUDING OBSERVATIONS

The research work which is still being carried out allows at this stage some synthesis reflections to be made. Based on the empirical evidence, findings show how business-internal processes and new relational processes within supply chains are invested by disruptive and unplanned digital transformations. The research focus has been on the processes of manufacturing activities and those of R&D of firms belonging to the supply chains that improve their digital evolutionary path accompanied by a very strong logic of servitization. This study provides several key contributions to understanding the interplay between servitization, technology-enabled platforms, and service innovation in supply chain.

We directed the study on the evidence that platforms dematerialise supply chains and redesign evolved and openness relationships in the digital economy era.

Servitization pushes firms to answer the increasing commoditization of products, by innovating their business models and shifting their focus from selling products to offering a combination of products and services

The investigated firm's cases highlight how Italian medium-sized chemical and agrochemical firms have redesigned their supply chain relationships with the actors belonging to the supply chain thanks to the implementation of digital technologies: it is highlighted how the supply chain platforms have allowed Italian chemical companies to continue advancing specific and sophisticated know-how in basic research. The platforms, which are specific to the supply chain, appear as collaborative supply chain: are designed by leading firms in the supply chain and all members collaborate and share knowledge and resources within the platform to accomplish supply chain goals that are shared by all.

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It emerges that a new supply chain reconfiguration is inevitably an important part of the current innovative processes that firstly are increasingly exploratory and secondly are almost continuous and generates sensitivity to innovative technological choices, for the interest of our research especially in operations and R&D areas of the firms belonging at the Italian chemical supply chains. Digital technologies transform existing supply chains and design new supply chains: in both cases, supply chains become open to open innovation as a form or mechanism of 'governance increased' of the buyer-supplier relationships.

The chosen case studies highlight how the firs belonging to the Italian innovative chemical supply chains have rethought and re-imagined the traditional ways of making innovation and to redesign processes that shape technology adoption within their sector.

Theoretically contribution to new ways of doing business in modern supply chains by highlighting the importance of the platform, understood as formalized technological-operating procedures, and recognized by the operators (innovators, suppliers, buyer-firms, information services providers) of supply chain. In this sense we highlight the transition, firstly from demand-chain data integration to a supply chain data integration in the sense of the offer's structure (from downstream to upstream); secondly, from ability in leveraging existing resources to develop new and dynamic capabilities with the aim of maintaining competitive advantage in changing industry environments and competitive processes.

The ongoing digitalization requires at all supply chain's firms to foster a digital mindset based on new strategic visions, managerial behaviors and skills to navigate information-dense digital competitive environments. These findings enrich the literature on strategic orientation and sustainable innovation and provide practical implications for guiding agrifood firms to implement all required R&D activities and innovative strategies; those carried out in a new and unusual way for innovative, and increasingly servitized chemical and agrochemical supply chain.

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OVERCOMING BARRIERS, ACHIEVING EXCELLENCE: THE ROLE OF AI IN PORTUGAL'S METALWORKING SMES

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ABSTRACT

This study investigates the critical determinants influencing the adoption of Artificial Intelligence (AI) among small and medium-sized enterprises (SMEs) within Portugal's strategically important metalworking sector. Employing the Hybrid Technology Acceptance Model-Technology-Organization-Environment (TAM-TOE), this qualitative research explores the interplay of technological, organizational, and environmental factors shaping AI integration. Through semi-structured interviews conducted across diverse SMEs, the findings highlight significant benefits such as enhanced productivity, operational efficiency, and competitive advantage. Conversely, barriers such as perceived complexity, financial constraints, limited technological literacy, and organizational resistance were also identified. The research underscores the pivotal role of visionary leadership, continuous employee training, strategic compatibility, and external partnerships with AI specialists in facilitating effective AI adoption. The study bridges existing literature gaps by providing nuanced insights into AI adoption dynamics in SMEs, contributing theoretically and managerially to understanding technology-driven competitiveness in the context of Industry 4.0.

Keywords: Artificial Intelligence; AI Adoption; SMEs; Hybrid TAM-TOE Model; Industry 4.0; Metalworking Sector; Portugal; Organizational Competence; Technological Integration; Competitive Advantage

INTRODUCTION

Smart Manufacturing, or Industry 4.0, represents a major shift in industrial paradigms through digitalization, automation, and data-driven decision-making (Grashof & Kopka, 2022). Artificial Intelligence (AI) is central to this revolution, transforming data into actionable insights for predictive, generative, and autonomous decision-making (Rammer et al., 2022; Taherizadeh & Beaudry, 2023). AI enhances operational efficiency, providing strategic advantages and fostering sustainable growth (Moradi & Dass, 2022). In metalworking, AI innovations like automated machining and predictive

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maintenance significantly boost productivity, reduce costs, and improve quality (Gajdzik & Wolniak, 2021; Rawashdeh et al., 2023). However, SMEs face challenges in AI adoption due to technological complexity, resource constraints, limited literacy, and resistance to change (Moradi & Dass, 2022; Taherizadeh & Beaudry, 2023). Overcoming these requires leadership, strategic alignment, workforce training, and partnerships with technology experts (Chatterjee et al., 2021).

In Portugal, metalworking sector is economically significant, with 23,000 companies, 246,000 employees, and €8.7 billion in annual revenue, accounting for 58% of exports in 2022 (Instituto Nacional de Estatística, 2023). Despite its importance, Portuguese SMEs lag in productivity compared to European counterparts, necessitating AI solutions.

This study uses the Hybrid Technology Acceptance Model-Technology-Organization-Environment (TAM-TOE) to analyze AI adoption determinants among Portuguese metalworking SMEs, aiming to understand motivations, benefits, and barriers and provide insights for effective AI integration in Industry 4.0.

LITERATURE REVIEW

AI replicates human cognitive abilities like learning, reasoning, and decision-making (Lee et al., 2019; Mishra & Tripathi, 2021); it is categorized into generative AI, which creates new content from data patterns, and predictive AI, which forecasts outcomes using historical data. Nowadays, AI's main features include autonomous learning, adaptability, and informed decision-making from historical and real-time data (Bhatt & Muduli, 2023), and it can be a key part of business operations, driving advancements in finance, healthcare, marketing, and manufacturing (Lee et al., 2019; Moradi & Dass, 2022). In Industry 4.0, AI is crucial for smart factories, making manufacturing environments more intelligent and responsive (Taherizadeh & Beaudry, 2023). AI can improve SMEs' productivity, efficiency, decision-making, and customer service personalization. In metalworking, AI-driven automation enhances production quality and reduces costs, addressing SMEs' resource limitations (Gajdzik & Wolniak, 2021; Rawashdeh et al., 2023). Automated machining processes operate independently during non-working hours, minimizing downtime and boosting productivity. However, SMEs face barriers like limited technological literacy, financial constraints, organizational complexity, and resistance to change (Moradi & Dass, 2022; Taherizadeh & Beaudry, 2023).

Given the complexity of AI implementation in SMEs, theoretical frameworks are crucial for understanding adoption dynamics. The Hybrid Technology Acceptance Model–Technology,

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Organization, Environment (TAM-TOE) integrates internal and external factors influencing technology adoption (Chatterjee et al., 2021; Jo & Bang, 2023).

The TAM model highlights perceived ease of use and usefulness as key determinants of technology adoption. Users are more likely to adopt new technologies if they find them beneficial and easy to use (Chatterjee et al., 2020; Jo & Bang, 2023). While external variables like leadership and competencies are important, the focus is on internal factors affecting individual acceptance and organizational change (Ramírez-Gutiérrez et al., 2023). The TOE framework complements TAM by considering technological, organizational, and environmental factors. It emphasizes organizational characteristics, leadership, market conditions, competitors, and external partnerships as critical for successful technology adoption (Alsheibani et al., 2018; Chatterjee et al., 2021; Jo & Bang, 2023; Ledro et al., 2023). Combining TAM and TOE into a hybrid model covers internal and external factors influencing AI adoption. This Hybrid TAM-TOE model provides a holistic understanding of the factors driving AI integration in SMEs, especially regarding socio-environmental and technological dimensions (Chatterjee et al., 2021; Ramírez-Gutiérrez et al., 2023).

The proposed conceptual model (Figure 1) for AI adoption in organizations includes organizational and environmental variables such as Efficiency (Rawashdeh et al., 2023), Competence, Complexity, and Organizational Capacity, categorized as internal variables. Competitive Advantage is presented as an external variable. Additionally, it integrates technical variables based on the Technology Acceptance Model (TAM), specifically Perceived Ease of Use and Perceived Usefulness (Chatterjee et al., 2021).

The variables of the model are described as follows:

Organizational Efficiency - Rawashdeh et al. (2023) highlight that time-saving drives AI adoption. Companies see AI as a tool for faster, cost-effective, and higher-quality task execution, boosting their willingness to adopt it for competitive advantage.

Organizational Competence - Employees' skills and knowledge are crucial for their tasks. The TOE model links competence to firm performance. Effective technology use by employees signifies competence; otherwise, its value is lost (Chatterjee et al., 2021).

Organizational Complexity - It involves challenges in understanding and using the technology, affecting efficiency and decision-making. Increased complexity reduces perceived usefulness and ease

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of use. Employees must recognize AI benefits to avoid difficulties (Chatterjee et al., 2021). Developing the necessary knowledge is crucial (Chaudhuri et al., 2022).

Organizational Capacity - involves the resources available for adopting technologies like AI. Size, financial, and technological resources are key factors. Larger organizations need more resources for new technologies. If unprepared, employees may feel uncomfortable, affecting perceived usefulness (Chatterjee et al., 2021).

Organizational Compatibility - involves integrating innovation with existing values, experiences, and requirements. It assesses how well AI aligns with organizational norms and values, measured by the ease of integrating AI into current processes and infrastructures. Legacy systems can hinder innovation due to incompatibility (Chatterjee et al., 2021; Chaudhuri et al., 2022; Zhou & Zheng, 2023).

Organizational Leadership - involves genuine leader engagement in implementing new systems, impacting perceived usefulness, ease of use, and usage intent (Chatterjee et al., 2021). This commitment is crucial for adopting innovative technologies (Chaudhuri et al., 2022; Grooss et al., 2022; Zhou & Zheng, 2023).

Competitive Advantage - refers to technology's benefits over alternatives, driving AI adoption by fostering innovation and new opportunities, creating an advantageous positioning relative to competitors, allowing differentiation and significant market advantage (Alsheibani et al., 2018; Chatterjee et al., 2021).

Perceived ease of use indicates how effortlessly new technology can be used without extra effort (Chatterjee et al., 2021; Nja et al., 2023). According to TAM, ease of use is crucial for AI acceptance in companies (Chatterjee et al., 2021; Nja et al., 2023), involving self-efficacy, external control, anxiety, interactivity, and enjoyment.

Perceived usefulness is users' belief that a system or application can improve their professional performance (Chatterjee et al., 2022; Chatterjee et al., 2021; Nja et al., 2023). This perception motivates technology usage, including aspects like subjective norms, image, job relevance, output quality, and results. Thus, perceived usefulness drives the intention to adopt new technology like AI (Chatterjee et al., 2021).

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METHODOLOGY

The qualitative approach was chosen specifically for its ability to offer in-depth insights into real-world phenomena, providing a nuanced understanding of the participants' attitudes, behaviours, and motivations concerning AI adoption (Ledro et al., 2023).

Data was collected through semi-structured interviews with key stakeholders from 13 SMEs in Portugal's metalworking sector. The selection was intentional and convenience-based (Farrokhi & Mahmoudi-Hamidabad, 2012; Suri, 2011). Respondents included senior management (9 interviews) and middle management (7 interviews), providing diverse insights into AI adoption. Interviews followed a semi-structured protocol based on the Hybrid TAM-TOE model (Chatterjee et al., 2021), allowing for free expression and exploration of emerging topics (Ledro et al., 2023). Data analysis was conducted in two stages using an abductive approach (Dubois & Gadde, 2002). Interviews were transcribed, imported into Nvivo, and coded according to the hybrid TAM-TOE model variables (Chatterjee et al., 2021). Leadership emerged as a primary variable, and "partner support" was replaced by "efficiency" (Rawashdeh et al., 2023). Table 1 presents all categories.

Categories	Meaning	F	R
Capacity	The organization's ability to adopt innovative technologies like AI depends on its size and financial resources. If unprepared, employees may feel uncomfortable using AI, affecting its perception and acceptance.		
Investment		7	12
Annual budget		2	2
Compatibility	How easily can AI innovation be integrated into existing processes and infrastructures, aligning with the organization's current standards and values?		
Administrative		3	3
Commercial		6	6
Quality Control		5	5
Marketing		4	4
Budgeting		2	2
Planning and Management		4	5
Production		4	4
Expected Results		15	38
Results		4	11
Competence	An organization's competence is tied to its employees' ability to use a technology; otherwise, its usefulness is compromised as employees don't recognize its benefits.		
Education		15	22
Age		15	19
Complexity	Challenges and limitations in understanding and using AI. If employees can't grasp the benefits of adopting AI, they'll face more issues when using the technology. Therefore, they must develop the necessary knowledge to use AI effectively without restrictions.		
Challenges		16	36

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AI specialists		14	17
Specific Training		13	18
Efficiency	AI can save time in task execution, positively influencing the willingness to adopt it.		
Productivity		16	25
Ease of Use	The ease of using new technology without requiring extra effort. The perception of ease motivates employees to use the technology.	11	15
Motivations		2	2
Leadership	The genuine involvement of leaders in implementing the technology. This commitment is crucial for the adoption of AI.		
Incentive		4	6
Not incentive		11	13
Perceived Usefulness	Users' perception that technology can enhance their work performance drives them to adopt new technology like AI.		
Importance		11	15
Advantages		4	5
Competitive Advantage	the benefits a technology offers compared to other options, playing a crucial role in its adoption. Clear advantages of AI can drive its adoption by overcoming the threat of losing benefits provided by alternatives. Additionally, competitive advantage pertains to an organisation's advantage over competitors by adopting innovative technologies.		
Competitiveness		15	44

Table 1 – Codification [Nota. Codebook extracted from NVivo (F – Files; R – References)]

RESULTS

The analyzed cases reveal significant variations in AI adoption stages. Some companies have already integrated AI, while others are aware of it but have yet to implement it for various reasons. Additionally, some firms are unfamiliar with AI but intend to adopt it in the future, whereas others neither possess knowledge of AI nor consider it relevant to their business.

The study revealed that leadership and leaders' knowledge about AI significantly influence its adoption. Mishrif and Khan (2023) highlight that SMEs are inclined to adopt innovative technologies when they recognize their potential to improve performance and generate tangible benefits, such as enhanced efficiency, cost reduction, or improved customer experience. This perception of direct advantages serves as a strong motivator for technological adoption. Contrary to initial expectations, data indicate that many leaders still lack awareness of AI's benefits, leaving its full potential largely unexplored ["*I was caught off guard by the topic of AI; honestly, I hadn't reflected on the matter and don't possess much knowledge about it*"].

Due to insufficient knowledge of AI technology, many companies struggle to keep pace with its demands. Consistent with the literature, not all businesses, particularly SMEs, will achieve their

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technological aspirations. Resource limitations constitute a significant barrier to digital transformation (Ghobakhloo et al., 2022). Implementing AI implies substantial investments alongside robust technological culture and expertise (Annosi et al., 2023; Grashof & Kopka, 2022; Ghobakhloo et al., 2022; Kinkel et al., 2022; Mishrif & Khan, 2023; Rawashdeh et al., 2023; Taherizadeh & Beaudry, 2023).

Interviews believe AI could be more readily adopted in commercial areas, quality control, marketing, management, and planning ["*The adoption of AI has led to increased productivity, improving production times, reducing waste, and making us more objective in targeting our audience*"]. Conversely, implementation in production faces uncertainty and is viewed by some as a challenging endeavor. However, there is a growing belief that AI can enhance automation on the production floor, enabling faster task execution, cost reduction, and improved product quality, thus fostering better customer relations (Kinkel et al., 2023). An interview claims that "*AI adoption will allow us to reduce production times and make processes more efficient*".

Despite its potential, SMEs' AI adoption remains limited, especially in production and logistics (Kinkel et al., 2022). Krzywdzinski et al. (2023) argue AI automates complex tasks with minimal creativity. However, there's no consensus among companies. One interviewee expressed concern that *"workers fear the potential elimination of jobs due to AI adoption"*. Others see AI as complementary, stating, *"AI would significantly help optimize time and add value to daily tasks, allowing people more time to innovate"*.Thus implementing AI within the metalworking sector seems a big challenge. This difficulty does not necessarily stem from worker qualifications, a common obstacle in the iron industry (Branca et al., 2020; Gajdzik & Wolniak, 2021). Instead, it arises from general AI knowledge deficits and difficulties attracting younger, tech-savvy workers ["*younger workers are more receptive to technology compared to older ones, who often resist changes*"]. Respondents acknowledge that AI adoption is likely easier for younger, qualified professionals, emphasizing the necessity of specific training programs. Furthermore, partnerships with external AI specialists might be crucial for successfully implementing and optimising AI benefits.

Research indicates AI adoption presents challenges regarding data quality, validity, security, and regulatory compliance (Moradi & Dass, 2022; Ramírez-Gutiérrez et al., 2023; Rammer et al., 2022; Sharma et al., 2022). Similarly, interviewees express reservations about AI ["*concerns over the quality and reliability of data fed into AI systems*"]

The interview analysis also identifies additional barriers to AI adoption among Portuguese SMEs in the metalworking sector. Beyond technological complexity, factors like "AI illiteracy" emerge as significant. Kumar et al. (2021) suggest that low AI literacy negatively impacts perceived usefulness,

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ultimately hindering adoption. Another critical obstacle repeatedly emphasized by interviewees is the lack of government support, particularly regarding high investment costs. The inability to accurately evaluate AI's return on investment (ROI) is another limiting factor discouraging investment (Taherizadeh & Beaudry, 2023). This lack of perceived financial gains further reduces SMEs' willingness to adopt AI-driven solutions.

DISCUSSION

Following the interview analysis, it was found that, in line with the arguments of Alsheibani et al. (2018), top management encouragement can positively influence the adoption of new technologies. This was observed in companies where leadership was key to advancing AI adoption. Furthermore, these companies demonstrated financial capacity to invest in technology, particularly one that has already made substantial investments in this area.

However, a divergence of opinions emerged; one company leader believes AI will reduce the need for specialized knowledge, and the other argues that AI will require greater specialization. This contrast highlights a topic that remains underexplored in the literature, as most studies focus on AI's technical and productivity benefits while neglecting how different leaders perceive shifts in human capital dynamics. Thus, individual leadership perspectives may vary significantly, shaping how AI is adopted and integrated within organizations. Existing literature (e.g., Hansen & Bøgh, 2021) tends to focus primarily on AI's efficiency impact. In contrast, one company is currently exploring and assessing digital technologies within Industry 4.0, which is clearly influenced by the leader's academic background and professional experience. Top management's lack of awareness or knowledge has led to the non-adoption of AI.

Sidlauskiene (2022) suggests that the perceived complexity of advanced technologies can be a significant barrier to adoption, particularly in contexts where top management lacks a clear understanding of AI's applications and benefits. This aligns with the observation that a company from our sample led by an informed and experienced leader is more inclined to explore AI. At the same time, other firms struggle due to limited knowledge. Moradi & Dass (2022) emphasize that education and professional experience can help overcome barriers to technology adoption, mainly by reducing internal resistance. These cases exemplify this point, illustrating how academic preparation facilitates AI adoption, contrasting with companies where leaders lack a similar understanding. AI adoption intent guided by the leader's knowledge and vision supports the notion that informed and strategic leadership is crucial (Ledro et al., 2023).

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Annosi et al. (2023) argue that resistance to digital technology adoption, particularly in SMEs, stems from managers' difficulty recognizing their benefits. However, interview analysis suggests that even when managers acknowledge AI's advantages, resistance to change persists, especially in sectors with a high proportion of manual tasks, such as shop-floor operations. This contradicts the assumption in the literature that theoretical acceptance of technological benefits automatically translates into practical adoption (Chatterjee et al., 2021).

Hansen & Bøgh (2021) argue that investment in AI will shape the future. However, given the substantial costs, companies remain hesitant about their return on investment (ROI). Some companies, especially younger ones still striving to meet their basic operational needs, lack the financial capacity for AI adoption. Sharma et al. (2022) highlight the importance of government incentives in AI adoption. The interviews confirm this necessity while also revealing that financially constrained younger firms struggle to implement cost-intensive technologies such as AI even with incentives. This suggests that existing literature may underestimate the impact of financial constraints, even when political incentives are available.

Interviewees generally perceive AI as a valuable tool, particularly in commercial operations, where it is expected to enhance customer response times, improve quality control, reduce errors, and increase customer satisfaction (Chatterjee et al., 2021; Kinkel et al., 2023). However, some companies hold a contrasting view on AI's role in after-sales services, arguing that AI-driven customer interactions may be detrimental; businesses often hide behind technology, and using automated responses fails to resolve customer issues adequately.

In marketing, AI is also seen as a powerful tool for creating more strategically targeted digital content, developing more engaging advertising, improving management efficiency, and optimizing administrative processes. Despite recognizing AI's potential to automate production processes, interviewees struggle to envision its practical implementation in shop-floor operations, where human labor remains highly dominant. This concern aligns with Sidlauskiene (2022), who argues that perceived complexity and adaptation difficulties in manual work environments represent significant barriers to AI adoption.

Age is crucial in AI adoption. Younger employees, familiar with technology, have an advantage over older ones, who may struggle. While digital literacy's role is acknowledged (Sidlauskiene, 2022), this study suggests age-related barriers are more significant. Strategies are needed to integrate AI across multigenerational workforces. This contrasts with Moradi & Dass (2022), who believe education and experience can mitigate generational disparities.

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The hybrid TAM-TOE model (Chatterjee et al., 2021) suggests a positive correlation between perceived ease of use and AI's usefulness. However, study findings indicate that while AI is perceived as user-friendly, this does not necessarily translate into a clear understanding of its advantages (Sidlauskiene, 2022). This discrepancy suggests that ease of use alone is insufficient to drive adoption if managers do not fully grasp AI's potential benefits for their organizations. Thus, existing literature may underestimate the relationship between perceived ease of use and actual adoption, failing to consider the crucial role of education and awareness in the process. To maximize AI's benefits, establishing partnerships with external AI specialists could provide essential support throughout the implementation phase. This aligns with literature emphasizing the challenges businesses face when adopting AI (Taherizadeh & Beaudry, 2023).

Interviewees agreed that AI adoption enhances efficiency, speeding up tasks and reducing effort, thus boosting competitive advantage. Rawashdeh et al. (2023) noted AI accelerates customer response, improves product quality, and offers competitive pricing. Haefner et al. (2023) argue AI is essential for industry leadership. However, most studied companies haven't integrated AI due to leadership's lack of initiative and understanding of AI's benefits. Managers often fail to grasp AI's strategic importance, delaying adoption. Interest in AI has risen, especially with tools like ChatGPT, but comprehension of its potential remains low. This gap isn't well-addressed in literature, which assumes exposure leads to understanding and adoption. This lack of awareness may hinder AI adoption, even among firms recognizing its strategic value. Table 2 provides a summary of the main findings.

Theme	Interviews Conclusions	Literature	Coments
Leadership Incentive	Top management support positively influences AI adoption in companies.	Alsheibani et al., 2018	According to the literature, it emphasizes the importance of leadership.
Financial Capacity	Companies with financial capacity for large AI investments find implementation easier.	Sidlauskiene, 2022	It highlights financial capacity as a facilitator for adoption
Perception of AI	Opinions diverge: AI is seen as reducing the need for specialized knowledge vs. increasing specialization.	Hansen & Bøgh, 2021	The literature focuses on efficiency, but leaders' perceptions show divergences.
Academic Background and Experience	Leaders' training and experience positively influence AI adoption.	Moradi & Dass, 2022	Alignment with the literature emphasizes the importance of training.
Resistance to Change	Resistance to change persists, especially in manual sectors, even when managers recognize AI benefits.	Annosi et al., 2023	The literature acknowledges resistance, but practice reveals greater complexity.
AI Compatibility	It is beneficial in commercial and marketing areas, but its application in production is challenging due to its reliance on human labor.	Sidlauskiene, 2022,	Compatibility is positive, but practice shows challenges.
Age Difference	Employee age is crucial; younger	Moradi &	Literature points to digital

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	workers adopt AI more easily than older ones.	Dass, 2022; Sidlauskiene, 2022	literacy, but age is a bigger hurdle.
Partnerships	Partnerships with AI experts are essential for successful implementation.	Taherizadeh & Beaudry, 2023	Ease of use should be supported by expert assistance.
Government Incentives	Even with government incentives, younger and less financially stable companies struggle to adopt AI.	Sharma et al., 2022	Literature downplays the impact of financial limitations on AI adoption.
Perception of AI Utility	Although AI is considered easy to use, this perception doesn't offer an advantage.	Chatterjee et al., 2021; Sidlauskiene, 2022	It suggests a greater need for education and awareness about the benefits of AI.
Competitive Advantage	All interviewees agree that AI will boost efficiency and competitive advantage for companies.	Haefner et al., 2023; Rawashdeh et al., 202)	There is strong agreement with the literature that views AI as essential for competitiveness.

Table 2 - Summary

CONCLUSION

In today's tech-driven world, companies that adopt new technologies can achieve sustainable growth. This study shows that for successful AI adoption, Portuguese SMEs in the metalworking sector need visionary leaders who stay updated on tools and technologies, encourage employees to embrace tech advancements, and maintain competitiveness.

Taherizadeh & Beaudry (2023) emphasize that leaders must have an open mindset towards new technologies to promote AI adoption among employees. This openness helps employees see AI as a tool to enhance work, not replace it, reducing resistance to change. While Chatterjee et al. (2021) view leadership as a moderating factor, this study highlights it as a key enabler of AI adoption, speeding up the process. Leaders must also recognize AI's utility, understand its benefits, and find ways to use it for growth.

Many leaders find AI easy to use but lack knowledge about its applications due to its complexity. Most agree on the need for partnerships with AI-specialized firms for successful implementation, as Taherizadeh & Beaudry (2023) noted. The TAM-TOE model by Chatterjee et al. (2021) identifies compatibility as crucial for perceived AI utility. However, this study found that many SMEs still rely on manual operations, needing significant changes to integrate AI. The advantages of AI remain largely unknown among these SMEs.

Strong, visionary leadership is crucial for AI adoption, but many organizations lack this. Visionary leaders are proactive and innovative and inspire employees towards common goals. They clearly

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communicate their vision, engage in operations, and drive innovation for long-term sustainability (Farhan, 2024). A major obstacle to AI adoption is the lack of tech awareness and leadership-driven incentives.

Despite challenges, there's growing recognition of AI's potential to boost efficiency and competitive advantage. This study could spark discussions on AI adoption, inspiring some initially curious interviewees to consider implementing AI. Leaders are willing to explore AI, understanding that business success relies on technological advancement. Companies that don't keep up risk losing their competitive edge.

In response to "What influences AI adoption among SMEs in the metalworking sector in Portugal?" based on the TAM-TOE hybrid model (Chatterjee et al., 2021), this study identifies four key factors: 1) Visionary leadership fostering a transformative culture; 2) Continuous AI literacy and training; 3) Strategic partnerships with AI specialists; and 4) Government incentives and support programs. The findings indicate that the lack of knowledge, leadership, and implementation costs are the most significant barriers to AI adoption. The study reinforces and expands existing theories by emphasizing leadership as a determinant factor in AI adoption. Chatterjee et al. (2021) identified leadership as a moderating variable, but this study shows it also catalyzes AI adoption. Visionary leadership fosters a culture supporting digital transformation (Farhan, 2024). This research adds to TAM-TOE by showing AI's perceived usefulness is limited by its complexity and SMEs' lack of deep tech understanding. Companies must evaluate technological complexity and internal competencies (Wael AL-Khatib, 2023). Strategic partnerships are crucial for AI adoption, bridging knowledge gaps (Taherizadeh & Beaudry, 2023). This suggests technology adoption theories should include strategic partnerships as a core component.

This research enhances understanding of cultural and organizational challenges in AI adoption, particularly within metalworking SMEs that still rely heavily on manual operations. The findings suggest that compatibility between AI and existing work processes is critical, as outlined in the TAM-TOE model. Moreover, the study highlights that a deep organizational transformation may be required to fully integrate AI, offering insights into resistance to change and necessary adaptations (Wael AL-Khatib, 2023). Analysing motivating and inhibiting factors in AI adoption adds a practical dimension, demonstrating that the lack of knowledge and leadership-driven incentives are significant obstacles. These theoretical insights emphasize the need for training strategies and skill development programs to reduce resistance and improve AI acceptance (Moradi & Dass, 2022; Dudzinskaite et al., 2024). Finally, the study reinforces the importance of attractive government policies encouraging

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SMEs to adopt AI. This suggests that technology adoption models should more explicitly incorporate the impact of external policies and government support (Sharma et al., 2022), particularly in contexts where SMEs face substantial challenges related to resources and capabilities.

The study's lack of comparative analysis between SMEs and larger enterprises limits understanding of AI adoption dynamics. Future research should use mixed-method approaches and larger, diverse samples to enhance generalizability and reduce biases. Comparative studies on AI adoption between different organizational scales could provide valuable insights into technology implementation and competitive outcomes.

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RECONCEPTUALISING PUBLIC–PRIVATE PARTNERSHIPS THROUGH THE ECOSYSTEM THEORY PERSPECTIVES: THE CASE OF THE SEMICONDUCTOR INDUSTRY

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ABSTRACT

Semiconductors are foundational to global competitiveness, technological sovereignty, and innovation across sectors such as AI, telecommunications, energy, and defense. Yet the industry faces a convergence of systemic risks: geopolitical tensions from production concentration, complex interdependencies in global value chains, and persistent supply chain disruptions. Traditional public–private partnership (PPP) models—typically bilateral, infrastructure-focused, and nationally bounded—are increasingly insufficient to navigate these challenges.

This paper reconceptualizes PPP governance through the lens of ecosystem theory, advancing a dynamic, multi-actor model that emphasizes strategic alignment and governance, ecosystem dynamics, and policy-driven interventions. It examines the evolving roles of diverse stakeholders—including international organizations, governments, suppliers, consumers, and multinational enterprises (MNEs)—within semiconductor PPP ecosystems. MNEs such as TSMC, Intel, Samsung, and ASML are reframed not as passive participants but as ecosystem orchestrators shaping resilience and innovation through multi-scalar governance.

The proposed ecosystem-oriented framework contributes to knowledge on governance, strategic management, and industrial resilience by offering an adaptive PPP mechanism suited for high-uncertainty environments. It provides practical insights for policymakers and firms seeking to build resilient, sovereign and long-term sustainable development.

Keywords: Public-Private Partnerships (PPPs), Ecosystem Resilience, Semiconductor Industry, Multinational Enterprises (MNEs), Ecosystem Governance, Technological Sovereignty, Sustainability

INTRODUCTION

Strategic industries such as the semiconductor industry serve as a cornerstone of global technological innovation and economic competitiveness. Semiconductors are not merely components; they are foundational enablers of national competitiveness, digital sovereignty, and industrial innovation. It

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underpins transformative progress across a vast spectrum of strategic sectors, including artificial intelligence, telecommunications, renewable energy systems, automotive technologies, healthcare innovation, advanced manufacturing, and defence infrastructures (Luo & Van Assche, 2023; McKinsey, 2022).

However, the industry now faces a convergence of emerging disruptions that threaten its operational stability and strategic trajectory. Three intertwined and escalating challenges are reshaping its landscape: (1) Geopolitical Risks: Heavy concentration of semiconductor production in a few geopolitical hotspots, most notably Taiwan and South Korea, has heightened exposure to trade wars, export controls, and geopolitical tensions (Aoyama et al., 2024; Wu, 2025); (2) Technological Interdependence: The semiconductor value chain is one of the most globally fragmented and technologically complex, requiring deep coordination across suppliers, designers, fabricators, and end-users (Kuan & West, 2023); (3) Supply Chain Vulnerabilities: Disruptions caused by the COVID-19 pandemic, natural disasters, and transport bottlenecks have underscored the fragility of just-in-time semiconductor logistics and exposed the need for diversified, redundant, and risk-resilient supply chains (BCG, 2024, 2021; Farrell & Newman, 2020; KPMG, 2021; Kurrahman et al., 2025; Lu et al., 2025; McKinsey, 2022; PWC, 2021; World Bank, 2021).

For multinational corporations such as TSMC, Intel, Samsung, and ASML, the confluence of geopolitical risk, technological interdependence, and supply chain fragility has evolved from a set of discrete operational concerns into existential threats to strategic viability. Navigating these systemic pressures requires more than conventional firm-level risk management or state-led industrial policy, it demands a deeper understanding of inter-organizational coordination mechanisms that transcend traditional roles (Neuner and Haeussler, 2021; Wang et al., 2017; Kim et al., 2017; Teow et al., 2022).

Yet existing public-private partnership (PPP) frameworks remain ill-suited to this challenge. Classical PPP models were designed around dyadic, infrastructure-focused collaborations between a government and a firm, often with stable project scopes and clear lines of accountability (Bovaird, 2004; Engel et al., 2014; Selsky and Parker, 2005). These models are poorly adapted to high-tech ecosystems like semiconductors, where innovation, production, and value creation are distributed across global, modular networks of public, private, and hybrid actors (Lin et al., 2018; Teow et al., 2022; Wang et al., 2017; Wu, 2025; Zhang et al., 2020). Recent literature has introduced the unified concept of the public-private ecosystem (PPE), defined by Candelon et al. (2022) as collaborative frameworks explicitly structured to address complex societal challenges, such as poverty alleviation, climate resilience, and sustainable development. Similarly, we acknowledge that PPE frameworks are

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particularly suited for addressing broad-scale societal issues. However, our research departs from the PPE concept by examining traditional public-private partnerships (PPPs) through the lens of ecosystem theory.

The aim of this study is to reconceptualize PPPs as dynamic, multi-actor governance mechanisms suited to the complex realities of industrial ecosystems, with a particular focus on high-tech strategic sectors like the semiconductor industry. Our approach brings together insights from ecosystem theory (Luo & Van Assche, 2023; Farrell & Newman, 2020; Lin et al., 2018) to propose a new PPP governance framework that reflects the complexity and interdependence of high-tech industrial systems. Specifically, this study answers the research question: How can the roles of PPPs be reconceptualized to enhance resilience in strategic industrial ecosystems?

This central question guides our conceptual inquiry, focusing attention on the evolving roles of multinational enterprises (MNEs) and the design of PPP governance architectures to achieve systemic resilience in turbulent global environments (Zhang et al., 2020). Moving beyond traditional bilateral models centered on government–firm relations, the paper develops a conceptual framework that accounts for differentiated actor roles, issue-specific engagement, and evolving PPP governance architectures. The argument unfolds in three core parts. First, the paper explores how PPP engagement varies across ecosystem actors and strategic challenges, rejecting the assumption of uniform involvement. Second, it critiques the limitations of static, dyadic PPP models and advances the need for more flexible, adaptive, and networked forms of governance. Third, the paper theorizes the strategic repositioning of MNEs as proactive orchestrators within these evolving structures. The concluding sections draw out the implications of this reconceptualization for governance theory, firm strategy, and future research on industrial resilience and sovereignty.

RECONCEPTUALISING PPP MECHANISM

Public–Private Partnerships (PPPs) have been conceptualized in various ways across the literature. At their core, PPPs are collaborative arrangements between public-sector organizations and external entities based on mutual commitments (Bovaird, 2004; Selsky & Parker, 2005). A narrower definition emphasizes long-term contractual agreements in which private firms finance, build, and operate infrastructure projects in return for revenue streams (Engel et al., 2014). This traditional model has proven effective in sectors such as transportation, energy, and healthcare. More recently, the UK's £60 million equity investment in Pragmatic Semiconductor (UK Parliament, 2024) reflects the application of PPP mechanisms in high-tech domains.

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Existing scholarship has recognized the utility of PPPs in high-uncertainty environments, where they support innovation, infrastructure development, and service delivery (Hwang et al., 2013; Kivilenca & Quelin, 2012; Dodge & Rye, 2024; Vezzoni, 2024). In the semiconductor sector, PPPs are increasingly leveraged to address supply chain vulnerabilities and promote regional self-reliance (BCG Global, 2024; Stanford University, 2023).

Much of the literature remains anchored in bilateral, project-centric models that fail to capture the complex, multi-actor dynamics of modern industrial ecosystems. This limitation is particularly evident in the semiconductor industry, where success depends on the interdependencies among governments, MNEs, suppliers, and supranational institutions like the WTO and World Bank (Fontana & Malerba, 2010; West, 2002). Traditional PPP frameworks, centered on dyadic government–firm relationships, fixed contracts, and hierarchical governance, are ill-equipped to manage the distributed, rapidly evolving nature of such ecosystems (Klijn & Koppenjan, 2016).

In contrast, the semiconductor landscape demands agile coordination, shared intelligence, and decentralized orchestration across diverse stakeholders. As such, PPPs must evolve from rigid contractual instruments into dynamic, multi-actor platforms that foster adaptive collaboration, co-innovation, and institutional resilience.

This transformation calls for a reconceptualization of PPPs through the lens of ecosystem theory. In management research, ecosystems are defined as networks of interdependent actors—including firms, governments, suppliers, and customs—who co-create value by sharing resources and knowledge (Best, 2015; Coccia, 2024; Sjödin et al., 2022; Zaoual, 2018). In complex, high-tech sectors such as semiconductors, coordinated co-innovation among these actors is crucial for sustaining competitiveness (Adner, 2017). Ecosystems are often modular in structure, enabling actors to operate autonomously while aligning their contributions toward shared objectives (Jacobides, Cennamo, & Gawer, 2018). This modularity enhances systemic adaptability and resilience—capabilities essential for navigating technological disruption and geopolitical volatility.

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Diverse actors	Critical challenges		
	Geopolitical risks	Technological interdependence	Supply chain vulnerabilities
International Organizations	Facilitate international trade frameworks and multilateral agreements to mitigate geopolitical disruptions (West, 2002).	Establish international technical standards and frameworks for semiconductor technologies (Nelson, 1996).	Coordinate cross-national initiatives aimed at stabilizing and securing global semiconductor supply chains (Cunningham, 2019).
Government	Formulate industrial policies to minimize external dependencies, provide strategic subsidies, and incentivize local semiconductor investments (Jacobides & Lianos, 2021).	Enhance national R&D capacity and educational infrastructure; implement comprehensive intellectual property protection frameworks (Cenamor & Frishammar, 2021).	Develop redundant, diversified, and geographically distributed supply chains; maintain strategic reserves of essential materials (Nave et al., 2024).
MNEs	Allocate strategic capital investments toward expanding and modernizing semiconductor fabrication capabilities to manage geopolitical risk exposure.	Support innovation by funding startups and research institutions; actively engage in co-development of emerging semiconductor technologies.	Diversify investment portfolios geographically and operationally to mitigate supply chain-related risks.
Customers	Advocate for localized consumption policies ("buy local"); establish incentives and consumer role-model strategies to reduce dependence on geopolitically unstable regions.	Encourage adoption and development of open-source semiconductor technologies to reduce proprietary dependence.	Actively support and participate in collaborative planning to enhance supply chain responsiveness and flexibility.
Suppliers	Guarantee reliable and diversified sourcing of critical raw materials and advanced manufacturing equipment to minimize geopolitical vulnerability.	Invest in innovative production technologies and methods to maintain technological leadership and self-sufficiency.	Establish supply chain redundancies, multiple sourcing strategies, and strategic partnerships to ensure continuity of supplies.
Shareholders	Implement governance structures ensuring regulatory compliance, accountability, and sustainability of operations to maintain market and geopolitical stability (Dibiaggio, 2007).	Facilitate strategic alignment between R&D investments, intellectual property management, and long-term technological competitiveness.	Ensure strategic alignment of organizational objectives, contingency planning, and agile responses to potential disruptions in the global semiconductor supply chain.

Table 1. *Multiple actors' roles in the semiconductor industry*

Table 1 presents a strategic matrix outlining the roles and responsibilities of diverse actors in addressing three critical challenges facing the semiconductor industry: geopolitical risks (economic security), technological interdependence (technological sovereignty), and supply chain vulnerabilities (resilience). International organisations such as the WTO and EU play key roles in setting international standards and coordinating trade frameworks, while national governments formulate industrial strategies, support domestic technological capabilities, and promote supply chain diversification.

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MNEs drive innovation and mitigate risks through strategic investments and operational diversification. Customers influence resilience by advocating local sourcing and open technologies, whereas suppliers focus on reliable material sourcing and redundancy. Governance bodies ensure regulatory compliance, strategic alignment, and organizational agility in response to disruption.

Collectively, this matrix highlights the multi-actor, multi-level nature of ecosystem governance, emphasizing that resilience in strategic sectors cannot be achieved through isolated or uniform interventions. This necessitates a shift from traditional, bilateral PPP models toward dynamic, adaptive governance frameworks that reflect actor heterogeneity and evolving strategic challenges.

Ecosystem-oriented PPP mechanisms play a critical role in coordinating alignment among diverse actors within complex industrial ecosystems. Moving beyond the traditional role of bridging the public and private sectors, these PPPs function as relational infrastructures - platforms that facilitate collective action, manage institutional frictions, and enhance systemic resilience.

In this expanded governance model, each actor contributes distinct capabilities and influence. International organizations provide global standards and regulatory frameworks, stabilizing the geopolitical environment for cross-border collaboration. National governments act as strategic enablers, shaping PPP structures through policy instruments and targeted investments. Investors and shareholders influence project viability and resource flows, while customers - through their preferences and purchasing behaviors - indirectly steer innovation and project direction. Suppliers and resource partners secure supply chain continuity and operational stability. Within participating firms, management teams drive execution and performance, while Boards of Directors ensure alignment with ESG commitments and long-term strategic objectives. This integrative view underscores the interdependent and multi-layered relationships that underpin effective, adaptive, and sustainable PPP governance.

Addressing today's cross-sectoral, high-uncertainty challenges requires governance mechanisms that transcend traditional hierarchical, command-and-control models. As Ansell and Gash (2008) emphasize, collaborative governance offers a participatory framework grounded in joint decision-making, shared accountability, and iterative learning. This aligns with governance network theory, which conceptualizes actors as embedded within interdependent yet autonomous institutional arrangements (Klijn et al., 2025). In such networks, PPPs are not static contractual tools but adaptive governance platforms shaped by actor interests, institutional logics, and power dynamics.

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MNEs, in particular, must reposition themselves from passive beneficiaries to proactive orchestrators within evolving PPP ecosystems. To maintain resilience, innovation leadership, and competitive advantage, MNEs must develop advanced relational, orchestration, and governance capabilities. From an institutional-stakeholder lens, Doh and Guay (2006) highlight how firms strategically navigate competing institutional demands in public policy contexts, offering insights into the legitimacy and positioning of MNEs within PPP ecosystems. Complementing this, Zahra and Nambisan (2012) define ecosystems as dynamic, interdependent platforms where entrepreneurial actors co-create and capture value. These perspectives collectively illuminate the transformation of MNEs into strategic orchestrators of PPP ecosystems, leveraging institutional embeddedness, stakeholder engagement, and entrepreneurial agency to drive public value and systemic resilience.

Dimension	Measures	Definition	Illustrative Example
Strategic Alignment & Governance	Infrastructure Investments	Government financing and support for foundational infrastructure (e.g., manufacturing facilities, transportation networks, digital infrastructure).	U.S. CHIPS Act's funding for domestic semiconductor fabrication plants.
	Financial Incentives	Economic policies such as subsidies, tax incentives, and grants designed to mitigate private sector investment risks and promote industry engagement.	South Korea's K-Semiconductor Strategy for incentivizing private investment in semiconductor infrastructure.
	Regulatory Oversight	Governance frameworks setting mandatory standards for product quality, safety compliance, environmental sustainability, and responsible data usage.	EU's regulatory standards under the Circular Economy Action Plan.
	Risk Sharing	Collaborative frameworks wherein governments and private entities share operational and financial risks to enhance industrial stability during market uncertainties and crises.	Taiwan's public-private agreements facilitating shared risks in semiconductor production.
	Stakeholder Collaboration	Cross-sector and international collaborations among governmental bodies, firms, academic institutions, and supply-chain partners to facilitate collective innovation and industry advancement.	U.S.-Japan and U.S.-South Korea semiconductor technology partnerships.
Ecosystem Dynamics	Modularity and Flexibility	Design and operational frameworks allowing rapid and flexible ecosystem adaptations without causing systemic disruption, thereby enhancing responsiveness.	Modular manufacturing practices adopted in semiconductor industry ecosystems.
	Collaborative Innovation	Interdisciplinary and cross-border cooperation promoting knowledge exchange, innovation, and accelerated technological development.	Taiwan's Industrial Technology Research Institute (ITRI) initiatives supporting cross-industry R&D.
	Scalable Adaptation	Structural capability of ecosystems to expand and adapt across geographical	Expansion and scalability strategies in semiconductor

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		regions and varying scales of production, accommodating growth and change.	clusters such as Hsinchu Science Park in Taiwan.
	Geopolitical Diversification	Strategic governmental policies aimed at geographically diversifying industry assets to reduce dependency on specific global hubs and mitigate geopolitical risks.	EU's strategic diversification efforts through European Chips Act.
	Resilience Strategies	Proactive policies and emergency protocols established to mitigate disruptions arising from natural disasters, geopolitical instability, or supply-chain vulnerabilities.	Japan's resilience protocols following supply-chain disruptions in semiconductor materials.
Policy-Driven Interventions	Sustainability Mandates	Regulations and policies enforcing stringent environmental standards, including energy-efficient production, waste management, sustainable sourcing, and eco-friendly operational practices.	EU's sustainability standards under the European Green Deal.
	Global Partnerships	Bilateral and multilateral agreements designed to facilitate knowledge sharing, resource coordination, and reduce redundant investments at a global level.	China's "Made in China 2025" initiative promoting international collaboration and resource self-reliance in high-tech industries.

Table 2. *Ecosystem-oriented PPP mechanisms*

Table 2 outlines three interrelated pillars of the proposed ecosystem-oriented PPP mechanism to achieve ecosystem resilience: strategic alignment and governance, ecosystem dynamics, and policy-driven interventions. Together, these components form a dynamic system that addresses supply chain vulnerabilities, enhances operational efficiency, and fosters long-term ecosystem resilience. Strategic Alignment and Governance integrates public policy objectives, financial incentives, and private sector initiatives. This alignment enables targeted responses to systemic risks, particularly in supply chain management, while also catalyzing innovation across the ecosystem. Industrial Ecosystem Dynamics emphasizes networked value creation, where actors such as government agencies, semiconductor manufacturers, suppliers, R&D institutions, and end users collaborate to co-create and distribute value. These multi-actor networks enable knowledge sharing, innovation diffusion, and coordinated responses to disruption. Policy-Driven Interventions synchronize industrial strategies with geopolitical and sustainability imperatives. By aligning regulatory frameworks and public investment with ecosystem needs, these interventions help reduce strategic dependencies, promote environmental goals, and build resilience into global supply chains.

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SYNTHESIS AND ECOSYSTEM RESILIENCE

The global semiconductor industry faces compounding pressures—from geopolitical realignments and technological interdependence to chronic supply chain disruptions and sustainability imperatives. These conditions expose the inadequacy of traditional bilateral public–private partnership (PPP) models, which are typically rigid, dyadic, and ill-equipped to navigate the complexity of multi-actor, cross-border industrial ecosystems (Klijn et al., 2025; Baldwin et al., 2024).

Proposition 1: Actor heterogeneity positively influences PPP adaptability

The growing heterogeneity of actors within semiconductor ecosystems, including national governments, MNEs, international organizations, and civil societies, demands a fundamental rethinking of PPP governance. These actors diverge not only in their strategic priorities, capabilities, and regulatory jurisdictions but also in their normative expectations and risk appetites. Consequently, PPP governance must become more adaptive, modular in design, contextually responsive, and capable of accommodating differentiated actor roles and shifting alliances (Doh & Guay, 2006; Kivleniece & Quélin, 2012

). Empirical contrasts further underscore this point: Taiwan's PPPs emphasize state–industry integration for industrial upgrading, while the EU's Chips Act institutionalizes cross-border sustainability objectives and resilience-building, illustrating how actor configurations drive the evolution and adaptability of PPP mechanisms (Wu, 2025; European Commission, 2024). Hence, actor heterogeneity is not simply a governance challenge, but drives adaptive, ecosystem-oriented PPP models.

Proposition 2: PPP adaptability enhances strategic alignment

Adaptability in PPP governance enhances an ecosystem's ability to respond to strategic challenges such as geopolitical risk, technology sovereignty, and supply chain vulnerabilities. Rather than applying uniform solutions, PPP adaptability enables tailored interventions that match the nature of each challenge—whether through regional diversification, dual-use R&D programs, or targeted subsidies (Luo & Van Assche, 2023; Aoyama, Song, & Wang, 2024). This strategic alignment fosters coordinated problem-solving and greater coherence between public policy and private innovation agendas (BCG & SIA, 2024).

Proposition 3: PPP adaptability enhances orchestration capability

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PPP adaptability also supports the orchestration capabilities of MNEs by providing institutional legitimacy, financial incentives, and governance platforms that enable cross-sector coordination. Firms such as TSMC, Intel, and Samsung illustrate how corporate actors can move from passive PPP participants to active orchestrators of innovation and resilience within their ecosystems (Zahra & Nambisan, 2012; Sjödin, Parida, & Visnjic, 2022). This orchestration role is crucial for aligning value creation across policy, market, and supply chain domains (ITRI, 2023; Stanford University, 2023).

Proposition 4: Orchestration Capability improves Ecosystem Resilience

Well-orchestrated ecosystems exhibit superior resilience in the face of external shocks. Orchestrators enable rapid resource reallocation, promote knowledge diffusion, and coordinate risk mitigation strategies across the ecosystem (Adner, 2017; Frieske & Stieler, 2022). These capabilities are essential for maintaining production stability, innovation momentum, and technological sovereignty during times of disruptions, such as during the COVID-19 pandemic or semiconductor shortages driven by geopolitical tensions (Kalvelage & Tups, 2024; Hess & Horner, 2024).

Proposition 5: Mediation effect of PPP adaptability on ecosystem resilience

Finally, PPP adaptability mediates the integrative effect of actor heterogeneity, strategic alignment, and orchestration capability on ecosystem resilience. These interconnected dimensions allow industrial systems to absorb shocks, sustain innovation, and adapt to long-term structural changes. Composite indicators such as time-to-recovery, patent activity, and regional supply chain diversification provide empirical signals of this integrated resilience (Candelon et al., 2022; McKinsey & Company, 2022).

Figure 1 visualises the five propositions in a dynamic conceptual model. It illustrates how ecosystem-oriented PPP governance serves as the linchpin connecting actor diversity, strategic coordination, firm leadership, and systemic resilience in semiconductor ecosystems. Grounded in ecosystem theory, institutional complexity, and collaborative governance, this model offers a strategic blueprint for designing resilient, sovereign and long-term sustainable PPP ecosystems in high-tech sectors.

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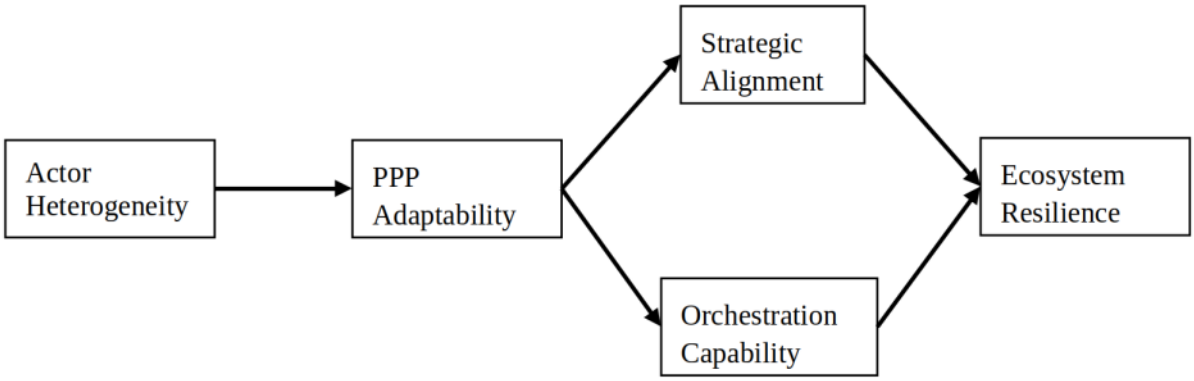


Figure 1. *Conceptual model of ecosystem resilience*

CONTRIBUTIONS AND FUTURE RESEARCH

This paper makes three core conceptual contributions. First, it advances PPP literature by shifting from static, bilateral models to framing PPPs as multi-actor governance mechanisms embedded in dynamic industrial ecosystems. Second, it introduces an ecosystem governance lens, highlighting how PPP engagement is actor- and issue-specific, shaped by geopolitical risks, supply chain fragility, and technological interdependencies. Third, it reconceptualizes MNEs as ecosystem orchestrators and institutional entrepreneurs, not merely participants, in shaping the structure and direction of collaborative governance.

Practically, this reframing has significant implications for both firms and policymakers. MNEs must adopt active governance roles, especially in sectors like semiconductors, AI, and green technologies where national interests and innovation capabilities intersect. Policymakers, in turn, must design flexible and inclusive PPP architectures that accommodate not just states and firms but also international organizations, investors, suppliers, and civil society.

Future research should develop typologies of PPP models based on actor constellations and innovation contexts (e.g., modular vs. integrative technologies). Configurational methods (e.g., fsQCA) and longitudinal studies can reveal how adaptive PPPs evolve over time and respond to disruptions. There is a need to examine how individual actors—managers, policymakers, and intermediaries—interpret and enact PPP strategies. Research should also address power asymmetries and legitimacy dynamics, particularly how dominant actors shape governance and how marginal actors gain influence or voice. Cross-national and institutional comparisons can uncover how PPPs adapt to different political economies. Further, the role of supranational actors (e.g., EU, WTO) in

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orchestrating transnational PPPs merits deeper exploration, especially in addressing global challenges like semiconductor security and green innovation.

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A LIFE CYCLE PERSPECTIVE ON RESEARCH TOPICS: STRATEGIES FOR SUSTAINED RELEVANCE WITH 'MICROFINANCE' AS A CASE STUDY

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ABSTRACT

This paper examines how life cycle theory can be applied to sustain the relevance of academic research agendas, using microfinance as a case study. With data from Scopus and Google Scholar (1995–present), we trace the evolution of microfinance research. Findings indicate that the field has entered a maturity phase, with publication growth leveling off. However, strategies such as re-labelling, thematic broadening, and integration into wider research categories like 'social enterprises' offer pathways for revitalization. The study demonstrates that life cycle thinking provides a valuable lens for managing research trajectories and ensuring long-term scholarly impact.

Keywords: life cycle theory, research strategies, microfinance publication history, novelty in research

INTRODUCTION

In this article, we demonstrate that, much like products, firms, and industries, research topics also follow distinct life cycles (Levit, 1965). Just as business managers need to navigate market dynamics, researchers must assess their topic's position within its life cycle and implement appropriate strategies to maintain relevance in the academic community. Scholars already employ various coping mechanisms to extend the longevity of research topics, including journal special issues (Colquitt & George, 2011), systematic literature reviews (Snyder, 2019), and calls for new research (Webster & Watson, 2002). However, we argue that leveraging insights from life cycle theories can be useful for researchers in order to sustain their relevance and motivate continued innovation in their academic works. While a theoretical framework has already been proposed to apply life cycle concepts to research topics (Cady et al., 2019), empirical investigations in this area remain limited. This study seeks to fill this gap by empirically examining how life cycle theories can be utilized to sustain and rejuvenate academic research areas.

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We use the research topic of 'microfinance', i.e. the provision of financial services to low-income families and their income-generating activities, as our case study. We trace the 30-year evolution of microfinance research, illustrating how it initially emerged in low-ranked development journals before expanding into a widely studied field. Over time, it gained recognition in well-ranked journals across multiple disciplines, though it remains significantly underrepresented in elite journals. We show that despite some may argue that research on microfinance has reached its peak, we demonstrate0 how research on financial services for the poor continues to expand under new labels, e.g. 'financial inclusion', which probably also reflects some kind of shift in focus and content. We suggest that such rebranding also serves as a strategy for researchers to extend the life of their research interests.

We further demonstrate that researchers, much like business managers, can adapt and innovate by leveraging microfinance knowledge to produce high-quality studies in related research areas beyond its traditional scope. To illustrate our points, we sometimes use our own experience as an example. Finally, as editors of this special issue, we review the included articles, highlighting how the authors have strategically ensured their work's relevance.

The remainder of this article is structured as follows. Section 2 provides a short review of applied strategies that researchers already employ to maintain the relevance of their work, before introducing the life cycle concept and how this can help guide researchers when trying to assure relevance of their research. Section 3 examines the evolution of microfinance as a research area and presents strategies researchers are following to ensure sustained relevance of their research. Section 4 offers a brief review of the other papers included in this special issue, assessing the strategies their authors have used to sustain the importance of their research. Finally, Section 5 presents our conclusions and outlines some directions for future research.

THEORY

A goal of any research question is to produce results that deepen our understanding of some phenomenon and then to disseminate the results to as broad audience as possible. The dissemination is best achieved in the highest ranked journals. The researcher's mundane task is often to write articles that are accepted in prestigious journals. This gives access to better positions, better researcher networks, and to funding for future research. So, how does a researcher go about to achieve this aim?

The authors' aim when submitting a research paper to a journal is to have it published there. The first bar to cross is not to be rejected. The paper needs not only to avoid mistakes, but to advance

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knowledge. Edmans (2024) divides his discussion into three in his discussion of rejections during his years as the editor of the *Review of Finance*. His three dimensions are contribution, execution, and exposition. The paper needs to make a significant contribution to our knowledge of a given phenomenon. The theories, methods and data used to demonstrate the contribution need to be adequate for the task, and finally, the paper should be well written and should avoid mistakes of grammatical sort, errors in reference list, tables etc. These demands are higher, the higher ranked the journal is. Also, a contribution may be judged significant, relevant and interesting in a specialised journal, for instance, in a development journal, and not meet the bar for interest in a high-ranking journal for the general reader. Stiglitz (1990) marks an early beginning in microfinance research when the concept of peer monitoring was introduced. Achieving this within a group lending context then became a big idea in microfinance research, leading to many theoretical papers and empirical investigations.

What do we mean by a significant contribution? The contribution needs to be new in some sense, something that no other researcher has worked on before. This is the requirement of novelty for a significant contribution. Most scholars work within what is called "normal science" (Kuhn, 2012; originally published in 1962), that is, we work within a broad understanding of the world, for instance, we work within a neo-classical world view that says that markets allocate resources in a superior way. Our work contributes incrementally to this understanding. Researchers build upon existing knowledge and add incrementally to it. We stand upon the shoulders of giants. A paper should add to our knowledge at the research frontier where researchers are active and develop new ideas and new results.

But this also means that what counts as a significant contribution is dynamic. What passed as a new, good idea some time ago has been taken up by other researchers and rendered your own contribution irrelevant. With an increasing store of knowledge, the formulation of new interesting research questions becomes harder, and the temptation to switch to a less developed area arises. A researcher needs to follow emerging trends, such as questions arising from ESG, CSR, Fintech, and Artificial Intelligence, to mention recent developments. A researcher may then ask what contributions existing insights of theory and method can be brought to bear on these new subject areas. For instance, what can Fintech achieve in microfinance?

The execution of the paper is important. The research question may be interesting, but if the demonstration of the findings is not done well, the paper is unlikely to make to a good journal. In an empirical paper the method is of paramount importance. Much of the empirical literature has turned

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to demonstrating causality. The researcher needs to be aware of the danger associated with omitted variables and reverse causality. The answers to this difficulty have been to turn to experiments (laboratory and field experiments), to exploit natural experiments such as changes in government policies, to use instruments and other econometric methods, such as propensity scoring. Machine learning techniques are also winning adherents, although results may not withstand the tests of corroboration and replicability (Popper, 2002 [1959]). The researcher who wants to establish a causal relationship needs to be familiar in one or more of these cutting-edge methods.

The paper needs to be well-written. This really goes without saying, but reviewers and editors are often exposed to papers that exhibit sloppy language, reference lists that are unconnected to the text, tables that are unintelligible, and so on. Sloppiness in one aspect of the paper immediately raises the suspicion that sloppiness exists also in method and data. Authors need to pay attention to the final writing of the paper, its exposition, to avoid a desk rejection.

The next question is if life cycle theory can shed light on the choice of elements in the research to publish in good journals? Life cycle theory is dynamic in nature and can provide researchers with some guide as to choice of subject for the paper.

Osland (1991) traces and discusses historical origins of the Product Life Cycle concept in various academic disciplines. Levitt (1965) and Vernon (1966) are often seen as the modern originators of the life cycle theory, the first from a management perspective, the other from an economic perspective. Their contributions have been highly influential and are extensively cited in discussions of product life cycles. We follow Levitt here.

The Product Life Cycle (PLC) theory is a foundational concept in marketing and economics that describes the stages a product goes through from its introduction to the market until its decline and eventual withdrawal. In his paper, Levitt proposed that products typically progress through four stages:

- Introduction: The product is launched, and awareness is built.
- Growth: The product gains acceptance, and sales increase.
- Maturity: Sales peak as the product saturates the market.
- Decline: Sales decline due to market saturation or newer innovations.

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The four stages of development are depicted in Figure 1. A standard life cycle form appears. A short, and slow introduction is followed by a steep growth stage, then a levelling-off at the maturity stage and then a decline stage when product sales are falling.

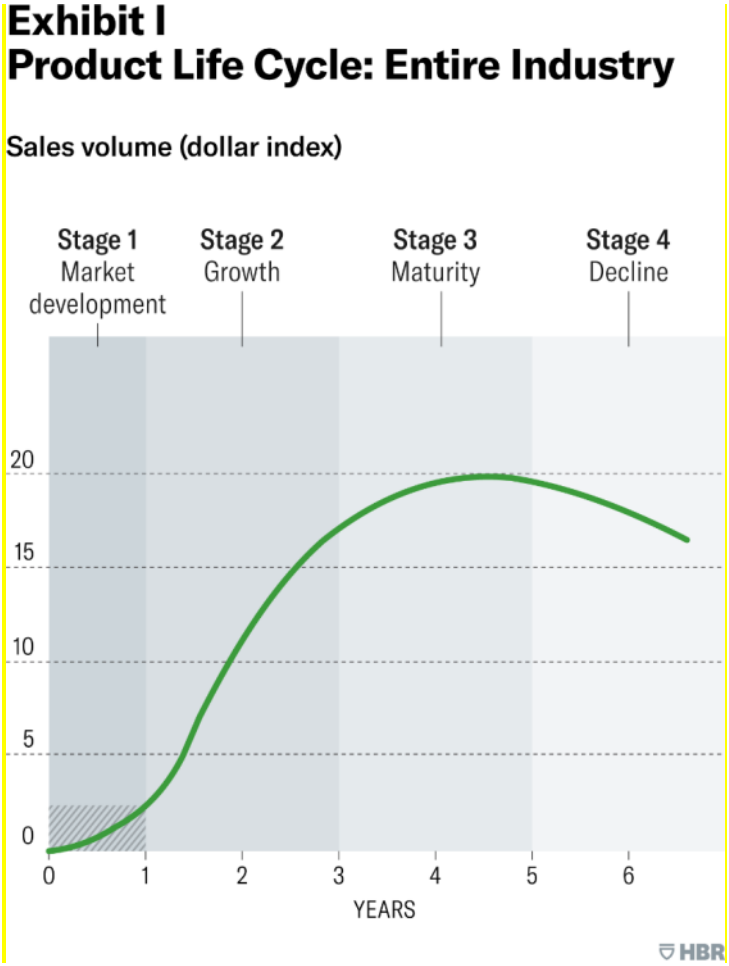


Figure 1: The product life cycle for the entire industry. Source: Levitt (1965)

Vernon (1966) presents a simpler model. The product runs through the stages New, Mature, and Standardised. The life cycle framework has been instrumental in understanding how products evolve in the market and has guided strategies in marketing, product development, and international trade.

Applying this to research in microfinance one may speculate if this line of research has reached the maturity, perhaps the decline stage, of development. Group lending and the microfinance institutions' double bottom line of financial sustainability and outreach to poor households and small businesses are well described and discussed from many perspectives and with different theories and empirical approaches. Various methods and data have been employed. What else is there to do? Has microfinance research reached a standardized phase where familiar questions are posed and studied using familiar methods and data?

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We have discussed how researchers use developments in theory, methods, and data to stay at the research frontier. Furthermore, the revolutionary ideas of microfinance of group lending and double bottom line are enduring insights. The life cycle theory is now a third aspect. In the following, we will discuss how we can use life cycle theory to understand where we are and what researchers do and can do to extend research in microfinance and present results in good journals. Our discussion here is not exhaustive.

Levitt (1965) suggested that the life cycle of a product can be extended time after time as illustrated in Figure 2 borrowed from Levitt (1965). While he presented this figure to illustrate how nylon had found more and more user groups, we propose that also research on microfinance can renew and find applications in new fields of research.

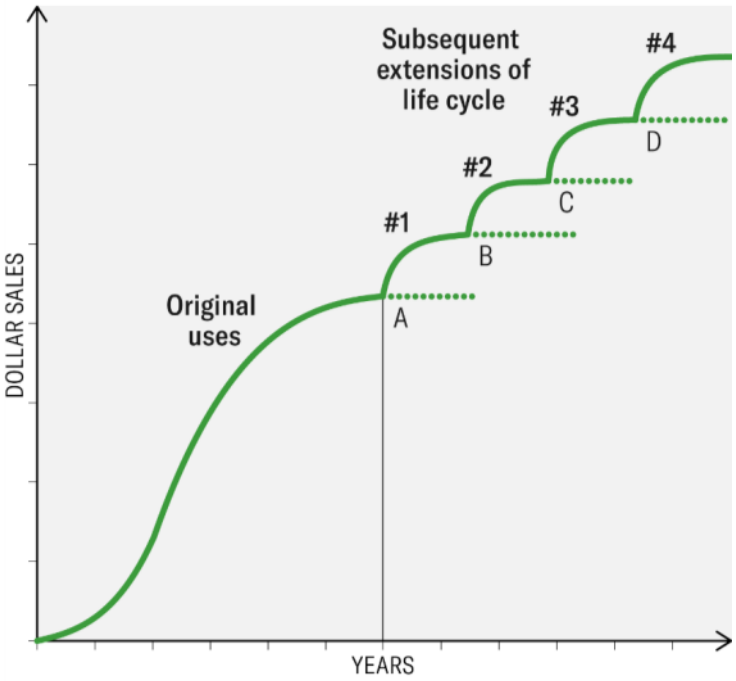


Figure 2: Extensions of the product's life cycle. Source: Levitt (1965)

THE EVOLVEMENT OF RESEARCH ON 'MICROFINANCE'

Before presenting data on the evolvement of research on 'microfinance' we first recognize the importance of understanding that all research build on other research. The emergence of microfinance as a research field in the 1990s built upon earlier studies on rural finance, agricultural credit, and informal financial markets from the 1970s and 1980s. Scholars like Dale Adams criticized traditional subsidized rural credit programs (Adams et al., 1984), while Joseph Stiglitz (1990) introduced

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theoretical insights on group lending and peer monitoring. Paul Mosley and David Hulme (1996) expanded on these ideas, linking microfinance to poverty reduction. These early works were among the many that helped establish microfinance research. At the same time, the term 'microfinance' better captured the industry's shift toward more market-driven financial services for the poor in the 1990s.

We use Scopus[1] to review the evolution of research on the topic of 'microfinance' as it ensures that the studies are of high quality and have been published in peer-reviewed journals. In addition, we incorporate data from Google Scholar to highlight the large volume of research published on microfinance.

Microfinance is a topic of considerable relevance, particularly outside Western academic environments. It is most widely practiced in Asia, Africa, and Latin America, where thousands of academics, many with limited experience in publishing in Western peer-reviewed journals, are researching the topic and teaching it in their classrooms. Often students in these regions study microfinance, as part of their bachelor or master theses. While these theses may not end up in top-ranked journals, they contribute valuable insights into the microfinance phenomenon in their local contexts where microfinance plays a critical role. Additionally, millions of practitioners and policymakers regularly write reports on market opportunities and the impact of microfinance outreach. Therefore, when considering a wider scope of research on microfinance, it is helpful to also include data from Google Scholar to ensure better capture of the global relevance of the field, especially in low-income countries.

Now, let us trace the development of microfinance research since it first appeared in the title of a paper published in a Scopus-indexed journal in 1996 (Figure 3).

[1] Scopus, owned by Elsevier, is a multi-disciplinary journal database covering a wide range of academic disciplines (https://www.elsevier.com/products/scopus).

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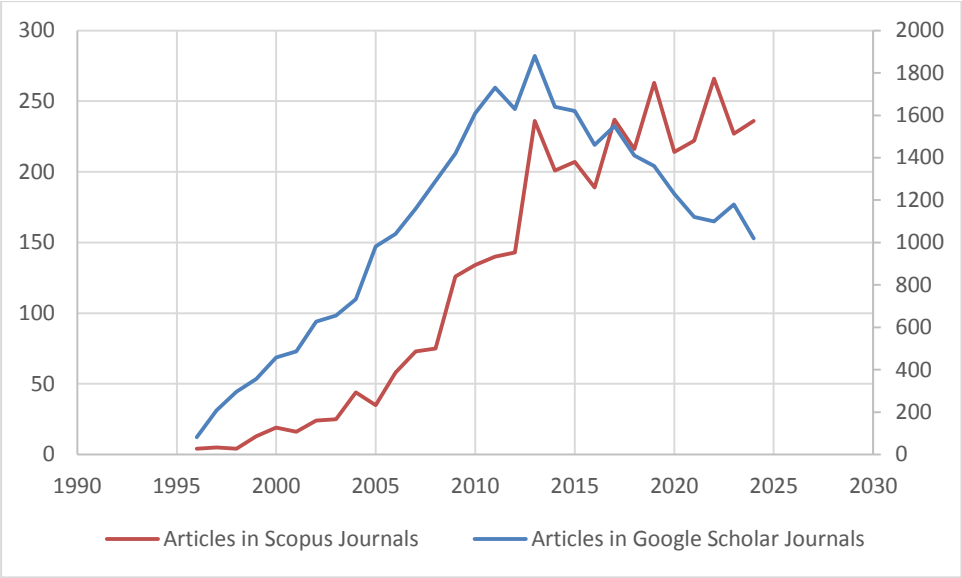


Figure 3: Articles published in Scopus and Google Scholar outlets with the term 'microfinance' in the title.

Our first observation is that articles with 'microfinance' in their titles are nearly 20 times more common in Google Scholar than in Scopus. At the same time, while the number of Google Scholar articles shows a clear downward trend, the number of Scopus articles continues to rise, though at a slower pace.

An important observation from reviewing the earliest papers using the term 'microfinance' is that they were published in specialized, lower-ranked development journals such as *Journal of International Development*, *Small Enterprise Development*, and *Savings and Development*. This highlights one of the key benefits of such journals: while they may not be highly ranked in academic circles, they may play a crucial role in identifying and disseminating emerging research topics.

If a new topic like 'microfinance' resonates with society or the research community, it is often quickly picked up by a top-tier field journal. In the case of microfinance, *World Development*, a highly regarded journal, played a key role in bringing the topic to a broader academic audience, as illustrated in Figure XX. Over the years, *World Development* has published as many as 65 articles with 'microfinance' in the title.

However, the publication trend has shifted over time. The journal was highly receptive to microfinance research, particularly in the years following the 2006 Nobel Peace Prize awarded to Muhammad Yunus. Yet, in recent years, it has become increasingly difficult to publish microfinance studies in *World Development*. Between 2009 and 2017, we successfully published five articles in the journal, but since then our submissions have been unsuccessful. The reason, we believe, is not a

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decline in research quality but rather a natural shift in the journal's focus. Like all academic journals, *World Development* evolves, prioritizing new and other emerging topics. As researchers, we must recognize these shifts and adapt accordingly.

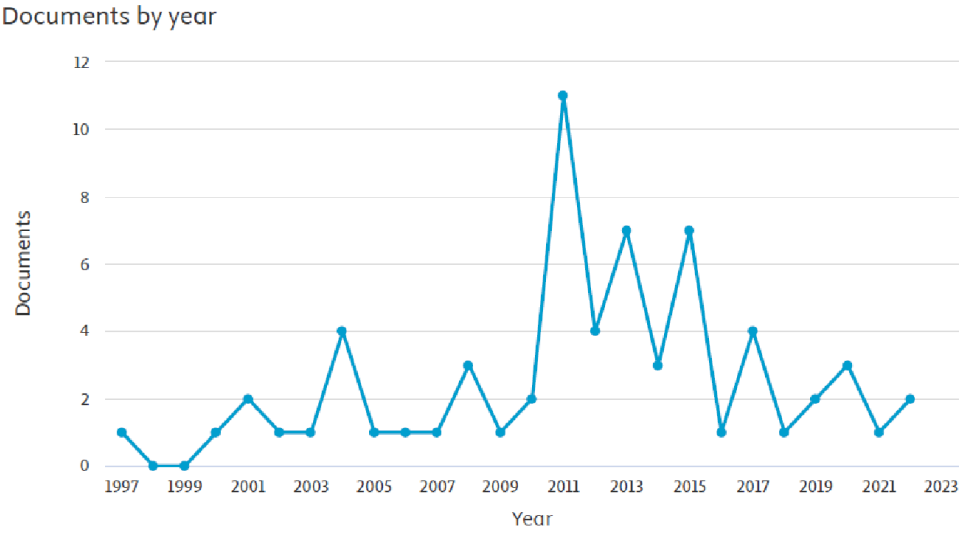


Figure 4: Number of Articles in World Development with Microfinance in the title

Throughout the 2000s, microfinance research gradually gained traction in various development and economics journals. The focus was often on topics such as social justice, lending methodologies, and client impact. However, it was not until 2009 that a well-ranked finance journal, *Journal of Banking and Finance*, published an article with 'microfinance' in the title (Mersland & Strøm, 2009). Given that microfinance involves the provision of financial services and represents the world's largest potential market in terms of client numbers, one might expect it to be a key topic for banking and finance journals.

Surprisingly, most finance and banking journals have published little to no research explicitly focused on microfinance. Those that have typically feature only one to three articles on the topic. Among well-ranked finance journals, only the *Journal of Banking and Finance* has demonstrated sustained interest over some time, publishing nine articles with 'microfinance' in their titles. However, this trend appears to have shifted. Since 2020, when the journal published an article co-authored by our colleague Trond Randøy, highlighting how competition in the microfinance market can sometimes be harmful rather than beneficial (Hossain, Galbreath, Hasan, & Randøy, 2020), no new articles with 'microfinance' in the title have appeared. Much like *World Development*, the *Journal of Banking and Finance* now seems to be prioritizing other topics.

Table 1: Journals that have published most articles with 'microfinance' in their titles.:

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Journal	Number of articles	ABS ranking1
Enterprise Development and Microfinance (formerly Small Enterprise Development)	118	Unranked
World Development	65	3
Journal of International Development	60	2
Strategic Change	46	2
Mondes en Development	33	Unranked
Savings and Development	32	Unranked
Journal of Development Studies	27	3
Development in Practice	27	Unranked
Applied Economics	26	2
International Journal of Social Economics	23	1

As shown in Table 1, research on microfinance tends to be published in specialized journals with relatively low rankings. Notable exceptions include *World Development* and *Journal of Development Studies*.

What about research on microfinance in elite journals, specifically those ranked 4* by the ABS? Out of nearly 2,000 journals, only 47 hold a 4* ranking, and as shown in Appendix A, 18 of these have published a total of 34 articles with 'microfinance' in their titles, the first of which appeared in 2008 and the latest in 2024. This represents less than 0.01% of the 3,670 articles with 'microfinance' in their titles listed in Scopus. While this is not surprising, as it reflects the perception of microfinance as a narrow field of limited interest to most academics, it is disappointing to note that only one of these articles was published in a journal within the 'Finance' research area. Furthermore, when we include articles published in finance journals ranked at the ABS 4 level, only four articles with 'microfinance' in the title are found. Given that microfinance is one of the world's largest banking segments, it is surprising that top-tier finance journals have not given more attention to this important phenomenon.

An interesting observation in Appendix A is the significant number of articles published in the two 4*-ranked[2] entrepreneurship journals. While microfinance has been of limited interest to scholars in finance, it has attracted considerable attention from entrepreneurship researchers over the past decade, who continue to find it highly relevant. Thus, if scholars with an interest in microfinance aim for elite 4* journals, targeting entrepreneurship journals may be a better bet than focusing on finance journals.

[1] The Academic Journal Guide (ABS ranking), published by the Chartered Association of Business Schools (CABS), ranks business and management journals based on quality and impact. The ranking goes from 1 as a recognized though modest standard to 4 and 4* which are considered the elite journals.

[2] In 2024, the *Entrepreneurship Theory and Practice* and *Journal of Business Venturing* journals were upgraded from 4 to 4* by the ABS.

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Based on our experience, we propose that research on microfinance, like probably most emerging research topics, has followed a distinct pattern. Initially, it appears in modestly ranked area-specific journals, such as development journals in our case. Over time, higher-ranked journals in the field recognize the topic, introducing it to a broader research community. This leads to wider dissemination, as journals with a broader readership outside the field, in this case, the banking and entrepreneurship research communities, begin to engage with the research. Finally, at the stage we find ourselves in now, researchers must employ various extension strategies to maintain the topic's relevance and ensure continued publication opportunities. Figure 5 illustrates a typical evolvement of a new research topic, in our case 'microfinance'.

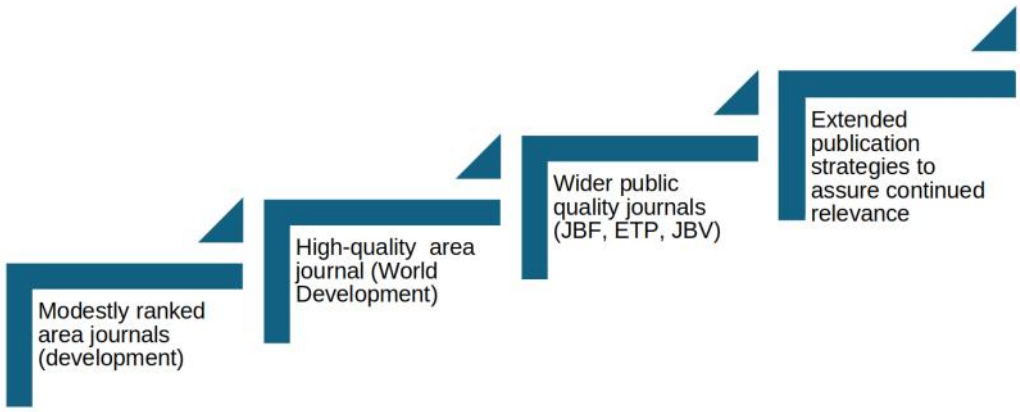


Figure 5: The evolvement of a new research topic.

STRATEGIES TO EXTEND THE RESEARCH LIFE CYCLE

In Table xx, we observed that the number of articles with 'microfinance' in their titles has declined in Google Scholar outlets over the last decade, though it continues to increase, albeit more slowly, in Scopus outlets. Let's now examine the trend when searching for the term 'microfinance' anywhere in the article (Figure xx). An interesting pattern emerges: while papers identified by Google Scholar show a downward trend, this shift started later compared to the data in Table xx. More notably, Scopus journals show a continued steep upward trend. This likely indicates two possibilities: either researchers are still working on microfinance but using different terms in their titles (e.g., financial inclusion), or they are applying microfinance lessons to other fields (e.g., social enterprises). These are examples of what Levitt (1965) refers to as life cycle extension strategies, which we will now explore further. Thus, in the following, we suggest strategies for researchers to maintain the relevance of their work while continuing to benefit from their knowledge in the field of microfinance.

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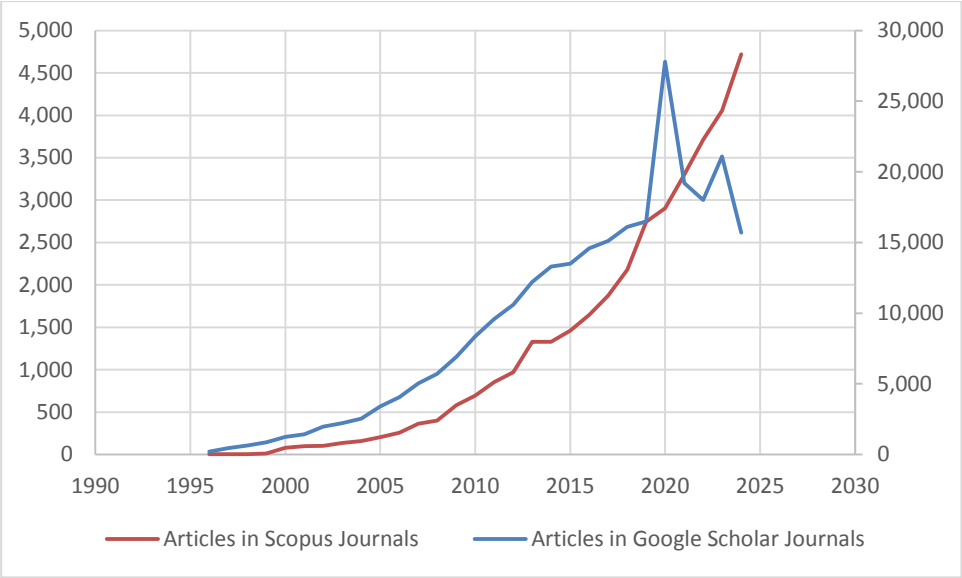


Figure 6: Number of articles in Google Scholar and Scopus outlets with the word 'microfinance' anywhere in the article

"New wrapping"

As we gain experience in research, we often feel that many ideas are simply old stories in new 'wrapping'. The same applies to research on financial services for the poor. The buzzword has now shifted from 'microfinance' to 'financial inclusion,' as illustrated in Figure 7.

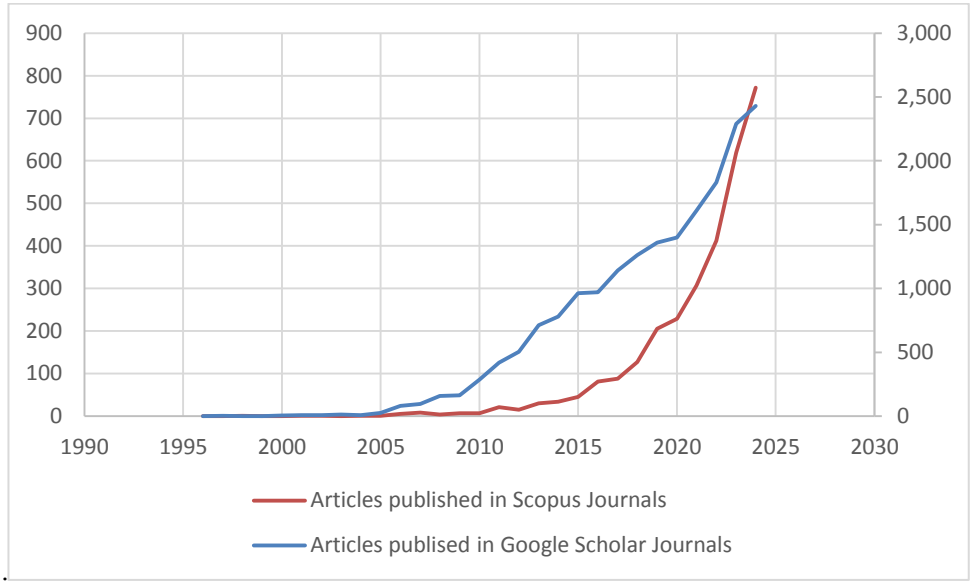


Figure 7: Articles published in Scopus and Google Scholar Journals with the term 'financial inclusion' in the title

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Microfinance and 'financial inclusion' are distinct terms, though both capture the provision of financial services to the poor. Microfinance tends to be more finance-driven, while financial inclusion emphasizes accessibility and a broader range of services. However, we argue that financial inclusion is largely a rebranding of microfinance, with a softer, more inclusive tone. This shift gained momentum after the 2006 Nobel Peace Prize, partly in response to critiques of microfinance's limitations and impact (Milana & Ashta, 2020).

Microfinance as an example of a broader concept

Another strategy used by researchers to prolong their involvement in microfinance research has been to consider MFIs so-called 'hybrid organizations' with both a business logic and a social logic. While we before called our research center the Norwegian Center for Microfinance Research (NORCEM) we decided to rebrand and since more than a decade ago we now call us Center for Research on Social Enterprises and Microfinance (CERSEM)[1]. We are far from alone in making this shift and considering MFIs 'social enterprises' or 'hybrid organizations'. In fact the World's most cited microfinance paper is the one by Battilana and Dorado (2010) where they use data from two microfinance institutions in Bolivia to illustrate how hybrid organizations can balance the tensions typically observed in such organizations. Figure xx illustrates the increase in papers published in Scopus Journals including both 'social enterprise' and 'microfinance' in either the title, the abstract or as key words.

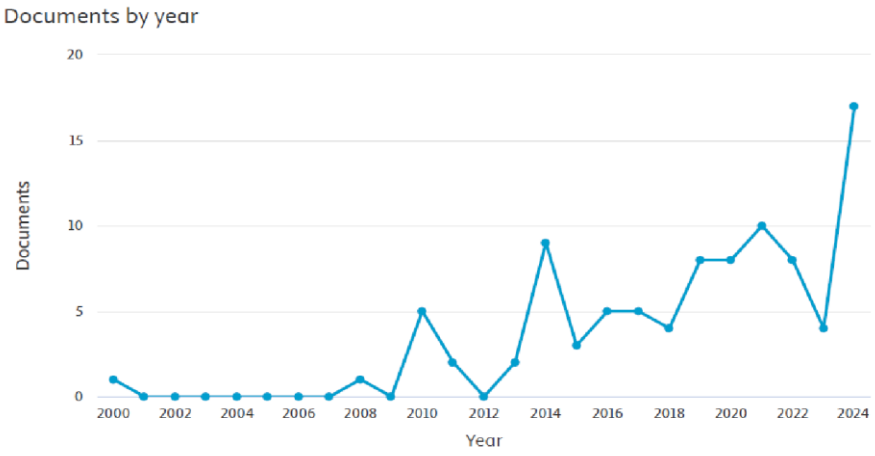


Figure 8: Papers published in Scopus Journals including both 'social enterprise' and 'microfinance' in either the title, the abstract or as key words

[1] Recently CERSEM has become part of a larger research center at University of Agder called Center for Research on Alternative Finance. We still keep our brand CERSEM but at the same time we are happy to now be part of a larger environment covering also other alternative finance topics like Crowdfunding, Cryptocurrencies and Green Finance.

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Usage of data from microfinance to study other topics

Other typical strategies to prolong the life of microfinance research have been to include knowledge from the microfinance literature (for example the trade-off when operating with multiple objectives) or data from microfinance institutions (for example the data from the Mixmarket as well as data from Microfinance Rating Agencies). Recently, for example, we used both knowledge and data from the microfinance industry to derive and estimate a production function which allows to calculate the ethical dilemma of balancing social and financial logics in hybrid organizations (Andersson et al., 2024). Likewise, we have used microfinance rating data from MFIs to forward what could be classified as the accounting/auditing literature. For example, we compared 'earning management' in NGOs and shareholder owned firms (Beisland and Mersland, 2014) and how the use of Big 4 auditors has an influence on fund raising in emerging markets (Beisland, Mersland, & Strøm, 2018). Likewise we have used microfinance data to forward the management literature with our study on the origin of the CEO and how internal hires (from within the firm) often perform better than external hires (Mersland et al., 2019), not to mention how we used unique microfinance data to illustrate the importance of language in international businesses (Golesorkhi, 2019).

New research methods

In recent years, new research methods such as Artificial Intelligence (AI) and machine learning have emerged, offering valuable opportunities for microfinance research. We have leveraged these advancements, using machine learning to examine whether some MFIs can achieve both strong financial and social performance (van der Auwera et al., 2024). Additionally, we developed a computer-based simulation model to compare borrower profitability when borrowing from a commercial lender versus a self-financing savings group (Gonzales et al., 2021). While experimental studies in microfinance exist (e.g., Giné et al., 2010), there is significant potential for further research using this approach or other innovative methodologies.

Niche research

Our final suggestion is for researchers to explore niche areas, 'hidden markets' with little existing research. In our case, this includes studying microfinance and financial inclusion for disabled people, a largely overlooked field. While this topic may not attract widespread academic attention, we pursue it because it matters. By doing so, we hope to raise awareness among researchers and journal editors about its significance. After all, the WHO estimates that 1.3 billion people, 16% of the global

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population, experience significant disabilities[1]. Moreover, most disabled individuals rely on necessity entrepreneurship and self-employment, requiring access to savings and credit to stabilize and improve their income (see Beisland et al., 2017).

Another niche research area where we and a few others are active is the study of savings groups—informal, self-managed groups of around 25 people who pool their savings and distribute loans among members in a structured manner (Bossuyt, 2023). This research traces back to studies of ancient financial systems, now commonly known as Rotating Savings and Credit Associations (ROSCAs) (Bouman, 1995). A savings group is essentially a better structured ROSCA, where pooled savings are distributed as loans rather than lump sums. After receiving some research attention in the 1990s, interest in this area is resurging as more scholars recognize that for a significant share of the world's population, savings groups (or self-help groups in India) are their primary financial institution—often far more important than banks or microfinance institutions (MFIs).

Motta et al. (2025)

CONCLUSION

We use the life cycle theory to understand how researchers in microfinance can position their papers to achieve publication in good journals. Life cycle theory (Levitt, 1965, Vernon, 1966) says that a product's life cycle transits through four phases, Development, Growth, Maturity, and Decline. We posit that microfinance research has reached the maturity stage, as witnessed by the numerous contributions in both theory and empirical studies. The last stage in the Vernon (1966) version of the life cycle theory is a product's standardisation. Levitt (1965) paints a more optimistic picture as he points out that product's life can be extended in various ways. The researcher's challenge is to avoid the standardisation of research, and to find extension strategies for research in microfinance to avoid the decline stage.

We describe the publication history of research in microfinance using data from the Scopus and Google Scholar databases from 1995 to the present. The overall curves show a levelling-off from about 2015, indicating that research has reached a maturity stage. We also trace publication records in high-ranking (mainly ABS 3 and higher). The records show that publication in these journals have become harder. At the same time, searching for the word "microfinance"! anywhere in the article shows a

[1] https://www.who.int/health-topics/disability

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rising trend over the years. If attention is paid to "financial inclusion" instead of e.g. "microfinance outreach", the publication curves are steep, indicating a growth stage.

Overall, our data tells us that microfinance research has reached a maturity stage, but that extension strategies are possible and are being used by researchers.

We first notice that microfinance research belongs to normal science (Kuhn, 2012 [1962]), that is, practitioners add incrementally to the frontier of knowledge. A researcher needs to bring something new to our existing knowledge if journals will accept the contribution.

This requirement of novelty can be met in several ways. We underline the importance of the research question. Furthermore, the researcher needs to bring either new theory, new method, or new data to claim novelty of the paper. For example, an enduring research question in microfinance is the goal conflict of financial sustainability and financial inclusion. Contributions in this part of the literature literature have mainly been using new methods, such as stochastic frontier analysis, and new data, mainly Mix Market data as the database has been extended and made easily accessible.

We trace the renewal strategies that researchers in the microfinance field have employed. We emphasise new research questions, such as microfinance as an example of a broader concept and using microfinance data to study other topics. We also note the use of new research methods such as artificial intelligence and machine learning, and the application of insights from microfinance to study related, niche fields, in particular, savings groups. The last is an example of new data.

Microfinance research has shown great vitality over the years. Our overview shows that it can extend research in several directions and stay novel.

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APPENDIX A

Field	Journal name	Article title	Authors	Year published	Number of citations (Scopus)
Accounting	Accounting, organization and society	Surfacing the political: Women's empowerment, microfinance, critical dialogic accounting and accountability	Tanima, Brown and Dillard	2020	61
Accounting	Accounting, organization and society	Microaccountability and biopolitics: Microfinance in a Sri Lankan village	Alawattage, Graham and Wickramasinghe	2019	53
Economics	American Economic Review	Credit elasticities in less-developed economies: Implications for microfinance	Karlan and Zinman	2008	141
Economics	American Economic Review	Does the classic microfinance model discourage entrepreneurship among the poor? Experimental evidence from India	Field, Pande, Papp and	2013	148
Economics	American Economic Review	Asset-Based Microfinance for Microenterprises: Evidence from Pakistan	Bari, Malik, Meki and Quinn	2024	2
Economics	Econometrica	A structural evaluation of a large-scale quasi-experimental microfinance initiative	Kaboski and Townsend	2011	110
Economics	Quarterly journal of economics	Measuring the Equilibrium Impacts of Credit: Evidence from the Indian Microfinance Crisis	Breza and Kinnan	2021	39
Economics	Review of Economic studies	The economic returns to social interaction: Experimental evidence from microfinance	Feigenberg and Pande	2013	159
Economics	Review of Economic studies	The macroeconomics of Microfinance	Buera, Kaboski and Shin	2021	35
Entrepreneurship	Entrepreneurship Theory and Practice	New financial alternatives in seeding entrepreneurship: Microfinance, crowdfunding, and peer-to-peer innovations	Bruton, Khavul, Siegel and Wright	2015	570
Entrepreneurship	Entrepreneurship Theory and Practice	The Effect of Virtuous and Entrepreneurial Orientations on Microfinance Lending and Repayment: A Signaling Theory Perspective	Moss, Neubaum and Meyskens	2015	298
Entrepreneurship	Entrepreneurship Theory and Practice	Cutting microfinance interest rates: An opportunity co-creation perspective	Sun and Im	2015	78
Entrepreneurship	Entrepreneurship Theory and Practice	The Impact of Entrepreneur-CEOs in Microfinance Institutions: A Global Survey	Randøy, Strøm and Mersland	2015	62
Entrepreneurship	Entrepreneurship Theory and Practice	Third-Party Signals in Crowdfunded Microfinance: The Role of Microfinance Institutions	Ketchen, Allison and McKenny	2020	47
Entrepreneurship	Journal of Business Venturing	An institutional logics approach to social entrepreneurship: Market logic, religious diversity, and resource acquisition by microfinance organizations	Zhao and Lounsbury	2016	146
Entrepreneurship	Journal of Business Venturing	When institutional change outruns the change agent: The contested terrain of entrepreneurial microfinance for those in poverty	Khavul, Chavez and Bruton	2013	143
Entrepreneurship	Journal of Business Venturing	Bankers at the gate: Microfinance and the high cost of borrowed logics	Kent and Dacin	2013	125
Entrepreneurship	Journal of Business Venturing	Language and market inclusivity for women entrepreneurship: the case of microfinance	Drori, Manos, Santacreu-Vasut,	2018	40
Entrepreneurship	Journal of Business Venturing	Globalization and affordability of microfinance	Sun and Liang	2021	25
Entrepreneurship	Journal of Business Venturing	The challenges of supporting necessity entrepreneurs: Understanding loan officer exit in microfinance	Doering and Wry	2022	17
Management	Academy of Management Journal	Building sustainable hybrid organizations: The case of commercial microfinance organizations	Battilana and Dorado	2010	1924
Management	Academy of Management Journal	Not all inequality is equal: Deconstructing the societal logic of patriarchy to understand microfinance lending to women	Zhao and Wry	2016	148
Finance	Journal of Finance	Cheap credit, lending operations, and international politics: The case of global microfinance	Garmaise and Natividad	2013	31
Finance	Review of Financial studies	Information, the Cost of Credit, and Operational E□ciency: An Empirical Study of Microfinance	Garmaise and Natividad	2010	51
Info-management	MIS Quarterly	Crowdfunding for microfinance institutions: The new hope?	Luo, Ge and Wang	2022	16
Marketing	Journal of Marketing Research	Microfinance decision making: A field study of prosocial lending	Galak, Small and Stephen	2011	257
Org and Management Sci	Management Science	A matter of (Relational) style: Loan officer consistency and exchange continuity in microfinance	Canales and Greenberg	2016	42
Organizational studies	Organization Science	Taking trade-offs seriously: Examining the contextually contingent relationship between social outreach intensity and financial sustainability in global microfinance	Wry and Zhao	2018	105
Organizational studies	Organization Science	Weaving straw into gold: Managing organizational tensions between standardization and flexibility in microfinance	Canales	2014	101
Sociology	American Journal of Sociology	Risks, returns, and relational lending: Personal ties in microfinance	Doering	2018	14
Sociology	American Sociological Review	From credit to collective action: The role of microfinance in promoting women's social capital and normative influence	Sanyal	2009	205
Sociology	American Sociological Review	The Effects of Gendered Occupational Roles on Men's and Women's Workplace Authority: Evidence from Microfinance	Doering and Thebaud	2017	39
Strategy	Strategic Management Journal	The institutional context of poverty: State fragility as a predictor of cross-national variation in commercial microfinance lending	Ault and Spicer	2014	96
Strategy	Strategic Management Journal	Community influence on microfinance loan defaults under crisis conditions: Evidence from Indian demonetization	Adbi, Lee and Singh	2024	3

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THE INFLUENCE OF REMUNERATION ON LEADERSHIP AND PERFORMANCE IN HOTEL UNITS: APPLICATION IN MADERIA ISLAND

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ABSTRACT

Efficient, service-oriented employees are essential to the success of hotel organizations. Leadership plays a critical role in enhancing employee performance, while remuneration may influence both leadership behavior and employee outcomes. Although prior studies have examined the effects of leadership styles and remuneration separately, few have explored the interrelationships among remuneration, transformational and transactional leadership, and employee performance, particularly in the hospitality sector. This study addresses this gap by analyzing the influence of remuneration on leadership styles and employee performance in hotel units on Madeira Island. Data was collected through a survey of 365 hotel employees. The results reveal that both transformational and transactional leadership styles positively impact employee performance, and that remuneration significantly influences both leadership styles. However, remuneration does not directly affect employee performance. These findings contribute to hospitality literature by clarifying the mediating role of leadership in the remuneration–performance link within a tourism-dependent context.

Keywords: Salary; Leadership; Employee performance; Hospitality; Island Destination

INTRODUCTION

The hotel industry employs a large and diverse workforce, characterized by the unique nature of its services, which are produced and consumed simultaneously (Sandstrom and Reynolds, 2020). Despite intense competition, hotels strive to differentiate themselves by offering unique and memorable experiences.

Employees are central to achieving this goal, as they are responsible for service delivery and shaping the customer experience (Zhang et al., 2020). However, factors such as job insecurity, low wages, and poor working conditions can hinder employee performance (Karatepe, Rezapouraghdam and

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Hassannia, 2020). Maintaining employee commitment is crucial, as service quality depends heavily on their engagement and efficiency (Ozturk, Karatepe and Okumus, 2021).

Leadership is vital in fostering this commitment and driving high performance. Different leadership styles can motivate employees and align them with organizational goals (Zhang et al., 2020); Teoh et al., 2022). Effective leadership has a direct impact on organizational outcomes by inspiring and managing teams (Yıldız, Baştürk and Boz, 2014).

This study aims to investigate the relationships between key organizational variables in the hotel sector by addressing three core research questions: how leadership influences employee performance, how remuneration affects leadership, and how remuneration impacts employee performance within hotel units. These questions guide the study's examination of the interconnections between leadership behavior, compensation practices, and employee outcomes in the hospitality context. Given the economic reliance on tourism in peripheral regions such as Madeira Island, it is important to explore how remuneration affects leadership and employee performance within hotel units (Marujo, 2013).

A quantitative methodology was employed using a questionnaire survey administered to hotel employees across Madeira Island. This research contributes to the literature by examining how remuneration impacts transformational and transactional leadership styles and employee performance in a tourism-dependent context, addressing a notable gap in empirical studies.

THE INFLUENCE OF LEADERSHIP ON EMPLOYEE PERFORMANCE IN HOTEL UNITS

Leadership

Leadership is a key organizational process that motivates individuals to achieve shared goals through influence and guidance (Ibrahim and Daniel, 2019; Nagarathinam, 2020). Leadership style refers to the approach leaders take in directing, motivating, and supporting employees to meet organizational objectives (Nagarathinam, 2020).

Among the various leadership styles examined in the literature, transformational and transactional leadership have received the most attention (Yıldız, Baştürk and Boz, 2014). Transformational leadership emphasizes inspiring change and aligning individual growth with organizational objectives. It is characterized by four core dimensions: idealized influence, in which leaders act ethically and foster trust (Teoh et al., 2022; Escortell, Baquero and Delgado, 2020); individualized

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consideration, which involves providing personalized support to foster employee development (Teoh et al., 2022; Si and Wei, 2012); inspirational motivation, where leaders articulate a compelling vision to energize teams (Teoh et al., 2022; Si and Wei, 2012); and intellectual stimulation, which encourages innovation and critical thinking among employees (Teoh et al., 2022; Si and Wei, 2012).

These components foster employee satisfaction, motivation, and ethical behavior, contributing to overall performance (Alrowwad et al., 2017).

Transactional leadership, by contrast, emphasizes task execution and performance monitoring through structured exchanges. It consists of:

- Contingent reward – recognition for meeting expectations (Hinkin and Schriesheim, 2008; Bass et al., 2003)];
- Active management by exception – proactive supervision to detect and correct errors (Si and Wei, 2012; Hinkin and Schriesheim, 2008);
- Passive management by exception – reactive intervention when problems arise (Hinkin and Schriesheim, 2008; Si and Wei, 2012).

Beyond these, other styles include autocratic (unilateral decisions), democratic (participative decision-making), laissez-faire (employee autonomy), bureaucratic (strict rule adherence), and strategic (long-term vision and short-term stability) (Nagarathinam, 2020).

Emerging models such as multicultural, authentic, servant, inclusive, empowering, educational, and ethical leadership further emphasize diversity, self-awareness, team support, belonging, autonomy, appreciation, and moral conduct (Eva et al., 2019; Randel et al., 2018; Dennerlein and Kirkman, 2022; Brown, Treviño and Harrison, 2005; Azila-Gbettor et al., 2024; Sun et al., 2024).

Effective leadership depends on both personal competence and contextual factors such as organizational culture and employee expectations (Bergamini, 1994; Garcia, 2017). Ultimately, leadership is a primary determinant of employee performance and organizational success (Yıldız, Baştürk and Boz, 2014).

Employee Performance

Employee performance refers to the effective execution of tasks and achievement of organizational goals within a defined timeframe (Yıldız, Baştürk and Boz, 2014; Giday and Elantheraiyan, 2023). It is

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a critical determinant of organizational success, particularly in service-intensive sectors like hospitality, where efficient staff performance directly influences business outcomes (Huang et al., 2023; Ibrahim and Daniel, 2019).

Performance is shaped by factors such as leadership, motivation, training, feedback, working conditions, and individual characteristics (Franco, Bennett, and Kanfer, 2002; AL-Sinawi, Piaw and Idris, 2015). Motivation, particularly when driven by financial incentives that support personal and family needs, enhances productivity and job satisfaction (Meng et al., 2024). Leadership also plays a central role by inspiring and guiding employees (Peng, Yang and Huan, 2022).

Continuous professional development, effective onboarding, and constructive feedback further improve employee competencies and outcomes (AL-Sinawi, Piaw and Idris, 2015). However, performance can be hindered by inadequate resources, demographic challenges, and limited training opportunities (Giday and Elantheraiyan, 2023).

Organizations are increasingly prioritizing employee well-being and development by implementing wellness programs and fostering supportive work environments to enhance overall performance (Huang et al., 2023). To evaluate performance effectively, several assessment tools are employed. Training evaluation measures the impact of training on job effectiveness (Giday and Elantheraiyan, 2023). Performance appraisals assess employee efficiency and goal attainment (Islami, Mulolli and Mustafa, 2018), while 360-degree feedback collects input from supervisors, peers, subordinates, and the employees themselves to provide a comprehensive view of performance (Carson, 2006). These tools collectively contribute to a more accurate and multidimensional understanding of employee effectiveness.

Forced distribution ranking, which categorizes performance across a preset curve, though it may reduce perceived fairness (Loberg, Nüesch and Foege, 2021).

This study adopts the Management by Objectives (MBO) approach, a goal-based strategy involving planning, monitoring, and feedback to align individual and organizational goals. MBO enhances communication, motivation, and performance, and is widely applied across industries, including hospitality (Islami, Mulolli and Mustafa, 2018; Ahmed et al., 2022; Salama, 2021).

The impact of leadership on employee performance in the hospitality industry: hypothesis formulation

Effective leadership is critical for enhancing employee performance and organizational success. Leaders who invest in their workforce foster motivation, autonomy, creativity, and long-term

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commitment (Giuliani and Oliva, 2014; Ibrahim and Daniel, 2019). Leadership plays a central role in guiding employee behavior and promoting the adoption of efficient practices (Silva et al., 2021; Peng, Yang and Huan, 2022). Positive leadership, especially when leaders act as role models and fulfill commitments, strengthens employee engagement and retention (Ozturk, Karatepe and Okumus, 2021; Dogantekin, Secilmis and Karatepe, 2022).

Conversely, poor leadership correlates with low employee performance, demotivation, ineffective service delivery, and increased turnover (Silva et al., 2021; Ibrahim and Daniel, 2019; Dogantekin et al., 2022). The alignment between personal and organizational goals is essential to sustain employee interest and performance.

Leadership style significantly affects job performance and trust in supervisors (Lee et al., 2023). Ineffective leadership reduces coordination, increases operational costs, and diminishes productivity. Therefore, adopting a leadership approach that fits team needs is essential (Teoh et al., 2022).

Empirical evidence supports these claims. Aboramadan et al. (2022) found that green inclusive leadership promotes environmentally responsible behavior. Yıldız et al. (2014) demonstrated that transformational and transactional leadership positively impact both employee and organizational performance. Teoh et al. (2022) and Nugroho et al. (2020) confirmed that transformational leadership, particularly idealized influence and inspirational motivation, enhances employee outcomes in the hospitality sector.

Ibrahim and Daniel (2019) showed that democratic leadership was most effective in improving performance at Coca-Cola Nigeria. Lee et al. (2023) highlighted the positive influence of emotionally intelligent, transformational, and transactional leadership on trust and performance. Nagarathinam (2020) reinforced the general link between supportive leadership styles and improved employee outcomes.

These findings inform the following hypotheses:

H1: Transformational leadership style positively influences employee performance.

H2: Transactional leadership style positively influences employee performance.

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REMUNERATION

Modern compensation systems typically link remuneration to job roles and hierarchical levels rather than individual performance. Remuneration encompasses financial rewards and benefits provided in exchange for employee contributions (Dessler, 2015).

Leadership effectiveness is closely tied to compensation. Patiar and Wang (2020) found that both leadership style and the availability of fair compensation influence employee behavior and performance. Leaders are more effective when their efforts are recognized and rewarded, particularly in the hospitality sector.

Nagarathinam (2020) also notes that incentives and favorable working conditions enhance employee satisfaction. Similarly, Krauter (2006) reported that remuneration positively impacts performance, productivity, satisfaction, and product quality across 79 firms in São Paulo.

Financial compensation is also a key motivator for employees who view their jobs as essential to family welfare and job stability (Meng et al., 2024).

Based on this evidence, the following hypotheses are proposed:

H3: Remuneration influences the transformational leadership style of hotel employees.

H4: Remuneration influences the transactional leadership style of hotel employees.

H5: Remuneration influences the performance of hotel employees.

THEORETICAL MODEL

Following the development of the five proposed hypotheses, the following theoretical model was formulated (figure 1):

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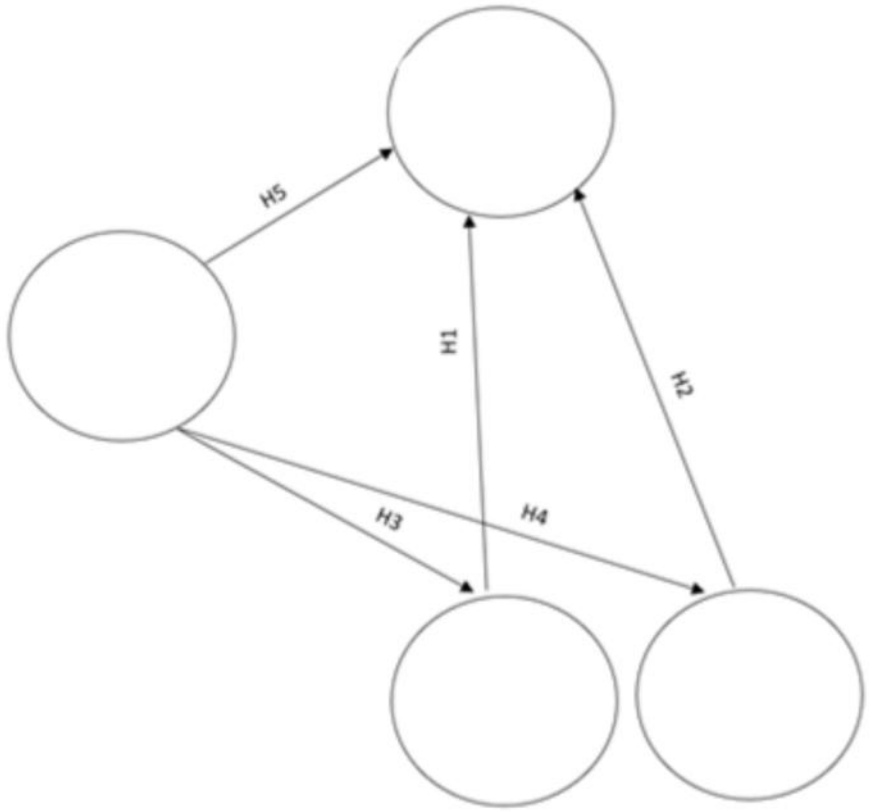


Figure 1. *Structural Model*

METHODOLOGY

Data Collection

This study investigates the impact of remuneration on transformational and transactional leadership styles, as well as on employee performance in hotel units across Madeira Island—a region economically and socially dependent on tourism, yet underexplored in empirical research (Marujo, 2013). The research is grounded in a literature review of relevant scientific articles. A quantitative methodology was employed through a structured questionnaire distributed to hotel employees on Madeira Island. The instrument, developed using Google Forms, was designed to test the study's hypotheses regarding the relationship between remuneration, leadership, and performance.

The questionnaire comprised five sections: hotel unit profile; respondent demographics; leadership (transformational and transactional); employee performance; remuneration and benefits.

Sections 1 and 2 collected sociodemographic and organizational data (e.g., gender, age, education, income), with all questions being closed-ended except one open-ended item on job role. Sections 3–5

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used a 7-point Likert scale (1 = Strongly Disagree; 7 = Strongly Agree), which provides ease of use and high accuracy (Malhotra, 2006).

Leadership constructs were measured through established dimensions:

- Transformational leadership: idealized influence, individualized consideration, inspirational motivation, and intellectual stimulation.

- Transactional leadership: contingent reward, active management by exception, and passive management by exception.

Employee performance was assessed in terms of contextual and task performance, while remuneration items addressed salary and non-wage benefits. The target population included all hotel sector employees on Madeira Island. The sample was selected through random sampling, and a pre-test involving 10 industry professionals was conducted from April 30 to May 8, 2024, to validate the instrument.

RESULTS AND DISCUSSION

Descriptive analysis of the sample

The sociodemographic profile of the study sample, in table 1, comprising 365 hotel employees from Madeira Island, reflects a predominantly operational workforce employed in medium- to large-scale hotel units. Most participants (65.5%) work in 4-star hotels, followed by 5-star (23.3%) and 3-star units (11.2%). Most of these establishments have between 200 and 299 rooms (54.2%), indicating the prevalence of sizeable hospitality infrastructures.

	N	%		N	%
1. Hotel Category			9. Position/Role Held		
3 stars	41	11.2	Receptionist	66	18.1
4 stars	239	65.5	Head of Reception	9	2.5
5 stars	85	23.3	Night Auditor	1	0.3
2. Number of Rooms			Reservations Assistant/Manager	17	4.7
≤ 100 Rooms	22	6.0	Maintenance Technician/Painter	30	8.2
101-199 Rooms	64	17.5	HR Assistant	16	4.4
200-299 Rooms	198	54.2	HR Manager/Director	5	1.4
300-399 Rooms	65	17.8	Barman/Barwoman	27	7.4
≥ 400 Rooms	16	4.4	F&B Manager	1	0.3
3. Gender			F&B Assistant	12	3.3
Feminine	216	59.2	Waiter/Waitress	10	2.7
Masculine	149	40.8	Housekeeper	10	2.7
4. Age			Laundry Assistant	17	4.7

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18-28 Years old	73	20.0	Chambermaid/Housekeeping/Floor Staff	58	15.9
29-39 Years old	166	45.5	Public Relations	3	0.8
40-50 Years old	107	29.3	Head of Purchasing	1	0.3
≥ 51 Years old	19	5.2	Masseur/Masseuse	5	1.4
5. Educational qualifications			Head Chef	3	0.8
Basic Education	2	0.5	Gardener	3	0.8
Secondary Education	156	42.7	Event Manager	5	1.4
Technological/Vocational/Other course	86	23.6	Digital Marketing/Assistant/Manager	12	3.3
Higher Education	121	33.2	Commercial Director	5	1.4
6. Department			Marketing Director	6	1.6
Reception	76	20.8	Sales Director	1	0.3
Reservations	17	4.7	Sales Assistant	2	0.5
Human Resources	21	5.8	Assistant Housekeeper	1	0.3
Marketing	24	6.6	Financial Assistant/Manager	8	2.2
Food and Beverages	63	17.3	Financial Director	3	0.8
Management and Finance	16	4.4	Electrician	1	0.3
Housekeeping	52	14.2	Head of Maintenance	3	0.8
Top Management	5	1.4	Head of Housekeeping	1	0.3
Maintenance	70	19.2	Commercial Assistant	3	0.8
Sales	10	2.7	Kitchen Assistant	8	2.2
Public Relations	1	0.3	Security	1	0.3
Spa	5	1.4	Management	3	0.8
Sales	1	0.3	Accountant	2	0.5
Communication	1	0.3	IT	1	0.3
Security	1	0.3	F&B Stock Manager/Storeroom Manager	3	0.8
Accounting	2	0.5	Head Waiter/Head of Dining Room	2	0.5
8. Experience in the hospitality sector			10. Individual net monthly salary		
< 2 Years	48	13.2	820€-1500€	321	87.9
2-5 Years	103	28.2	1501€-2500€	43	11.8
5-10 Years	107	29.3	2501€-3000€	1	0.3
10-20 Years	76	20.8	11. Performs management/supervisory duties		
> 20 Years	31	8.5	Yes	59	16.2
			No	306	83.8

Table 1. *Socio-demographic Profile of the Sample*

In terms of gender, the sample is slightly female dominated, with women representing 59.2% and men 40.8%. The most represented age group is 29–39 years (45.5%), followed by 40–50 years (29.3%), suggesting a relatively mature and experienced workforce. Educational attainment is high, with 42.7% having completed secondary education and 33.2% holding a university degree. An additional 23.6% possess vocational or technical qualifications, while only 0.5% have completed only primary education.

Respondents are employed across a broad range of departments, with the highest concentrations in Reception (20.8%), Maintenance (19.2%), and Food and Beverage (17.3%). Job roles vary significantly, although front-line positions such as receptionists (18.1%), housekeeping staff (15.9%), and

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maintenance technicians (8.2%) are prominent. Only 16.2% of respondents occupy managerial or supervisory roles, indicating that the sample largely consists of non-leadership personnel.

Regarding professional experience, most employees have between 2 and 10 years of service in the hotel sector (57.5%), with 29.3% falling within the 5–10 year bracket. Only 8.5% have more than 20 years of experience. In terms of monthly net income, the vast majority (87.9%) earn between €820 and €1500, underscoring the modest wage structure typical of the hospitality industry in peripheral regions like Madeira.

Overall, the sample represents a well-distributed cross-section of hotel sector employees in Madeira, characterized by operational roles, intermediate to high levels of education, and modest remuneration.

Measurement model validation

This section analyzes the relationships among the core variables of the study, remuneration, leadership, and employee performance, by assessing the validity and reliability of the measurement model. To ensure the constructs' consistency, a confirmatory factor analysis (CFA) was conducted. This method, widely used in structural equation modeling, enabled the examination of correlations between variables and the strength of their associations (Marôco, 2014). The bootstrapping technique was employed to generate subsamples, enhancing the robustness of the model by providing more accurate estimates and confidence intervals (Hair et al., 2010).

Reliability and internal consistency were evaluated using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). As shown in Table 2, all Cronbach's Alpha values were above 0.9, indicating excellent internal consistency among the items (Marôco, 2014). Similarly, all CR values exceeded the recommended threshold of 0.7, confirming that the constructs are reliable (Hair et al., 2010). The AVE values were all above 0.7, well above the minimum acceptable value of 0.5, demonstrating strong convergent validity. Additionally, all factor loadings were higher than 0.7, reflecting a well-defined and stable structure for each construct.

Overall, the results support the robustness of the measurement model, confirming that the constructs of remuneration, leadership, and employee performance are reliable, valid, and suitable for further analysis.

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Items	Loadings	t-value	CR	AVE
Transformational Leadership (◎= 0.989)			0.990	0.790
11_ChefCrenc	0.847	44.414		
12_ChefAmb	0.866	46.759		
13_ChefConsq	0.888	60.945		
14_ChefMet	0.882	66.567		
15_ChefProb	0.886	74.755		
16_ChefOrientSup	0.912	92.045		
17_ChefDesenv	0.909	91.502		
18_ChefBemEs	0.889	48.740		
19_ChefResp	0.891	67.330		
20_ChefAssEsf	0.868	43.403		
21_ChefHabAsp	0.894	65.240		
22_ChefIncen	0.898	54.566		
23_ChefConfi	0.895	59.672		
24_ChefDifInc	0.909	89.406		
25_ChefVisFut	0.905	91.158		
26_ChefExpEntus	0.906	69.386		
27_ChefSensCol	0.896	69.698		
28_ChefPropos	0.909	87.792		
29_ChefAlcMetas	0.896	58.539		
30_ChefPensaOpin	0.903	89.489		
31_ChefReflxQuest	0.900	77.937		
32_ChefNovProj	0.860	41.446		
33_ChefAmbConfFunc	0.899	76.469		
34_ChefPVistResProb	0.893	73.533		
35_ChefProbDifAng	0.906	86.383		
36_ChefInterProb	0.792	25.870		
Transactional Leadership (**α**= 0.973)			0.976	0.757
37_ChefBomDes	0.878	66.090		
38_ChefSatAlcMet	0.873	55.776		
39_ChefElogPad	0.889	78.265		
40_ChefInfRecomp	0.876	54.556		
41_ChefErrRecFalh	0.883	67.526		
42_ChefTratJust	0.893	66.491		
43_ChefNEngnBnP	0.872	55.560		
44_ChefMonotInad	0.910	101.181		
45_ChefContrErr	0.890	60.196		
46_ChefFocIrrErr	0.846	32.187		
47_ChefAtenFunc	0.879	53.469		
48_ChefSurgProb	0.748	19.547		
49_ChefAtencFalh	0.861	39.766		
Employee Performance (**α**= 0.970)			0.976	0.869

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50_ColSupDif	0.934	96.859		
51_ColIniResProb	0.938	123.119		
52_ColTrabAusChef	0.940	166.200		
53_ColRecTrab	0.921	74.529		
54_ColEficTrabAlt	0.932	88.423		
55_ColRealTarfs	0.929	79.268		
Remuneration (**α**= 0.977)			0.980	0.827
56_HotPagMert	0.889	65.326		
57_HotRecuDesmp	0.903	66.428		
58_HotComRmnBnf	0.874	47.230		
59_HotAlMetDsmp	0.924	113.268		
60_HotIncenGrp	0.903	75.962		
61_HotRecmpMud	0.933	109.411		
62_HotRecmpCmp	0.921	91.379		
63_HotLancNvAbord	0.923	80.699		
64_HotOfeCompBenf	0.908	86.544		
65_HotRecMet	0.916	82.858		

Table 2. *Measurement scales, dimensionality, and reliability*

Measurement model validation

After validating the measurement models as outlined in the previous section, the hypotheses under study were analyzed to confirm the structural model (figure 2).

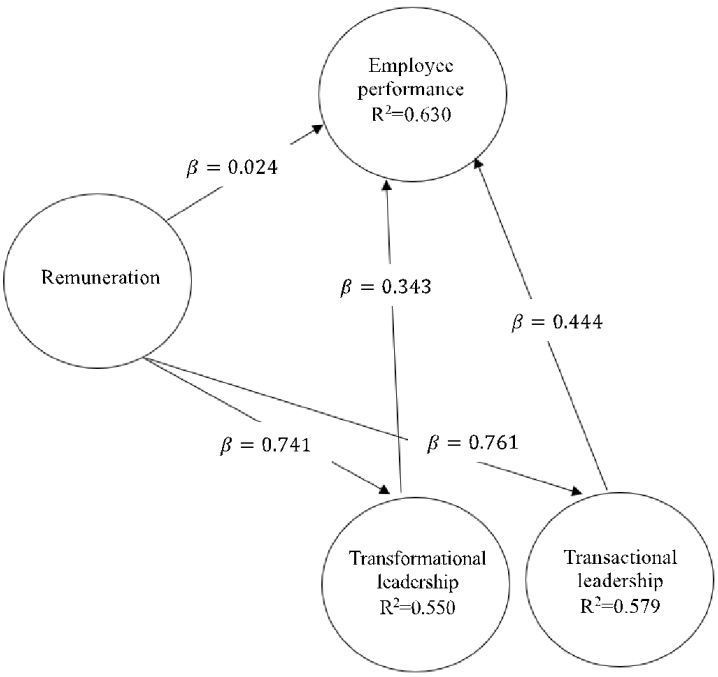


Figure 2. *Validated Structural Model*

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The main objective of this study was to assess how remuneration influences leadership and employee performance within hotel units, specifically those located on Madeira Island.

To this end, it was essential to evaluate factors such as transformational leadership, transactional leadership, employee performance, and remuneration to understand how the two leadership styles influence performance and how remuneration affects both leadership styles and employee performance in hotel units.

The findings confirm that transformational leadership positively influences employee performance (H1). As established in the literature review, leadership fosters positive behaviours among employees (Peng, Yang and Huan, 2022), motivating them and strengthening their commitment to work (Ozturk, Karatepe and Okumus, 2021). This style of leadership supports employees by offering guidance and creating a positive working environment (Nagarathinam, 2020). Transformational leaders highlight the importance of employees' contributions, organisational goals, and staff wellbeing (Yıldız, Baştürk and Boz, 2014), thereby forming meaningful connections (Teoh et al., 2022). In fact, specific dimensions of transformational leadership, particularly idealized influence and inspirational motivation, play a key role in improving employee performance in hotel units (Teoh et al., 2022).

The second hypothesis also held true: transactional leadership positively influences employee performance (H2). According to Bass et al. (2003), transactional leadership is characterised by agreements between leaders and subordinates, where employees fulfil tasks in exchange for rewards or to avoid penalties. This leadership style motivates employees through reward mechanisms and corrective actions to maintain discipline and promote desirable behavior (Lee, Yeh, Yu and Lin, 2023).

Regarding hypotheses 3 and 4, the study concluded that remuneration influences both transformational and transactional leadership styles (H3 and H4). This supports findings by Patiar and Wang (2020), who demonstrated that financial compensation and benefits enhance leaders' effectiveness, as they feel their efforts are recognized and rewarded.

However, hypothesis H5 was not confirmed: remuneration does not directly influence employee performance. While remuneration appears to shape leadership styles, its direct impact on performance was not supported by this study. This contrasts with studies such as Krauter (2006), who found a positive correlation between pay and performance, but aligns with the understanding that leadership acts as a mediating factor in this relationship.

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Overall, the results underscore the importance of leadership styles in enhancing employee performance and highlight the indirect role of remuneration through its effect on leadership approaches.

CONCLUSIONS

This study advances the literature by establishing a theoretical link between remuneration, leadership styles (transformational and transactional), and employee performance within hotel units in Madeira Island, an underexplored context. Results indicate that both leadership styles positively influence employee performance and are themselves influenced by remuneration. However, remuneration does not directly affect performance.

Despite access to a comprehensive database of hotel units, data collection was constrained by low response rates and limited engagement, particularly from management.

Future research should investigate additional leadership styles within Madeira and compare findings across regions. Qualitative methods, such as interviews, may enrich insights. Comparative studies between hotel categories (e.g., 3-star vs. 5-star) could further reveal how remuneration levels and leadership dynamics influence staff behavior and organizational outcomes.

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EFFECTS OF ARTIFICIAL INTELLIGENCE ON THE HUMAN SIDE OF THE ORGANISATION IN THE BUSINESS PROCESS OUTSOURCING INDUSTRY

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ABSTRACT

Purpose- Focused on the business process outsourcing industry, this study aimed to determine the effects of Artificial Intelligence (AI) on job creation, job destruction, upskilling and reskilling as well as human-machine collaboration.

Design/Methodology/Approach- The study was qualitative and relied on secondary literature. SCOPUS, Science direct, JSTOR, EBSCO, DOAJ and Google scholar databases as well as some few grey literature considered credible were used. Publication period restriction was from 2021 to 2025 with very few critical exceptions. A systematic review was employed for peer reviewed journals using the SALSA method (search, appraisal, synthesis and analysis).

Findings-AI leads to both job creation and destruction. The jobs created are high skilled and relate to management and supervision of AI, AI ethics as well as AI technical development and programming. The jobs destroyed are low skilled, repetitive and manual. AI leads to an increase in upskilling and reskilling of employees in areas that keep changing as AI advances, hence the need for lifelong learning. Human-AI relationship should be stronger and need to graduate into a symbiosis.

Originality/Value- Unlike most literature that list fixed skills to be learnt due to AI adoption, this study finds that upskilling and reskilling domains must be dynamic as AI advances. It also points at the adoption of lifelong learning as well as advises managers to divide markets into either AI or human-centered segments.

Keywords: Artificial intelligence, Business process outsourcing, Upskilling, Reskilling, Job creation, Job destruction, Human-machine collaboration.

INTRODUCTION

Artificial intelligence (AI) is revolutionising the way business is done. From a global perspective, 95% of all consumer support interactions will be done by AI by 2025 (Arakpogun et al., 2021), 70% of firms may have deployed at least one AI technology, with less than 50% deploying all the 5 technologies

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(Zarifhonarvar, 2024; Ellingrud and Salguero, 2020**).** By 2026, companies and boards of directors would be expected to get assistance in decision support information by AI (Li, 2024). Expenditures in AI have grown to 30 billion dollars globally since 2016. Interestingly, only 10% went to acquisitions and 90 per cent to research and development, signalling how much AI is still developing and evolving (Ndungi and Siregar, 2023). To signal AI's fast growth, ChatGPT, an example of generative AI, was introduced on November 30, 2022, and its ability to give users comprehensive responses and precise answers was so impressive that it gathered 100 million active users every month. In Asia, one in every three workers in Philippines is highly exposed to AI while one sixth are rated highly complementary (Cucio and Hennig, 2025). The percentage of the workforce that employs AI at work in China and India stood at 77% and 71% respectively (Jaiswal et al. (2023). In Africa, there are more than 100 AI startups (Arakpogun et al., 2021). IBM opened AI research labs in Kenya in 2013 and South Africa in 2016, with Google opening a similar one in Ghana in 2019 (Arakpogun et al., 2021). In Morocco, Uganda, Botswana, Kenya, Nigeria and Algeria, Women in Machine Learning and Data Science (WiMLDS) promotes the participation of women in AI, while in South Africa, the University of South Africa established the Robotics and Agent Lab (RAL) in 2007 to promote AI (Arakpogun et al., 2021). The foregoing are just a few samples of the growth and advancement of AI.

On the other hand, Business process outsourcing (BPO), which is the contracting of a firm's specific business processes, services or operations to another firm acting as a service provider (Mbanje and Orthodox, 2023), has also been gaining traction. Beginning with the United States of America (USA), Plunkett (2023) reported that the IT cloud, data processing and internet content hosting BPO sector in the USA had 388,300 employees in 2022, with total revenues of 2.208 trillion dollars, representing an 8% annual revenue growth rate, expected to grow to 3.1 trillion dollars by 2030. In the Middle East, Fitchsolutions (2023) observed that much as Lebanon has a growing BPO industry, it still suffers from high infrastructure costs, cybersecurity risks and an immature data centre infrastructure. The country had a total of 200 BPO enterprises, with IT services taking 90% of all. In Asia, Prince (2022) reported that the Indian BPO sector has suffered high attrition rates occasioned by low perceived value of the BPO jobs, monotony in the work, dispirited efficiency and working ungodly hours. In Africa, Mbanje and Orthodox (2023) indicated that by 2019, the South African BPO sector was valued at USD 1.4 Billion and would grow by 13.2% annually up to 2027.

Research problem

BPO has witnessed steady growth, same as AI advancements. BPO firms exist to help clients concentrate on core business as well as cut costs. Yet the BPO industry is highly labour intensive, with

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manual and repetitive tasks which can be automated using AI, to save costs. When AI is used, staff may be left jobless or may have to upskill and reskill to remain competitive. There are also chances that humans would be in competition with the machines. These leave questions as to what the effects of AI has been specifically on the human side of organisations involved in the BPO industry.

Research objectives

Focusing on the BPO industry, this research was therefore an attempt:

i. To determine the contribution of AI on job creation.

ii. To evaluate the influence of AI on job destruction.

iii. To assess the influence of AI on upskilling and reskilling of workers.

iv. To evaluate the extent of the influence of AI on human-machine collaboration.

To realise the above objectives, a systematic review was employed for peer reviewed journals using the SALSA method (search, appraisal, synthesis and analysis). The study found out that AI leads to creation of technical AI-centric jobs, destruction of repetitive and manual jobs, upskilling and reskilling in the areas of the new jobs created as well as symbiosis between AI and human beings.

Research contribution

New knowledge has been generated that points out that jobs created or destroyed by AI are not static but dynamic, hence the need to continuously change upskilling and reskilling programs. The realisation of AI's gradual task replacement leading to full job replacement contributes to an organised employee redeployment as well as affords time for staff to upskill and reskill, eliminating abrupt job changes. The research further builds on the already existing literature on AI and human resource fields concerning training and job descriptions.

The next section of this paper is literature review, followed by methodology, results, discussion of results, implications and then conclusion.

LITERATURE REVIEW

Theoretical framework

The AI job replacement theory by Huang and Rust (2018) is used to ground the study. This theory

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recognises the double-edged impact of AI, in the sense that much as it leads to innovation by reshaping services, it also threatens human jobs. Four types of intelligence are discussed for service tasks, namely: mechanical, analytical, intuitive and empathetic. At augmentation stage, AI replaces just some tasks. Later, AI develops and progressively takes over all the tasks in a job, finally replacing the entire human labour. Therefore, for service employees, analytical tasks will become less important as AI takes them over, leaving the employees with intuitive and empathetic skills. Eventually, AI will perform even the intuitive and empathetic tasks, hence enabling innovative ways of human-machine integration for providing services but also threatening human employment (Huang and Rust, 2018). It is therefore important to segment markets into those with stronger preference for humans and those that prefer machines as well as promote collaboration between humans and machines.

This theory can help employees in the BPO industry to check the progression of AI in taking over tasks and know how to upskill and reskill before AI takes over all the tasks in a job, hence respond effectively to job destruction that threatens human employment. Additionally, the theory can be leveraged to scan the environment and hence segment the markets into those that have stronger preference for humans and those that prefer machines, creating a good mix of AI and human labour.

Jaiswal et al. (2023) however concluded that since organisations are found in a complex socio-economic, political and cultural set up, it would be unethical and not useful to completely outsource intelligence to machines. Therefore, the total replacement of jobs by AI at level four as posited by Huang and Rust (2018) in this theory may need further interrogation.

Empirical literature

AI on job creation and job destruction

Researchers agree that AI affects human labour. Zarifhonarvar (2024) classified AI as a labour-saving technology (LST) and traced the growth of LST to the introduction of electricity in late 20th century and expansion of computers and IT, which led to the adoption of robots and automation across different business spheres. He also posited that the effect of AI on jobs will depend on the speed at which automation can be done, and augmentation of tasks. Montobbio et al. (2022) while concluding that robots had labour saving effects, added that such effects would vary in direction and size, based on countries, skill levels, and industries in question. Salguero from McKinsey and Company (2020) opined that 39 to 58 percent of work activities could be automated since they are predictable and repetitive, with labour intensive sectors being most affected, including manufacturing, food service,

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retail and agriculture. They added that other factors could be ease of a job being coded and substituted.

Hupfer (2020) argued that already, 82 per cent of job roles have been changed as a result of AI adoption. Zarifhonarvar (2024) in their study of the influence of ChatGPT on labour market dynamics found out that ChatGPT could fully impact 32.8% of occupations, with 36.5% of occupations experiencing partial impact and 30.7%, no impact. They further estimated the potential effect of AI on the global economic activity by 2030 to be $13 trillion.

Horobet et al. (2021), Lacová et al. (2022), Marcu (2021) and Grenčíková et al. (2021) all agreed on significant destruction and creation of jobs in their analyses of Industry 4.0. Dwivedi et al. (2021) put the number of job losses due to AI implementation to be 375 million by 2030.

Echoing similar results, Li (2024) concluded that AI would lead to a likelihood of disappearance and downgrading of some jobs. Similarly, Jumaev (2024) argued that AI does not entirely replace work but introduces shifts and creation of new opportunities. They added that AI, by automation, increases efficiency and productivity as it takes over routine tasks and frees up people to do higher value work, whose requirements are emotional intelligence, critical thinking and problem solving, creating new jobs in industries like robotics, healthcare technology, autonomous vehicles as well as design, development and management of chatbots and virtual assistants. George (2024) did a meta-analysis of 127 studies of automation in Europe and North America and found that 7% of workers suffered job losses and long periods of job transition, but the net effect was job creation. Ali (2023) argued that in as much as AI would render some jobs redundant, there lies a huge opportunity for jobs that require what they termed as higher order cognitive skills, adaptability and creativity, social intelligence and problem solving. The job domains that they concluded would emerge would be in data analysis, human-AI collaboration and AI development. Ibegbulam et al. (2023) also argued that AI leads to job displacement as well as creation of new jobs. They listed the displaced jobs as those are routine and repetitive, especially in data entry, customer service and manufacturing, but argued that there are roles AI cannot easily perform, especially if the jobs require emotional intelligence, complex problem-solving and critical thinking. Hassel, Özkiziltan and Weil (2022) while studying the impact of automation on employment and wages in OECD countries concluded that the effects were mixed, adverse and beneficial for low skilled, middle skilled and high skilled workers respectively.

Other researchers found net job increase. Much as Georgieff and Milanez (2021) observed that jobs that were at high risk of automation in 2012 suffered weaker growth in employment and a net loss of workers, they concluded that indeed, automation does not result in net job destruction. Supporting

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this view, in a study in Spanish manufacturing firms, Koch et al. (2021) found that organisations that did not employ robots suffered job losses while those that did, had a 10% net job increase. Similarly, Aghion et al. (2022) found a positive impact of automation on employment at industry and firm levels in France. They considered two views of automation on employment. One that it would destroy jobs and another that it would create jobs. They concluded that automation leads to more productivity, hence more demand from clients thereby resulting into higher employment. But their findings leave a question to be asked: What if the more demand from clients led to deeper use of automation to create more products? Is this not a paradox? Would firms automate to increase productivity then employ more people to meet the increased demands rather than automate more?

Into the specifics of job types and skills mostly affected by AI, Jaiswal et al. (2023) listed what he referred to as not only mundane and mechanical but also tedious human tasks. Ferreira et al. (2020) also identified mechanical and repetitive tasks as most affected. Dwivedi et al. (2021) opined that the ratio of current jobs to be displaced by AI could be one third, majorly low skilled, repetitive and rule-based ones, and argued that high skilled jobs would be on demand. Zarifhonarvar (2024) argued that LSTs like AI would only replace employees who worked in jobs that required low skill levels. These findings agreed with those of Acemoglu et al. (2020) who noted that AI's effect would be job displacement especially for those with routine jobs, and that as AI takes up repetitive jobs, it frees up workers to take other jobs that would be more creative and complex. They further stated that there were increasing number of new AI related vacancies for firms that use AI and positions that survived had skill requirement changes.

But contrary to most research that posit that AI adoption only affects low skilled workers, Morandini et al. (2023) argued that since AI automates a variety of tasks, it affects both knowledge and blue-collar workers. Advancing further divergent views, Hirvonen, Stenhammar and Tuhkuri (2022) while studying the effects of technology on employment in Finland concluded that advanced technology had no effect on skill composition and led to increase in employment. They argued that companies used advanced technology to produce new types of output rather than replace workers.

The results of AI effect on jobs become more inconclusive when time horizons are introduced. Zarifhonarvar (2024) argued that in the short run, Chat GPT and other generative AI technologies may decrease demand for workers in some particular fields as automation takes center stage as well as create some new opportunities in such areas as AI development. They further added that there will be a skills mismatch, albeit temporarily, as the needed capabilities will not be matched by the skills employees possess. The mismatch would create temporary unemployment and underemployment,

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but which will disappear as employees reskill in response to AI induced changes. In the long run, they argue, generative AI would result into two scenarios: One being a positive influence of services on productivity, hence economic growth and labour demand, and therefore an increase in new vacancies and wages paid for them. On the other hand, it could be reduced demand for workers as a result of automation, hence reduced labour and wages. They conclude that the influence of AI on the labour market cannot be easily predicted but would rely on several factors including type of industry, the rate of adoption of automation, the automation scope, and the availability reskilling and upskilling for employees.

Specific to the BPO industry, chatbots have been found to be one of the most disruptive AI technologies especially in call centers. Ferreira et al. (2020) argued that chatbots take up mechanical and repetitive tasks done by agents in call centers. Since they use natural language interfaces and have human like dialogue, they provide clear responses to customers and can handle a huge number of requests. Coupled with the fact that chatbots have no such human limitations like getting grumpy, tired or even sick, they are increasingly taking over jobs in different domains including customer service and human resources (Ndungi and Siregar, 2023).

But AI also creates new jobs. Morandini et al. (2023) opined that new jobs created will be those in the industries concerned with development and implementation of AI technology (Puzzo et al., 2020). Gillath et al. (2021) agreed that AI needs constant supervision from human beings. In concurrence, Brunetti et al. (2020) concluded that AI applications still need oversight provided by human beings leading to emergence of highly skilled job requirements. Ibegbulam et al. (2023) enumerated new job roles that could be coming up because of AI implementation including AI ethicists, AI specialists, Machine learning engineers and data scientists, AI developers, AI generated insights interpreters as well as AI managers and overseers. Zarifhonarvar (2024) argued that implementation of AI, while causing redundancy in some jobs, would also create new ones as well as pose transitional challenges as workers opt to acquire new skills through training to remain competitive. They Identified new roles being introduced by AI as digital assistant engineers, warehouse robot engineers, and AI marketing specialists. Similarly, Ali (2023) identified some new roles that would emerge such as AI specialists, Data Scientists, Cybersecurity Experts, Human-Machine Interaction (HMI) Designers and Robotic Process Automation (RPA) Specialists. Jumaev (2024) concluded that new fields created include software development, machine learning and data analysis and listed some new jobs that AI has brough about as AI Specialists, Data Scientists, AI Ethicists, Automation Specialists, AI Trainers, Human-Machine Interaction Specialists, AI Policy Analysts and Hybrid Job Roles.

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From the foregoing literature on job creation and job destruction caused by AI implementation, there still exist opposing views between scholars who conclude that AI would lead to job losses as others insist that it would instead augment existing ones (Tschang and Mezquita, 2021; Jaiswal et al., 2023). While some researchers like Malik et al. (2021) and Wach et al. (2023) argue that AI will lead to job cuts, others are of the opinion that job creation would be more prominent than job destruction. Yet others conclude that the net effects differ based on time horizons and it remains a wait and see issue. One thing that remains clear, is that some jobs will be destroyed, and others will be created. Therefore, this remains a rich area for research, especially in the BPO industry where there are a lot of jobs that are repetitive and that can be automated.

AI on upskilling and reskilling

With the advent of AI, adjustment to new models is necessary (Jaiswal et al., 2023), and one of those adjustments is the need to reevaluate the required skills in an organisation (Hancock et al., 2020), hence the need for upskilling and reskilling (Morandini et al., 2023). Upskilling involves new skill acquisition or current skills improvement in order to advance careers and improve effectiveness in one's current role (Moore et al., 2020). Reskilling on the other hand encompasses learning new skills in a totally different field, occupation or industry (Morandini, et al., 2023) and basically aids in career or industry change (Sawant et al., 2022). Anshari and Hamdan (2022) argued that upskilling and reskilling would eliminate employee deskilling and demotivation that may be a result of digitisation initiatives like AI. Jaiswal et al. (2023) argued that upskilling will help find jobs while reskilling will be critical at the stage of AI adoption and will also help employees develop new skills and competencies for the new roles (Makarius et al., 2020).

Jaiswal et al. (2023) identified interpersonal skills, leadership and communication skills as key requirements by leaders to communicate effectively the need for upskilling due to AI adoption and to help avoid dehumanization of staff, as AI takes over their roles. Akanksha et al. (2021) identified digital skills, advanced cognition, decision-making, continuous learning and data analysis as the five key skills required due to AI adoption. On the other hand, Cramarenco et al. (2023) identified new programming languages, big data analytics, machine and deep learning and robotics as the key skills required as a result of AI implementation.

Morandini et al. (2023) were more structural. They classified the skills needed in order to adapt to the emergence of AI as technical and soft skills. Machine learning, programming, cybersecurity and data analysis were identified as the key technical skills while emotional intelligence, critical thinking, creativity and communication were identified as the soft skills. These soft skills majorly

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complemented the technical ones. Microsoft (2023) followed the same trend and identified the need for soft skills in an AI workplace, listing them as AI delegation, creative judgement, intellectual curiosity, bias detection, flexibility, emotional intelligence and analytical judgement. Ibegbulam et al. (2023) too, argued for the case of soft and technical skills, with the latter being AI related and soft skills being not only difficult to automate, but also those that enable employees to perform effectively in roles requiring human-AI interaction. Technical skills included data science, programming, machine learning, AI ethics and AI application development while soft skills would include adaptability, creativity, critical thinking and emotional intelligence.

The other factor in upskilling and reskilling is the approach. Li (2024) recommended upskilling for skilled professionals and reskilling for routine tasks. He also recommended a mix of university education, experiential learning, certification and recertification as well as open learning self-courses. In addition, he vouched for a hybrid approach of reskilling existing employees as well as recruiting new talent that is competent in AI. Arakpogun et al. (2021) also while advocating for reskilling workforce added the need for repositioning of the education systems to address the emerging AI skill needs and recommended the embedding of AI in the curriculums at secondary and primary schools. Morandini et al. (2023) and Zajko (2022) argued that the impact of AI on learning and development must be carefully considered so that needs and perspectives of the workforce are taken into account.

But even as researchers argue about the need to develop soft human transversal skills such as communication, problem-solving, conflict resolution, reasoning and creativity, Jaiswal et al. (2023) argue that generative AI can indeed replace or mimic such skills. Indeed Dwivedi et al. (2021) also argued that AI has the potential to augment or even replace human tasks and activities through recognition, understanding, learning, and action. Therefore, the types of skills required to keep up with AI keeps evolving and needs further research. With AI systems like DALL-E 2 that can learn from their mistakes and increasingly generate more accurate results, as well as the advent of Artificial General Intelligence (AGI), which has the capacity to perform intellectual tasks traditionally reserved for human beings, there are suggestions that human intelligence will be surpassed (Morandini et al., 2023). This complexity, therefore, means that people and organisations should focus on lifelong learning, as AI and technology keep changing and advancing. It is with this realisation that Li (2024) recommended that upskilling and reskilling should place emphasis on human capital development as well as lifelong learning, with technology, people and organisation as the main components, observing the importance of traditional primary, secondary to university education as well as on the job training, seminars industry certifications and self-study. He also stressed the need for collaboration between governments, educators and corporates and businesses to form an education

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alliance (Li, 2024). This need for lifelong or continuous learning also formed the findings of Jumaev (2024) and Ali (2023). Indeed Gabriel et al. (2025) also recommended the need for workers to prioritize continuous learning to keep up with technology and automation, and the importance of collaboration between government, business and educational sectors in creating policies, programs and digital literacy in a bid to reskill workers and hence allow them to adapt to changing technology. As a clear testament to how skills needed keep changing and hence the need for lifelong learning, Li (2024) found out that emotional intelligence, active listening and quality control that were core in 2015 would no longer be so by 2025. Instead, self-management skills would be key, including flexibility, stress tolerance, active listening and resilience.

In conclusion, research has found out a number of skills that need to be learnt and improved on as a way of adapting to changes brought about by AI. Human and soft skills are recommended to be the ones upskilling and reskilling should focus on, apart from AI technical development skills. But AI is evolving so fast and seems to be edging closer to and even overtaking human skills, making lifelong learning inevitable and leading to constant mutation of skills to be adopted in upskilling and reskilling, making this area to be ripe for continuous research.

AI on human- machine collaboration

Research is converging in the direction of human-AI collaboration, where AI focuses on enhancement of human competencies, skills and capacity (Din and Dke, 2020), so that people_major on skills referred to as human-only, which include effective team working, creative thinking, managing difficult conversations, and problem solving (Cook et al., 2020). Indeed, this coexistence was also vouched for by Jaiswal et al. (2023) who concluded that it would be unethical and not useful to completely outsource intelligence to machines because organisations are found in a complex socio economic, political and cultural set up. Sowa et al. (2021) also agreed on a symbiotic relationship where activities left for AI would be those that are routine, risky, manual and tedious ones. Rampersad (2020) also agrees on certain skills, which he calls essential, remaining with humans, even after AI implementation**.** Additionally, Zirar et al. (2023) posited that there is a perpetual race between human beings and AI in people's quest to learn new skills too complex for AI to perform and defined the resultant relationship as symbiotic. Jaiswal et al. (2023) agreed that a lot of research is now advocating for synergies between human and machine competencies. Similarly, Ibegbulam et al. (2023) argued for a human-machine collaboration to enhance productivity and innovation, same as Ali (2023). Adding their voices to this growing perspective, Jumaev (2024) stressed the importance of human-machine collaboration, noting that the symbiosis would improve innovation and produce

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more job opportunities. Indeed, Li (2024) observed that the focus of industry 4.0 smart systems is not just automation, but rather, a human-machine intelligent collaboration. Faluyi (2025) called it AI augmentation, which he posited, can make work experiences more fulfilling, efficient and innovative, since it combines the strength of human workers as well as that of AI. But he also pointed out the need to reskill, even with AI augmentation.

METHODOLOGY

A systematic review was employed for peer reviewed journals, using the SALSA method (search, appraisal, synthesis and analysis). First, a search was done using defined search strings such as 'artificial intelligence' AND 'Business process outsourcing', 'artificial intelligence' AND 'job creation and destruction' as well as 'artificial intelligence' AND 'upskilling and reskilling'. A restriction was made for articles published between 2021 and 2025, but some interesting papers were found that were slightly older than 2021 including those touching on theoretical framework. The databases were also defined and were majorly SCOPUS, Science direct, JSTOR, EBSCO, DOAJ and Google scholar.

No	Search criteria	Narration
1	Databases	SCOPUS, Science direct, JSTOR, EBSCO, DOAJ and Google scholar
2	Search Words	'Artificial intelligence' AND 'Business process outsourcing', 'Artificial intelligence' AND 'job creation and destruction', 'artificial intelligence' AND 'upskilling and reskilling', 'BPO industry in Kenya', 'Artificial intelligence' AND 'Kenya'.
3	Period	2021-2025 (A few older ones were considered on relevance)

Table 1: Search criteria

Next, an appraisal was done. This involved the evaluation of the selected articles to check if they matched the objectives of the review. Studies were selected using an inclusion criterion then a quality analysis done. Papers that passed the inclusion criteria were selected for further investigation and content analysis (Mengist and Legese, 2020). The criteria included year of publishing, whether the papers were primary research, accessibility of the papers (locked or unlocked), language of the paper (English), appearance of the key word either in whole in the title, abstract or keywords, and whether the paper was published in a peer reviewed journal.

Apart from the database searches, a few grey literatures considered credible were picked, including some papers from conference proceedings, credible publications like Government readiness index from Oxford, Deloitte Insights and IMF working papers. Though not peer reviewed journals, these sources of grey literature were critical to avoid biases. They also augmented the published journals.

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No	Inclusion criteria	Narration
1	Year of publishing	2021-2025 (with a few exceptions)
2	Peer reviewed journal	'Yes/No
	Paper accessible to the researcher?	Locked/Unlocked
3	Paper language is English?	Yes/No
4	Key search word present in title, abstract or key words?	Yes/No

Table 2: Inclusion and exclusion criteria

Next followed the synthesis. Which involved extraction and classification of relevant data from selected papers to derive knowledge and conclusions.

Lastly, analysis was done, which involved the evaluation of the synthesized data and the extraction of meaningful information, before the report was written, with conclusions and implications.

RESULTS AND FINDINGS

Results from the considered literature generally points to the fact that artificial intelligence leads to an increase in number of new jobs created as well as number of jobs destroyed at the same time. AI also leads to an increase in upskilling and reskilling needs and lastly, it increases the need for human-machine collaboration to produce better innovation and results. The foregoing is summarised in figure 1 below:

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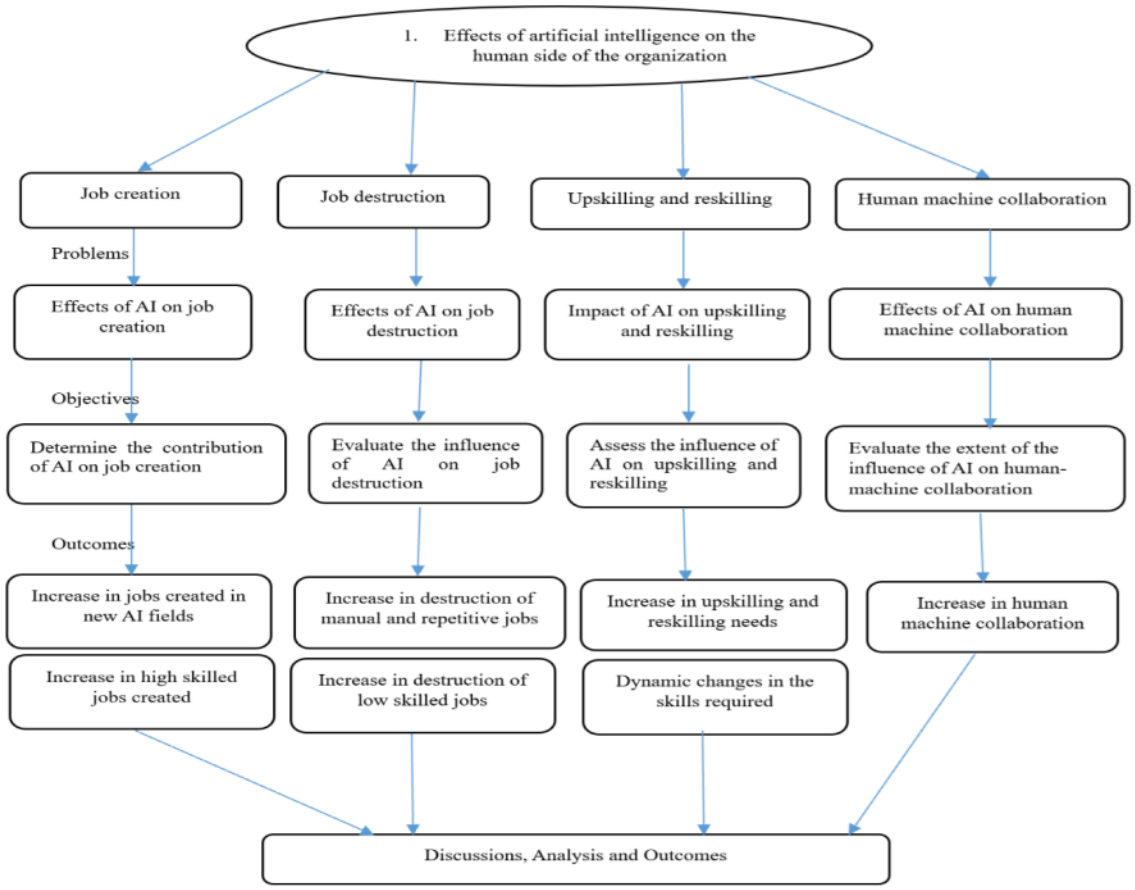


Fig 1: Research Framework and results

DISCUSSION, PRACTICAL IMPLICATIONS AND LIMITATIONS

AI on job creation

Outcomes

Artificial intelligence leads to the creation of new jobs related to management and supervision of AI, ethics of AI, AI technical development and programming, ICT security among others (Morandini et al., 2023; Brunetti et al., 2020; Ibegbulam et al., 2023; Ali, 2023; Jumaev, 2024).. The second outcome is that most jobs created are high skilled. These results fulfil the first objective.

Proposition 1

a) Artificial intelligence positively influences job creation in the new fields of AI.

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b) Artificial intelligence positively influences creation of high skilled jobs.

AI on job destruction

Outcomes

The first outcome is that artificial intelligence leads to destruction of repetitive and manual jobs (Dwivedi et al., 2021; Li, 2022; Jaiswal et al., 2023; Ferreira et al., 2020; Zarifhonarvar, 2024). The second outcome from most researchers was that jobs that are destroyed are generally low skilled. These results answer to the second research objective.

Proposition 2

a) Artificial intelligence positively influences job destruction for manual and repetitive jobs.

b) Artificial intelligence positively influences job destruction for low skilled jobs.

AI on upskilling and reskilling

Outcomes

The first outcome is that implementation of AI leads to an increase in reskilling and upskilling activities of employees (Li, 2022; WEF, 2020; Schwab and Zahidi, 2020; Jaiswal et al., 2023; Cramarenco et al., 2023; Morandini et al., 2023; Ibegbulam et al., 2023). The skills are classified into technical and soft skills.

The second outcome is that the areas of reskilling and upskilling keep changing as AI advances, with indications that AI may surpass human intelligence and perform all tasks that human does, and even more (Jaiswal et al., 2023; Dwivedi et al., 2021; Morandini et al., 2023). This calls for lifelong learning. These results address the third objective of the study.

Proposition 3

a) Artificial intelligence positively influences upskilling and reskilling.

b) Upskilling and reskilling areas keep changing with advances in AI, hence need for lifelong learning.

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AI on human- machine collaboration

Outcomes

The outcomes in this area favour human-AI collaboration, where AI automates repetitive, manual and mundane tasks as human beings concentrate on other human-centred jobs like effective team working, creative thinking, managing difficult conversations, and problem solving. Most researchers also consider the outsourcing of all work to AI as unethical and see a long-term relationship and coexistence of humans and machines, known as symbiosis. These results address the fourth objective of the study.

Proposition 4

a) Artificial intelligence positively influences human-machine collaboration.

Practical implications

This research helps managers in the BPO industry to employ a tough balancing act of inculcating a culture of innovation and yet still preserving jobs. Secondly, it illuminates the importance of segmenting markets into those that prefer AI and those that prefer human service, thereby still promoting human-machine involvement in a mixed matrix. Additionally, the research has made contributions on how training should be conducted, with a focus shift from mechanical skills to more intuitive and empathetical subjects to keep up with AI. By revealing that lifelong learning is key to ensure staff have skills in AI, the research helps staff and BPO managers to focus on a continuous, lifelong mix of formal school and college learning, self-enrolment courses, on the job training as well as acquisition of certifications in order to keep up with upskilling and reskilling to respond to changes introduced by AI.

Limitations and future research

This study was purely qualitative. No attempt was made to collect data, analyse them and establish findings that would confirm or contradict the results in the available literature. The researcher will collect data and analyse them in the BPO industry in Kenya as a second stage to make the study quantitative. Other future research should also use empirical study and employ quantitative methods and reach conclusions after data analysis. In addition, the study relied on available literature and only a number of research papers. Future studies could widen the scope of the papers studied.

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CONCLUSIONS

The effects of artificial intelligence on job creation and job destruction remain dynamic. Increasingly, more jobs are getting created with varying skillsets required, while more jobs still are getting destroyed with accompanying skills rendered redundant. Therefore, there is neither a specific list of jobs created and those destroyed, nor fixed skills needed or discarded. With the foregoing, it is necessary that there be a symbiotic relationship between AI and human beings, referred to as human-machine collaboration. This collaboration too will be dynamic, as the shifts between what AI does and what is left to humans keep changing. These dynamic changes in the AI landscape also call for lifelong learning to cope with the ever-changing nature of skills required.

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THE IMPACT OF INCREASED WEBSITE INTERACTIVITY ON PERSUASION AND ATTITUDE STRENGTH FOR LOW-INVOLVEMENT PRODUCTS

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ABSTRACT

The current work examined whether increased interactivity levels on a website that presents a low involvement product facilitate the persuasion process and increase the attitude strength towards the website. To achieve this, the Elaboration Likelihood Model (ELM) was applied, serving as a framework for understanding persuasion and attitude change in relation to advertised products and services. An experimental design was employed and three versions of a website were designed for a fictitious refreshment soft drink, representing a low involvement product. The findings provide key insights into how different levels of interactivity influence information processes related to website-oriented and product-oriented thoughts.

Keywords: interactivity level, low-involvement product, thought elicitation, attitude strength, ELM, advertising

INTRODUCTION

Internet users reached approximately 5.5 billion in 2024, representing 68 percent of the global population, an increase from 65 percent the previous year. The annual growth rate also rose from 2.7 percent to 3.4 percent (*ITU Digital World*, 2025).

During these years the communication between companies and consumers has been reshaping and continues to be evolving, clearly influenced by the ongoing digitalization and Internet explosion. The assessment and the evaluation of the effectiveness of interactive marketing techniques across business practices is of particular importance in order to capitalize the technology advances and incorporate them in the whole shopping experience (Wang, Zhong and Liu, 2022). From the very first moment Internet emergence, created for consumers new shopping experiences and ways of searching product

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information (Hood *et al.*, 2015). This trend has been reinforced since customers are increasingly acquainted with internet technologies and digital interactions (Lütjens *et al.*, 2022). At the same time, companies, by using various interactive channels such as e-mails, social media and websites, attempt to generate an effective and interactive communication with selected audiences (Lemon and Verhoef, 2016; Kuehnl, Jozic and Homburg, 2019; Wagner, Schramm-Klein and Steinmann, 2020). Though, the official website signifies the link between the company and the customers since it remains the main source of information for more than 50% of e-visitors worldwide. Overall, the importance of a well-designed website is profound since it enables interactive communication, formulates long term and durable relationships and contributes to consumers' engagement and loyalty (Voorveld, Van Noort and Duijn, 2013; Liao, Chen and Shih, 2019; Ye *et al.*, 2019; Quan *et al.*, 2020).

Since the inception of Internet commercialization up to the contemporary era, interactivity, is considered as the most important aspect of a website and appears to be a significant predictor of website effectiveness (Ghose and Dou, 1998; Macias, 2003; Song and Zinkhan, 2008; Hari, Iyer and Sampat, 2022). Interactivity is not dichotomous (a medium/channel is not just interactive or not) but can differ in level (from not interactive to highly interactive) as well as in type (the user affects the form and the content) (Coyle and Thorson, 2001; Lombard and Snyder-Duch, 2001; Coursaris and Sung, 2012; Fazli-Salehi *et al.*, 2022). A website may be of high, low or medium interactivity level. Different levels of interactivity can be incorporated into a website, potentially leading to varying communication outcomes. Different levels of interactivity can be employed in a website and may yield different communication outcomes.

No matter how interactive the web medium may be, web communication can be of low interaction or static if the user is unable to manipulate an interactive element. A website's interactivity only provides the potential for interaction. However, if users do not utilize the interactive features for any reason, their perceived interactivity may remain low. Conversely, users may perceive high interactivity even when the necessary interactive structures are not clearly present (McMillan, Hwang and Lee, 2003) For that reason, in this paper, we adopted perceived interactivity, in addition to actual interactivity, as we focus on how users perceive the various interactive elements used on a website (Xiang and Chae, 2022).

Determining the optimal level of interactivity required for a website to be effective has been a central focus of numerous studies for over two decades (Mai *et al.*, 2014; Hood *et al.*, 2015; Yang and Shen, 2018; Wu, 2019; Maduku *et al.*, 2024). The best interactivity level is difficult to be specified. Findings regarding the optimal level of website interactivity are conflicting. Increased interactivity levels may

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have a positive impact (Devaraj, Fan and Kohli, 2002; McMillan, Hwang and Lee, 2003; Thorson and Rodgers, 2006; Yim, Chu and Sauer, 2017) or a negative (Ariely, 2000; Fortin and Dholakia, 2005; Sohn, Ci and Lee, 2007). Moderating factors in online persuasion such as "need for cognition", "user ability" and "task involvement" have been successfully proposed in the debated notion of interactivity literature (Sicilia, Ruiz and Munuera, 2005; Liu and Shrum, 2009). "Product involvement" has been also proposed as a factor that is considered to determine or moderate the directions and shapes of the relationship between interactivity and advertising effectiveness (Sohn, Ci and Lee, 2007, p. 117). Product involvement, as a factor, affects surfing behavior and reinforces the extent of interactive behavior (Mathwick and Rigdon, 2004; Levy and Nebenzahl, 2008).

According to the theory of the Elaboration Likelihood Model, the degree of product involvement is an important determinant that affects whether an individual will follow the central or the peripheral route of information elaboration (Petty and Cacioppo, 1981, 1986). The moderating role of product involvement in the impact of website interactivity has been central to understanding how digital engagement shapes consumer behavior. Palla, Tsiotsou and Zotos (2013) found that for high-involvement products, interactive elements like personalization, help create stronger attitudes and lead to more informed purchase decisions. However, for low-involvement products, where decision-making tends to be less thoughtful, the benefits of interactivity are less pronounced. Recent studies (i.e., Lee, 2020) reinforce these findings, suggesting that interactivity might still have an impact on consumer engagement, but the effects on thought elicitation and attitude strength are more subtle for low-involvement products**.** Given these insights, further research is needed to better understand how website interactivity fosters cognitive responses and influences attitude strength, particularly in low-involvement contexts. This investigation is crucial for marketers seeking to optimize their digital strategies and understand how interactivity can be tailored to enhance consumer engagement across a product of low involvement levels.

In the present study, we aim to determine the appropriate level of interactivity required to establish conditions for effective communication between users and brand websites when promoting a low-involvement product. Effective communication is expected to elicit positive consumer responses toward both the website and the brand. We measure these responses by assessing the information process and the attitude strength subsequent of users' navigation to the experimental website.

Specifically, this study employs the experimental approach in order to examine the effects of three varying levels (high, medium, and low) of perceived interactivity on brand websites presenting a low-involvement product. We investigate how these levels influence information processing regarding the

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website and the brand, as well as their impact on consumer attitude strength toward the product in the online environment. To achieve this, the Elaboration Likelihood Model is applied.

REVIEW OF LITERATURE

Elaboration Likelihood Model

The Elaboration Likelihood Model (ELM) was developed to explain inconsistencies in attitude research. It explains how a source, a recipient and a persuasive message can generate persuasion by a variety of high and lower cognitive processes that operate along an elaboration continuum (Petty, Barden and Wheeler, 2009). The ELM articulates multiple persuasion processes into two routes to attitude change. The central route involves change that occurs when people are relatively thoughtful in their consideration of the issue-relevant information presented. In contrast, the peripheral route to persuasion involves processes requiring relatively little thought about issue-relevant information. Instead, attitudes are changed by simple association processes (for example, classical conditioning) or the use of various mental shortcuts and heuristics. By noting that variables influence attitudes by different means at different points along an elaboration continuum, the ELM is able to explain seemingly inconsistent findings in the persuasion literature. Based on the level of elaboration two different types of persuasion process can result; one involves systematically thinking and the other cognitive shortcuts. The attitude shaped under the high involvement process will be more stable, more directive of behavior and more enduring as compared to conditions of low involvement (Wagner and Petty, 2022).

Product involvement

Product involvement refers to the level of personal relevance a consumer attaches to a product, influencing how they process advertising messages. For low-involvement products, attitude change results from the process of peripheral cues like visuals rather than argument strength. In contrast, for high-involvement products, attitude change results from the central processing of arguments, critically evaluating the content. This distinction significantly impacts consumer behavior, with low-involvement products leading to a reliance on heuristic processing and making consumers more susceptible to emotional appeals or other non-rational factors (Petty and Cacioppo, 1986; Park and Moon, 2003; Schumann, Kotowski and Young, 2012). Research suggests that product involvement interacts with motivation and message design to influence consumer responses, especially in online advertising contexts (Zheng et al., 2024; Mandel and Johnson, 2002).

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Interactivity

Interactivity has enriched the shopping experience occurred in the digital arena (Flavián, Ibáñez-Sánchez and Orús, 2019). The last twenty years, many studies have focused on critical aspects of interactivity, interactive advertising and online information process (Lütjens *et al.*, 2022; Joo and Yang, 2023). In the web environment, interactivity appears to be a variable that may perform as a peripheral cue, or enact central processing based on other possible factors (i.e., internet usage experience), reconfirming postulate three (3) of the ELM theory in online settings (Liu and Shrum, 2009). Previous studies in the web environment suggest that interactivity influences users in different ways, depending on various personal and situational factors (Sohn, Ci and Lee, 2007; Liu and Shrum, 2009). Interactivity, according to Liu and Shrum (2009), could lead highly involved visitors to greater elaboration. However, they underlined the dual role of the interactivity in facilitating or interrupting the elaboration and thus the persuasion process. Experienced users are able to organize and manage the flow of information resulting in greater cognitive processing. Inexperienced users on the other hand are unable to manage interactivity, leading to inhibited persuasion process.

Different levels of interactivity (high, medium, low) may lead to different styles of information processing (central/ peripheral). Many studies have indicated that heightened levels of website interactivity yield positive outcomes not only in terms of consumer engagement and responses, but also in overall website evaluation (Devaraj, Fan and Kohli, 2002; McMillan, Hwang and Lee, 2003; Thorson and Rodgers, 2006; Yim, Chu and Sauer, 2017; Ducasse, Kljun and Čopič Pucihar, 2020; Xiang and Chae, 2022). Nevertheless, several authors have emphasized the adverse effects of increased website interactivity on information processing (Ariely, 2000; Fortin and Dholakia, 2005; Sohn, Ci and Lee, 2007). The contentious concept of interactivity has been a recurrent theme in internet-related studies. Relevant literature has focused on the contrasting findings concerning the impact of interactivity on the effectiveness of online advertising.

"Interactivity" constitutes a fundamental axis in communication provided by internet-related channels. It provides individuals and organizations with the ability of direct and bilateral communication. Steuer (1992) suggests that interactivity "*is the extent to which users can participate in modifying the format and content of a mediated environment in real time*" (p. 84). Pavlou and Stewart (2000) support that interactivity is an attribute of the consumer and not of the medium. Following this line of thought, a plethora of studies distinguished interactivity into actual and perceived (McMillan, Hwang and Lee, 2003; Wu, 2006; Voorveld, Neijens and Smit, 2011; Joo and Yang, 2023). Actual interactivity is encapsulated to the medium, whereas perceived is experienced by the user. Actual interactivity can

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only provide the potential to allow interaction. It can be measured by simply numbering the interactive features that are available in a communicational channel. Perceived interactivity is defined as "*a psychological state experienced by a site-visitor during his or her interaction with a website*" (Wu, 2006, p. 91) Actual interactivity is not always equal to perceived one. For example, a website may have increased interactive elements and thus increased actual level of interactivity. If, for whatever reason, subjects are not using interactive features within this website, perceived interactivity can be low. Likewise, perception of high interactivity can occur even when the structures necessary for interactivity do not seem to be present (McMillan, Hwang and Lee, 2003). Similarly, perceptions of low interactivity can occur even when a large number of interactive elements are available. No matter how interactive the web medium may be, the communication channel can be perceived as having low interaction if the individual is unable to manipulate it (Voorveld, Neijens and Smit, 2011; Xiang and Chae, 2022).

According to the literature, perceived interactive has three dimensions; two-way communication, synchronicity, and active control of the user (Blattberg and Deighton, 1991; Joo and Yang, 2023). Interactivity enables consumers and companies with two-way, direct communication regardless of distance or time (Blattberg and Deighton, 1991). The communication takes place in real time and the reaction of the two parties will influence their future reaction and behavior (Joo and Yang, 2023). Users and visitors have the active control of the information flow at their own time and pace. Novak, Hoffman and Yung (2000) in a user-centered approach focus on the extent to which the user has the ability to modify and form the content of presented information. Anderson (1995) agrees that the concept of interactivity is constituted by a multiple flow of information wherein the message is perceived as responsive, intelligent and on-demand accessible, the user rather that the sender has the ability to customize the content and there is an immediacy of feedback. Consistent with these prepositions Pavlou and Stewart (2000) support that interactivity is an attribute of the consumer and not of the medium. Building on previous studies on consumer behavior and responses, we focus on perceived rather than actual interactivity (i.e., Xiang and Chae, 2022).

Therefore, it is expected that internet consumers today, due to increased exposure to interactive advertising, behave differently to interactive communication and advertising as compared to ten or fifteen years ago or 15 years ago (Vance *et al.*, 2018; Bortko *et al.*, 2019). Features that were considered highly interactive in the past may not have the same impact in the future due to technological evolution. Furthermore, as consumers become more familiar with interactive elements, their expectations for interactivity tend to increase.

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HYPOTHESES FORMULATION

Hypothesis 1: Interactivity – thought elicitation

In the online environment, interactivity functions in a specific manner under conditions of low involvement. In particular, low-involvement consumers do not tend to be engaged in extensive interaction and the interactivity is serving as an additional positive peripheral cue, which can have a direct impact on the persuasion process regardless of individuals' ability to process the provided information (Liu and Shrum, 2009).

In the present study we analyse the interactivity under the 6th and the 3rd postulate proposed by Petty and Cacioppo (2012). In particular, the authors proposed that when both motivation and ability to process the message are low, any influence that occurs will be due to peripheral cues. In short, we postulate a tradeoff between argument elaboration and the operation of peripheral cues. As argument processing decreases, whether objective or biased, peripheral cues become more important determinants of persuasion. According to the ELM under the 6th postulate it is implied that when the product is of low involvement, interactivity, performing as a peripheral cue, becomes an even more significant factor in persuasion. In addition, postulate three (3) states "*Variables can affect the amount and direction of attitude change by: (a) serving as persuasive arguments, (b) serving as peripheral cues, and/or (c) affecting the extent or direction of issue and argument elaboration*" (Petty and Cacioppo, 1986). Under the third postulate it is noted that the same variable, can both increase and decrease persuasion. In particular, it is underlined that one variable can enhance information processing in some conditions, but can reduce in others (i.e., rhetorical questions proposed by Petty, Cacioppo and Heesacker, 1981; endorsements proposed by Baker and Petty, 1994; and positive or negative framing of the message arguments proposed by Smith and Petty, 1996) (Petty and Wegener, 1999). In this study the interactivity is examined under the sixth and third postulate since it appears as a variable that can both increase and decrease persuasion under the condition of a low involvement product (i.e., internet usage experience) (Liu and Shrum, 2009).

According to the ELM, it is the quantity not the quality of the arguments that leads low-involvement consumers to persuasion (Chen and Lee, 2008). The large number of interactive elements may enhance the likeability and the persuasion of the website (Luo, Li and Sun, 2022). In addition, interactivity has been shown to increase the information processing (Sicilia, Ruiz and Munuera, 2005; Sher and Lee, 2009), enhance consumers' affective involvement with the website (Fortin and Dholakia, 2005; Munaro *et al.*, 2021), and result to a more enjoyable experience (Raney *et al.*, 2003; Shi, 2024). Therefore, the following hypothesis is formulated:

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H1: When individuals are exposed to a website of a low involvement product they will elicit more (i) website and (ii) product-oriented thoughts as the level of interactivity increases (a) from low to medium, (b) from medium to high and (c) from low to high.

Hypothesis 2: Interactivity- attitude strength

If H1 is confirmed, it is expected that as the interactivity levels are increased, individuals process the provided information more centrally. Thus, it is expected that increased interactivity levels may lead to the formulation of stronger attitudes for individuals exposed to websites of a low involvement product.

Previous studies indicated that the website is likely to feel more personal and engaging, leading users to spend more time with the content and feel more connected to it, as interactivity increases. This increase in engagement is theorized to lead in stronger attitudes, as individuals experience a sense of involvement that goes beyond their initial low involvement with the product itself. Therefore, as interactivity moves from low to medium, medium to high, and ultimately from low to high, individuals will likely experience increasingly positive attitudes due to greater engagement and affective responses, as they are drawn into the interactive experience (Chang *et al.*, 2018).

In addition, interactivity has been shown to increase affective involvement, which can lead to a more positive attitude towards the product or brand (Hollebeek, Glynn and Brodie, 2014; O'Brien, Cairns and Hall, 2018). In the context of low-involvement products, increased interactivity may create a connection with the website and its content, which could elevate attitudes towards both the website and the product (Lou and Xie, 2021). As interactivity increases, users are more likely to engage with the content and form stronger attitudes, even in low-involvement situations. Interactivity fosters increased emotional and cognitive involvement (Hollebeek, Glynn and Brodie, 2014), leading to more favourable evaluations of the product and website. It should be underlined that in low-involvement contexts, the enhancement in website interactivity level acts as a peripheral cue, upgrading the experience and attitude formation through increased engagement and personal connection to the content (Huang and Benyoucef, 2017).

The H2 aligns with these principles by predicting that when individuals are exposed to a website of a low-involvement product, their attitudes toward the website will become stronger as the level of interactivity increases, from low to medium, medium to high, and low to high.

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Since increased interactivity leads individuals to process the provided information more centrally, it is expected that increased interactivity leads to the formulation of stronger attitudes as compared to decreased levels of interactivity (Tellis and Ambler, 2007). Therefore, it is expected that:

H2: When individuals are exposed to a website of a low involvement product then they will formulate stronger attitudes towards the product- as the level of interactivity increases (a) from low to medium, (b) from medium to high and (c) from low to high.

METHOD

Following previous studies, in the online context, (i.e., Ha and Lennon 2010) the "experimental design" was employed to examine the effects of the three (3) varying levels (high, medium and low) of perceived interactivity, available on brand websites that presents a product of low involvement, on the process of the information towards the website and the brand as well as on the resulting consumer attitude strength in the online environment.

The dependent variables are (1) the number of elicited thoughts towards the low involvement product and its website as well as (2) the attitude strength towards the website. The manipulated (independent) variable is the level of interactivity within the website (high, medium or low).

Product Involvement

To conclude on a low involvement product, a number of pre-tests were conducted. The level of involvement with a particular object is defined as the individual importance that a person assigns to an object (Antil, 1984). It incorporates person-specific characteristics, as it can vary from person to person (Zaichkowsky, 1985b, 1986). Consumers may perceive the same product differently based on their individual involvement (Lastovicka and Gardner, 1979; Zaichkowsky, 1985b, 1986). However, the "group effect" of certain product categories should also be noted, where for some groups of people (target markets), specific products are perceived as highly involving, while others may see the same products as low-involvement (Rahtz and Moore, 1989). In light of the "group effect", two pre-tests were used in this study. Consistent with prior research (Hong, 2015; Han and Kim, 2017), pre-tests were conducted to identify a low-involvement product for which the experimental websites would be constructed. In the first pretest participants (with the same characteristics as the participants of the main experiment) proposed a number of products that are characterized with low-involvement criterions. Participants' involvement with the proposed low-involvement products was measured

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using the Personal Involvement Inventory (PII) developed by Zaichkowsky (1985a, 1994). Results indicated that the refreshment drink was perceived as a low-involvement product (Luo *et al*., 2017).

Assessment of actual interactivity

Interactivity has been defined as a multidimensional construct that includes features such as two-way communication, synchronicity, and control (McMillan, Hwang and Lee, 2003; Liu and Shrum, 2009). However, a central premise of the interactivity literature provides the distinction between actual vs. perceived (Voorveld, Neijens and Smit, 2011). Research suggests that while there is a positive linear relationship between actual and perceived interactivity, the relationship is rather unclear. Increasing the number of interactive elements on a website does not guarantee stronger perceptions of interactivity (Sicilia, Ruiz and Munuera, 2005; Song and Zinkhan, 2008). Previous studies have found that perceived interactivity is often more strongly influenced by the user's subjective experience of the website than by the mere presence of interactive features (Voorveld, Neijens and Smit, 2011; Voorveld, Van Noort and Duijn, 2013).

For instance, features like feedback forms, customization options, and user-controlled navigation tools are known to enhance perceived interactivity by increasing the sense of control and responsiveness (Huang and Benyoucef, 2017). Despite the increasing body of research on this topic, the relationship between actual and perceived interactivity remains complex and is influenced by various psychological and contextual factors (Wu, 2006). This study takes these complexities into account and applies them in the development of six experimental websites for the low-involvement product.

(Voorveld, Neijens and Smit, 2011) conclude on six interactive functions that appear to affect the level of perceived interactivity in a Web site. These functions are "*feedback forms, the capability to register the product online, the option to recommend the site to a friend, dropdown menus, the option to customize products and the capability to customize information on the Web site*" (p. 89). Previous studies support this viewpoint (Kim and Im, 2025; Zhang *et al*., 2025). Based on the above literature, three experimental websites were designed. It should be underlined that the three (3) websites (high/medium/low) of the low involvement product (Sunshine refreshment) contain exactly the same information, texts and images.

The level of actual interactivity was assessed by three experienced web-brand designers. All of them confirmed that the three versions of the experimental websites with high, medium and low interactivity had the respective number of interactive elements.

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To measure the levels of perceived interactivity, and in particular, its three dimensions which are two-way communication, control and synchronicity, seventeen (17) items were used taken from Liu (2003), McMillan and Hwang, (2002) and Song and Zinkhan (2008). 60 individuals participated in the pre-test. Results indicated that the levels of perceived interactivity where appropriate for each interactive version of the experimental website.

It should be noted that the arguments employed, in each interactive version of the website, were also pretested following Andrews and Shimp (1990). Also, the employed arguments as well as the texts were the same in three interactive versions of each website. However, the number of images was increased in accordance to the levels of interactivity.

Sample - Procedure

The sample consisted of 87 university students in their 3rd or 4th year, selected through convenience sampling. The average age was 20.9 years, and 48% of the participants were women. Participants arrived at a university lab and first completed an online questionnaire about their internet behavior and demographics. Each participant was exposed to one (out of three) website based on the experimental treatments. Participants were instructed to navigate at the website individually, at their own time and pace. Once the navigation process was completed, the participants were invited to log out and fill in the rest questionnaires at their own time and pace. Later, participants completed a questionnaire using the thought-listing technique to capture how they processed the provided information. They also filled in a questionnaire measuring their attitude toward the website. One week later, participants were asked to complete another questionnaire to assess the strength of their attitude without visiting the website again. The thought listing technique employed to record how individuals process the provided information. This technique also termed as thought elicitation, free-call thought and cognitive response was established by Wright (1973) and used by many academics (i.e., Zotos, Lysonski and Martin (1992); Sicilia, Ruiz and Munuera, (2005). Attitude strength was measured with the structured questionnaire proposed by (Chen and Wells, 1999) and the process proposed by DeMarree, Petty and Briñol (2007).

DATA ANALYSIS

Testing the H1, two (2) trained coders analysed the data. When a conflict exists, a third coder is used to resolve it. At this stage of the coding, following Miniard et al. (1991), thoughts not related to the experimental stimuli were discarded. Data were then entered to the SPSS 22 program (Statistical Package for Social Science). One-way Analysis of Variance (ANOVA) was selected for the analysis.

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The dependent variable was the "number of elicited thoughts (0-7)" whereas the independent variable was the "level of interactivity (high vs low, high vs medium, medium vs low)".

87 students participated in the study. 30 students were exposed to the high interactive version of the low involvement website, 30 to the medium and 27 to the low. Individuals exposed to the medium interactive websites elicited more thoughts as compared to those exposed to high and low interactive versions (Web Thoughts: medium: .97; high: .67; low: .26); (Product Thoughts: medium: .4.17; high: 3.50; low: 1.07).

Wilk's Lambda test statistic is significant, indicating that overall, there is a significant effect of the level of interactivity employed in the website of low involvement (V=.666, F=9.349b, Sig.: .000). The level of interactivity has a significant effect on the number of product-oriented (F= 13.931, Sig. = .000) but not on the number of website – oriented thoughts (F= 3.568, Sig.= .086).

Regarding the H1 and the website-oriented thoughts, it seems that increase interactive does not have any effect on thought elicitation. Individuals exposed to the medium interactive website generated more website thoughts as compared to those exposed to high and low interactive version but these differences are not statistically important (Table 1).

Table 1. Multiple comparisons about H1

Tukey HSD							
Dependent Variable	interactivity level (I)	interactivity level (J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Site thoughts	High	Medium	-.30	.307	.593	-1.03	.43
		Low	.41	.315	.404	-.35	1.16
	Medium	High	.30	.307	.593	-.43	1.03
		Low	.71	.315	.070	-.05	1.46
	Low	High	-.41	.315	.404	-1.16	.35
		Medium	-.71	.315	.070	-1.46	.05
Product thoughts	High	Medium	-.67	.596	.505	-2.09	.76
		Low	2.43*	.612	.000	.97	3.89
	Medium	High	.67	.596	.505	-.76	2.09
		Low	3.09*	.612	.000	1.63	4.55
	Low	High	-2.43*	.612	.000	-3.89	-.97
		Medium	-3.09*	.612	.000	-4.55	-1.63
Based on observed means. The error term is Mean Square (Error) = 5,328.							
*. The mean difference is significant at the ,05 level.							

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Regarding the product-oriented thoughts increased interactivity seems to affect the number of thought elicitation. In particular, individuals exposed to the medium interactive website generated insignificantly more product-related thoughts as compared to those exposed to the high interactive version. Furthermore, individuals exposed to the medium interactive version generated significantly more thoughts as compared to those exposed to the low one (Sig.= .000). Therefore H1(ii) a and H1 (ii) c are accepted whereas, H1 (ii) b, H1 (i) a, b, c are rejected. It seems that the web-oriented thoughts are not influenced by the interactivity level.

Regarding the H2, Cronbach's α is .779 indicating high reliability of the five (5) items measuring the attitude strength. Data was analysed with the ANOVA method. Levene Statistic is Sig. = .364 indicating homogeneity of variances. Individuals exposed to the high (mean = 6.333) interactive website indicated stronger attitude as compared to those exposed to the medium (mean = 5.137) and low (mean = 5.457) interactive levels. This difference is statistically significant (Sig. .003).

Multiple comparisons (Tukey HSD) indicate that the mean difference of the attitude strength between those exposed to the high and those exposed to the medium interactivity level is 1.1958 (Sig. .003) and between those exposed to the high and those exposed to the low is .8762 (Sig. .044).

The findings are visually depicted in Figure 1.

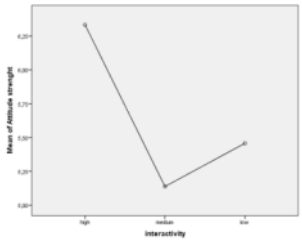


Figure 1. Attitude strength for a low involvement product

Therefore, the hypotheses H2b and H2c are accepted whereas the H2a is rejected. It seems that when individuals are exposed to a website of a low involvement product then they will formulate stronger attitudes towards the product- as the level of interactivity increases from medium to high and from low to high, whereas is unaffected from low to medium.

CONCLUSIONS, SUGGESTIONS FOR FURTHER RESEARCH, LIMITATIONS

The data analysis reconfirms that interactivity significantly influences persuasion in low-involvement contexts. In online environments where consumer involvement is low, interactivity functions as a

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peripheral cue, influencing the persuasion process. Findings H1 (ii)a &c support the premise of the Elaboration Likelihood Model (ELM), specifically the 6th postulate by Petty and Cacioppo (2012), which posits that when motivation and/or ability to process information are low, persuasion occurs primarily through peripheral cues, such as interactive features. Previous studies, such as those by Chen and Lee (2008) and Luo, Li and Sun (2022), also found that low-involvement consumers are more influenced by the quantity of interactive elements rather than the quality of arguments presented. This reinforces the idea that, in low-involvement conditions, the mere presence of interactive features can guide consumer decision-making and lead to more favorable outcomes. This is consistent with the work of Munaro et al. (2021) and (Raney *et al.*, 2003) who have shown that a more interactive online environment enhances the overall persuasive impact on low-involvement consumers. Thus, the findings from the data analysis align with and extend the theoretical foundations established by the ELM, highlighting the critical role of interactivity as a peripheral cue in shaping consumer attitudes and behavior in low-involvement product categories.

In addition, the results of this study [H1] highlight how interactivity functions as a variable that can either increase (i.e., product –oriented thoughts: acceptance of H1(ii)a,c) or decrease (website – oriented thoughts: rejection of H1a,b,c) persuasion among low-involvement consumers. As noted by Petty and Wegener (1999), in some situations, interactivity may enhance information processing by drawing consumers' attention, but in other cases, it may dilute the impact of the message by shifting focus away from the core arguments. These findings align with previous research showing that the effect of interactivity is not always straightforward but can vary depending on the level of involvement and the specific characteristics of the web environment (Petty, Cacioppo and Heesacker, 1981; Liu and Shrum, 2009).

It appears that increased interactivity in online environments significantly strengthens consumer attitudes toward low-involvement products [H2c accepted]. As interactivity levels increased from low and medium to high, participants demonstrated increasingly positive attitudes, aligning with previous research that suggests interactivity fosters greater emotional and cognitive involvement (Hollebeek, Glynn and Brodie, 2014; O'Brien, Cairns and Hall, 2018). By enhancing engagement and involvement, interactive features serve as effective peripheral cue, which is particularly important in the context of low-involvement products, where consumers typically do not engage deeply with the product or its attributes (Huang and Benyoucef, 2017).

The theoretical contribution of the present study aligns with the main argument of the (ELM), which suggests that peripheral cues such as interactivity play a more substantial role in persuasion when

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individuals are less motivated or able to process information centrally (Petty and Cacioppo, 1986). As interactivity increased, users engaged more with the content, processing the information more centrally, and forming stronger attitudes toward the website. This finding reflects the work of Tellis and Ambler (2007), who noted that higher levels of interactivity lead to stronger, more positive attitudes due to enhanced cognitive processing.

The practical contribution of this study offers valuable insights for web designers as well. Digital marketers may use higher levels of interactivity for low-involvement products to encourage deeper consumer engagement. This approach can enhance overall consumer perceptions and strengthen attitudes toward the website. Web designers may take under consideration the power of interactivity as a key peripheral cue that drives more effective communication outcomes, in low-involvement contexts. Furthermore, low interactive websites seem to be inefficient. Low interactivity does not facilitate the cognitive process and does not contribute positively to the resulting formulated attitudes.

Future research could explore how different levels of website interactivity impact users across various types of products and services. Additionally, longitudinal studies could provide a deeper understanding of how the effects of interactivity develop over time.

Regarding the limitations, this study's sample was limited to 87 students, which may not fully represent the broader population. The cognitive characteristics, attitudes, and behaviors of students can differ from those of other demographic groups, such as working professionals or older adults. Finally, this study considered only three levels of interactivity: high, medium, and low. Future studies could explore a broader spectrum of interactivity, such as personalized or adaptive features that respond to user input in real time.

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MAPPING THE LANDSCAPE OF GLOBAL EMPLOYEES' WELL-BEING: INSIGHTS FROM A DECADE OF BIBLIOMETRIC DATA

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ABSTRACT

Purpose – This study aims to i) assess research performance, ii) highlight emerging areas and core themes in the field of global employee well-being during the period 2014–2024, and iii) provide directions for future research.

Design/methodology – Bibliometric analysis based on a Scopus database was used to identify the context of global employees' well-being studies, opening the opportunity to identify research trends and future perspectives. The Scopus database as well as the VOSviewer tool were chosen for analytical outputs. The final sample consisted of 548 articles.

Findings – The analysis revealed the rising popularity of the topic of well-being of global employees through recent years in various fields, with the leading areas of Business, Management, and Accounting. Five industrial leaders of the world: the United States, India, the United Kingdom, Australia, and China were identified as the leading countries per the number of publications. Six research clusters were highlighted in the analysis. Possible future research directions were revealed through thematic cluster analysis, hinting at the less explored topics: negative aspects of a global career as well as digitalization as a means of support for global employees.

Originality/value – This study provides a systemic insight into the well-being of global employees topic, by identifying current trends and future research perspectives of less explored thematic fields.

Keywords: Well-being, global employees, expatriates, migrants, international employees, bibliometric analysis

INTRODUCTION

The estimated number of international migrants grew from 150 million in 2020 to 281 million in 2024, out of which the number of migrant workers reached 169 million (McAuliffe and Oucho, 2024).

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According to the United Nations World Migration Report (2024), the majority of people worldwide migrate due to reasons related to work, family, and education. In recent years, the concept of well-being has moved to the center of attention, while many have started to see the inextricable link between the well-being of an organization and the well-being of its workers (Litchfield *et al.*, 2016). While job satisfaction is positively associated with workplace financial performance and labor productivity as well as the quality of service, policies and practices that target improvements in subjective well-being can be linked with improved workplace performance and result in economic growth (Bryson *et al.*, 2017).

According to the report of the fifth European Working Conditions Survey (Eurofound, 2012), work and well-being are closely related, while working conditions can have a direct impact on individuals' quality of life. Migrants frequently face challenges, including barriers to decent work, discrimination, xenophobia, violence, and inequality (Nimble, 2024) - all of which significantly impact their well-being (McGowran, 2024). Therefore, the importance of studies on the well-being of global employees is growing, corresponding to the growing number of research and publications in the field.

While the number of scholarly articles published increases every year, the challenge of keeping track of new developments in the respected field could be recognized, and the rising importance of systematic literature review and bibliometric analysis methods in various fields could be identified (Linnenluecke *et al.*, 2020). Bibliometric analysis has experienced growth during the past two decades, including various subject areas (Mukherjee *et al.*, 2022), while bibliometric analysis allows for simplifying the information search process (Sanchez-Perez *et al.*, 2025). As far as the research development in the arena of the well-being of global employees provides the challenges for continuity, consistency, and novelty, this study aims to systematize the past research in the field and provide insights for future research of the well-being of global employees, based on bibliometric analysis.

The variety of terms used in the research area of global employees could be mentioned as a significant limitation in discussing their well-being and conducting any research, including bibliometric analysis. Additionally, it creates an obstacle to finding the most relevant studies in the field. The broadest categories in the field of well-being of global employees are limited to several research of scholars and include *expatriates, self-initiated expatriates* (Peltokorpi and Froese, 2009; Andresen *et al.*, 2014); *business expatriates* (McNulty and Brewster, 2016), *migrants* (Liu *et al.*, 2019; Ullah, 2012) as well as *migrant workers* (Ruhs, 2016), *skilled* or *qualified immigrants* (Cerdin *et al.*, 2014); l*ow-skilled migrants* (Chaloff, 2008); *seasonal* or *temporary migrants* (Gibson *et al.*, 2014), and *irregular migrant workers* (Koser, 2010).

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Banevičienė *et al.,* (2024) notice that standardizing terminology for IE types could enhance the development of adjustment research and improve precision, while the term immigrant lacks a more robust definition compared to such terms as assigned expatriate or skilled migrant. Therefore, as one of the solutions, to sum up working migrant experiences, in this study the term *global employees* is chosen. Global employees will be viewed as individuals who perform paid work abroad, despite their contractual or migration status.

Employee well-being has been an interest of the researchers and organizations, while many studies find a positive correlation between subjective well-being and job performance (Bryson, Forth & Stokes, 2017). While quite some studies analyze employee well-being in general, the lack of a global employee perspective as well as a systematic approach can be recognized. Therefore, the study fills an important gap in global employees' well-being research by providing a bibliometric approach to reveal existing research tendencies and identify possible future research directions.

While the study seeks to systematize past research and contextualize the development of global employee well-being studies, the following research questions are aimed to be answered during the research: ***RQ1****: What is the research performance in the field of global employee well-being, based on bibliometric data?* ***RQ2****: What are the emerging thematic areas and dominant research trends, as revealed through cluster analysis?* ***RQ3****: What future research directions can be identified from the existing body of literature between 2014 and 2024?*

The following sections start with a description of the research design, followed by the bibliometric analysis results on reviewed publications, their distribution according to the main categories, and trends of keywords. The analysis of thematic clusters is presented afterward. The paper ends with conclusions and insights for future research about global employees and their well-being.

RESEARCH DESIGN

The guidelines for the bibliometric analysis procedure by Donthu *et al.,* (2021) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page *et al.*, 2021) recommend defining the aim and scope of the analysis in regard of the analysis width, depth, and the research area. This research aims to review research trends on the well-being of global employees during the time frame of 2014-2024 through bibliometric analysis and provide directions for future research.

While Donthu *et al.* (2021) recommend choosing bibliometric analysis over systematic literature review if the number of articles is 500 or more, the optimal number of 500 articles is selected as an

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aimed sample of the analysis. The following steps correspond to the techniques for bibliometric analysis chosen, the data collected by designing the term-based search, and the database selected based on the coverage of the well-being of global employees topic. Regarding this research, the Scopus database is chosen as a source of publications and analytical outputs. Compared to the Web of Science (WoS) database, Scopus covers more than double of journals, only missing 121 unique journals at WoS (Singh *et al.,* 2021). In respect of the research field, Mongeon and Paul-Hus (2016) point to the higher coverage of social science publications in Scopus rather than in WoS, identify a high overlap of these two databases and pay attention to a very small number of unique publications in WoS. Regarding bibliometric analysis, Scopus offers several operating functions that facilitate it (Sweileh, 2018), such as data of journal authors, affiliation, documents by country, subject area, and source. Thus, the Scopus was selected for the current research.

The main inclusion criteria for the selection were based on the relevance of the articles during the timeframe of 2014-2024. Even though the Scopus database allows analysis the articles from as early as 1967, an initial review showed from 0 to 1 publication per year in a timeframe of 1967 to 1996 and less than 10 documents per year on average up until 2014. From 2014, significant annual growth of the publications in the field could be recognized; therefore, the period of 2014 – 2024 was selected for this analysis. Data sampling for bibliometric analysis was conducted in three stages following PRISMA logic (see Figure 1).

First, the records in Scopus were identified according to the keywords related to the research area. Recognizing the existing variety of terms used in order to cover global employees' topics, the following combinations of terms were used in order to cover the research topic: "wellbeing OR well-being" AND "expat OR expatriate OR migrant OR global AND employee OR international AND employee". 776 articles were selected for further screening

The exclusion process was as follows. The criteria for exclusion covered languages other than English, other than the defined timeframe, and publications other than articles, book chapters, or conference papers. Only articles in English at the final publication stage were selected. The document type category was limited to articles, book chapters, and conference papers. The range of years included articles from 2014 to 2024. After exclusion, the sample consisted of 548 remaining articles selected for bibliometric analysis. The Scopus analysis tool was used to explore the number of publications per year, documents per year by source, distribution by subject area, country, as well as authorship and citation. VOSviewer tool was used to find out trends based on keywords and terms.

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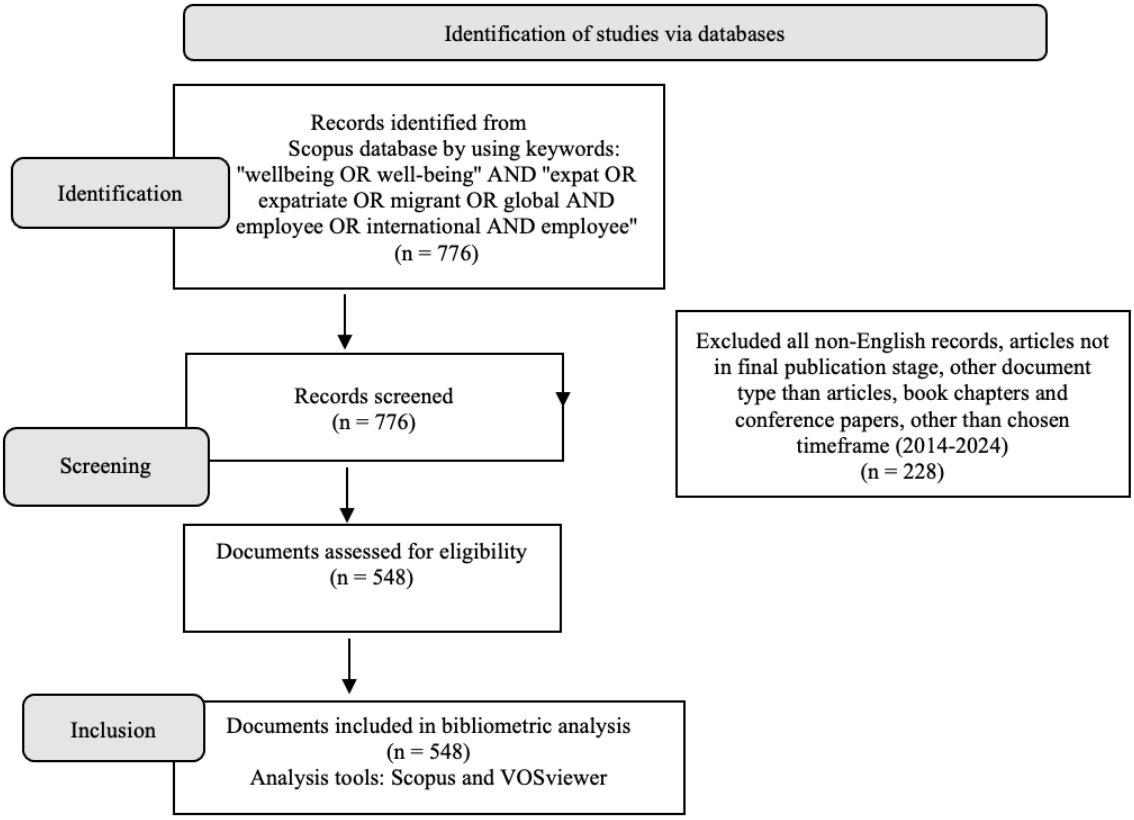


Figure 1. *PRISMA flow chart in the field of well-being of global employees*

RESULTS

In response to RQ1, the results of the bibliometric analysis on the well-being of global employees are presented with respect to the number of publications per year, distribution by publication sources, types and subject areas, countries, authors and their affiliations, citation patterns, and emerging research trends.

Number of publications per year

When comparing the analyzed period 2014-2024, the number of publications per year in the area of well-being and global employees was continuously rising. The highest number of publications were in 2023 (92 publications) and 2024 (114 publications). For comparison, only 13 publications were published in 2014.

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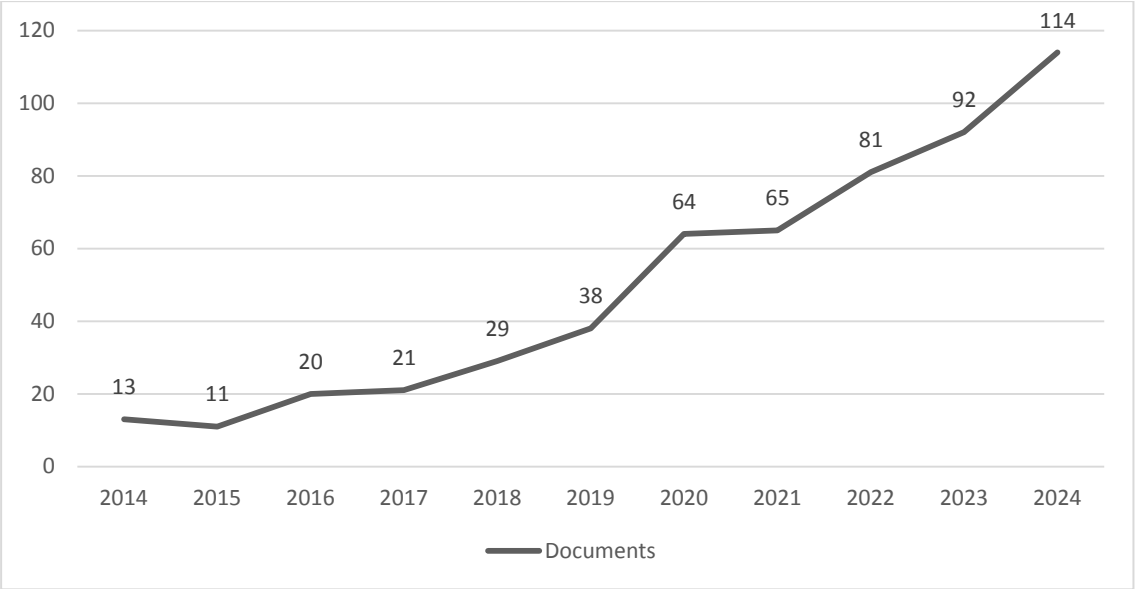


Figure 2. *Number of publications on well-being and global employees during 2014-2024*

A consistent trend of a growing number of publications signifies the increasing importance of the topic of the well-being of global employees, influenced by various global processes, including changing policies and attitudes, migration, war, and others. The recent pause in this research area of 2020-2021 reflects the COVID-19 pandemic that could be related to a radical change in working and traveling settings, essential for global employees. The subsequent boost in global employee research may correspond to the challenges for the well-being of this group of employees.

Distribution of publications by sources

Five of the most active sources of publications were identified for the period 2014-2024 (see Figure 3). Since 2014, fourteen articles have been published in the *International Journal of Environmental Research and Public Health* with the highest number of articles (5) in 2022, thirteen in *Sustainability Switzerland*, with the highest total number of articles (6) published during the last year (2024). The same number of eight articles were published in *Employee Relations* and *Frontiers in Psychology*. Finally, five articles were published in *Plos One.*

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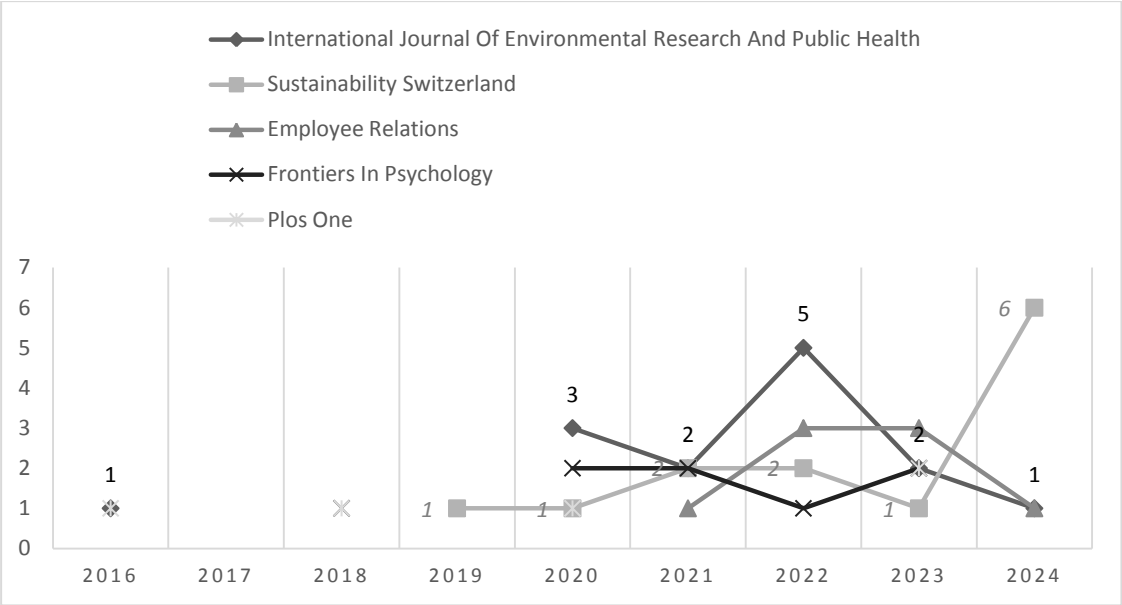


Figure 3. *Distribution of publications on well-being and global employees during 2014-2024 according to the source*

Plos One started the list in 2014 but publications on the well-being of global employees did not present a consistent trend in this case. Regarding other trends, only the *International Journal of Environmental Research and Public Health* revealed the recent boost of articles on the well-being of global employees. Most of the other sources did not have annual repetition of publications.

Distribution of publications by type and subject area

The sample of the documents for the analysis included 404 articles (73.7 percent), 80 book chapters (14.6 percent), and 64 conference papers (11.7 percent). Although some subject areas overlapped, most research was published in the area of *Business, Management, and Accounting* (204 articles). In addition to this, 159 research were published in the area of *Social Sciences*, and 117 research followed in *Medicine* (see Figure 4).

The each of rest of the subject areas covered less than 10 percent of publications on well-being and global employees during the select period. Still, the well-being of global employees was in the scope of publishing in such areas as *Psychology* (9 percent), *Economics, Econometrics, and Finance* (8 percent), Environmental Science (7 percent), *Computer Science*, and *Engineering* (both of 6 percent). Such subject areas as environmental, computer sciences, engineering, or energy might reflect the employing industries of global employees or specifics of the well-being of global employees in particular areas.

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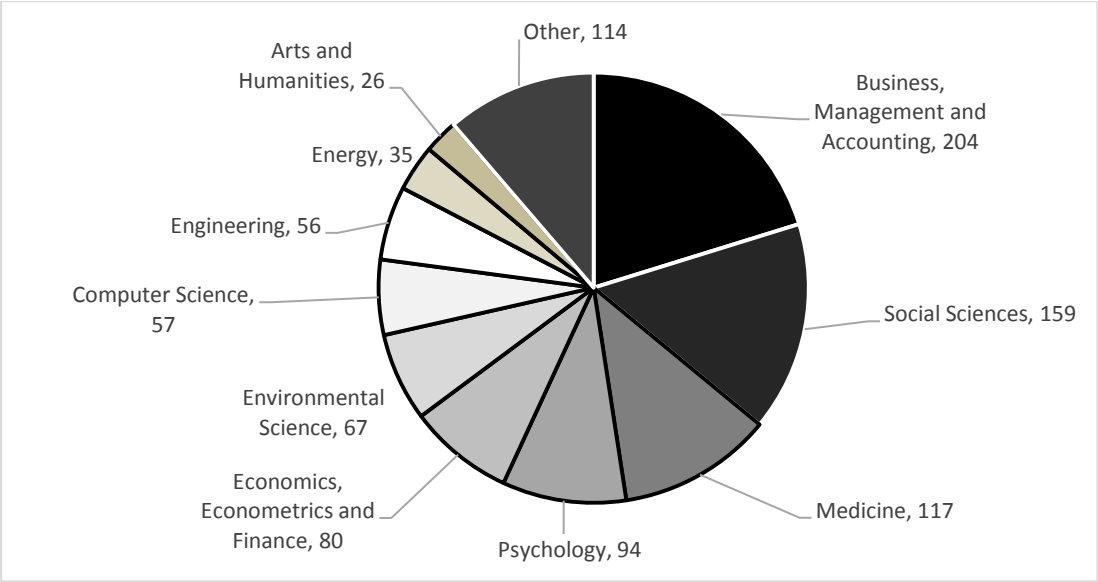


Figure 4. *Distribution of publications on well-being and global employees during 2014-2024 by the subject area*

Distribution of publications by country

The United States was identified as the most productive country in the research area of global employees and well-being studies during 2014-2024, with contributions to 101 Scopus publications and generating 23.4 percent of the total amount of publications from the top 10 countries (see Figure 5). India was linked to 59 publications, similar to the United Kingdom, generating 13.7 percent per each of total publications. In total, the United States, India, and the United Kingdom covered more than 50 percent of publications in this research area.

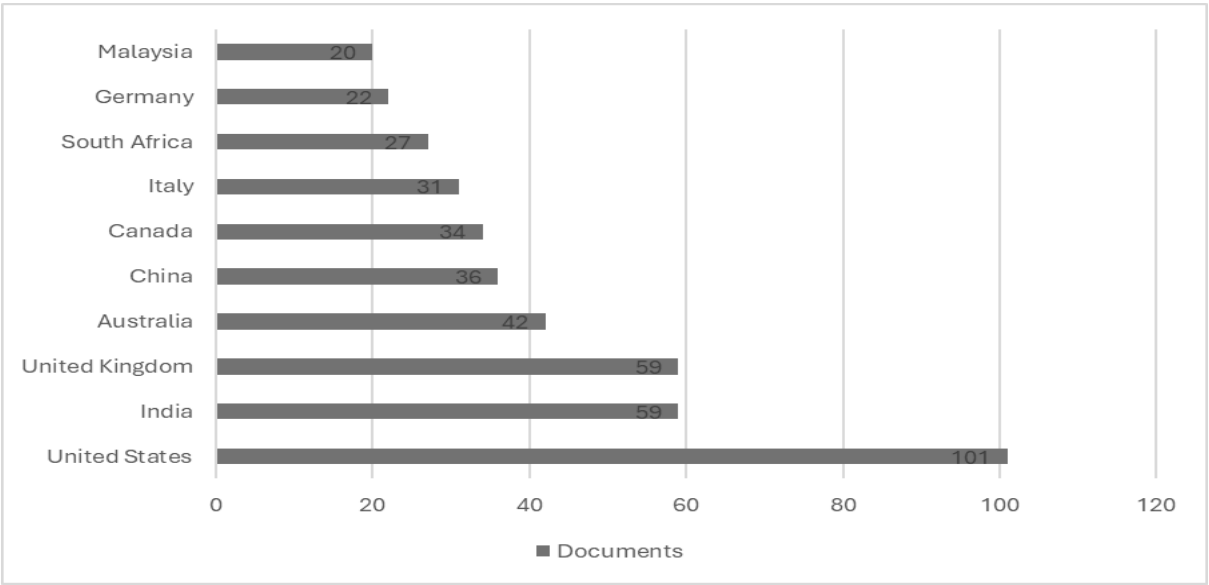


Figure 5. *Distribution of publications on well-being and global employees during 2014-2024 by countries*

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There is growing interest in workplace mental health and employee well-being in the UK and globally, as organizations invest in these areas to enhance productivity, improve their public image, and fulfill legal obligations (Henstock *et al.*, 2025). Current research results showed that the well-being of global employees was of attention by researchers from North America, Asia, Europe, Australia, and South Africa, but South America was missing. Covered areas reflected the higher level of economic development and the higher care of employees.

Trends based on keywords

Co-occurrence of keywords analysis might be helpful in order to identify the research direction as well as the central theme of a researched field (Xu *et al.*, 2021). Keywords co-occurrence map was created using VOSviewer tool (see Figure 6). Different colors in the map represent different clusters, the size – and frequency of keywords, and the lines – the connection between the keywords.

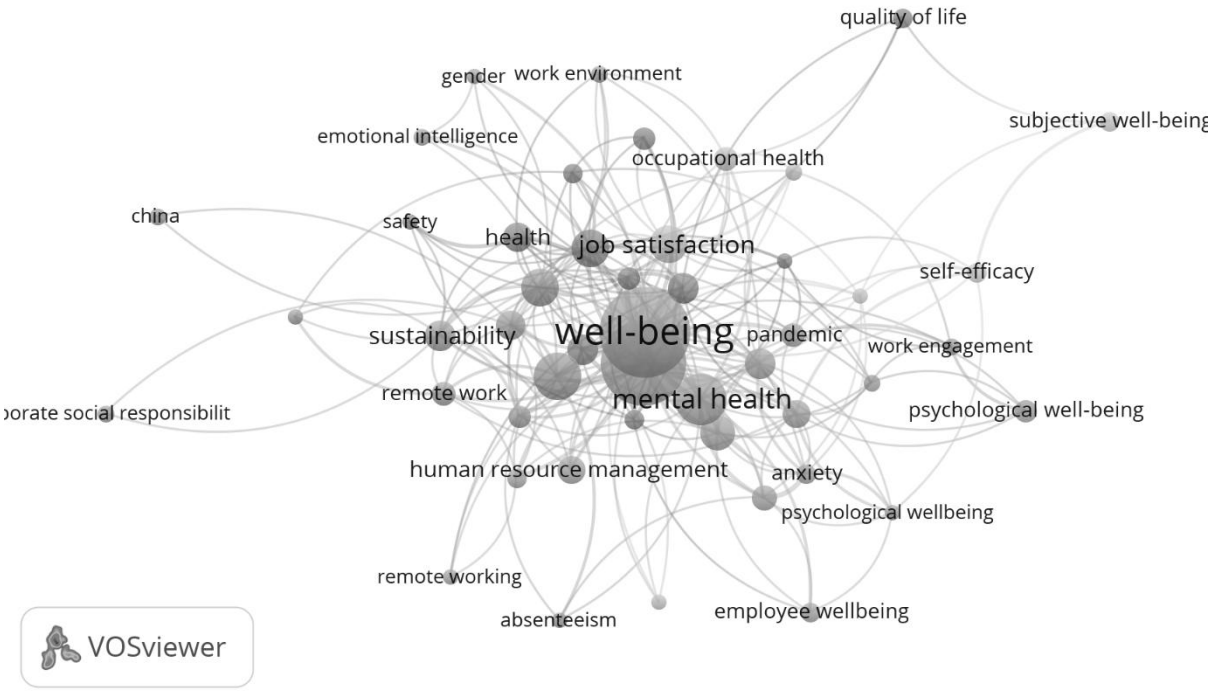


Figure 6. *Visual network map of author keywords co-occurrence*

Out of 1777 author keywords, 48 met the threshold of at least five minimum occurrences. For each 48 keywords, the strength of the co-occurrence links with other keywords was calculated by the program. The strongest keywords were: *well-being* (54 occurrences); *COVID-19* (49 occurrences); *mental health* (25 occurrences); and *leadership* (17 occurrences). In addition to this, linguistic differences should be mentioned as the terms 'wellbeing' and 'well-being' as well as 'employee well-being' were listed as separate keywords.

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The analysis of keywords showed a higher usage of *psychological well-being* than *employee well-being* in general or *subjective well-being.* Continuing, the dark side of work is revealed through such keywords as *absenteeism* and *anxiety*. Remote work or remote working reflected the COVID-19 changed settings of the working environment, fostering the importance of *work engagement, self-efficiency, and job satisfaction* as well as *HRM*, *safety*, and *(occupational) health*. *Sustainability* and *CSR* also were found during the analysis, but without a clear relation to the *quality of life*, assuming their limited links to the work-related area only.

CLUSTER ANALYSIS

To address RQ2, a cluster analysis was conducted. Accordingly, a term co-occurrence map based on textual data was generated (see Figure 7). Title and abstract fields were analyzed. Similarly, different colors in the map represent different clusters with lines in respect to the size according to the frequency of keywords for connection between them.

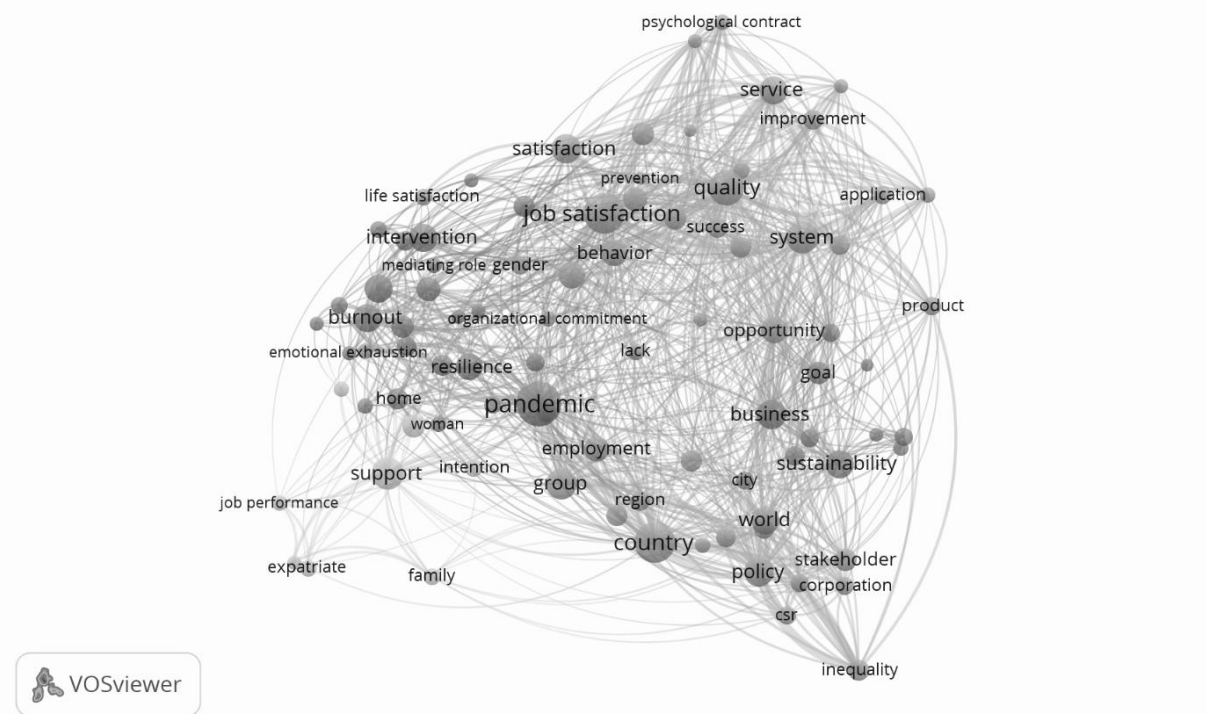


Figure 7. *Visual network map of term co-occurrence based on text data*

Out of 14811 terms, 247 met the threshold of minimum number of 20 occurrences of a term. 100 terms were selected for further analysis in order to calculate the relevance score. During the verification process, 10 terms were excluded due to their common meaning and no direct relation to the analyzed topic (term, part, hypothesis, variable, item, period, present study, fact, questionnaire, and

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dimension). The topmost relevant ones were '*psychological wellbeing*' (with 25 occurrences); *expatriate* (34 occurrences); *job performance* (28 occurrences); *psychological contract* (28 occurrences) and *employee performance* (26 occurrences). The ones with the most occurrences were *pandemic* (230 occurrences); *job satisfaction* (195 occurrences); *country* (195 occurrences); *quality* (142 occurrences); and *support* (121 occurrences).

The results of bibliometric analysis using the text data revealed several clusters, related to the well-being of global employees' research:

The first cluster included terms: application (41), behaviour (84), competitive advantage (24), customer (30), difference (82), education (46), effectiveness (61), employee engagement (22), employee performance (26), engagement (68), gender (39), implementation (36), improvement (45), innovation (52), job satisfaction (195), knowledge (59), life satisfaction (33), opportunity (81), prevention (21), product (43), psychological contract (28), quality (142), satisfaction (102), service (98), success (46), and system (119). The most frequently used terms in this cluster were *job satisfaction*, *quality*, *system*, and *service*. *Job satisfaction* together with *satisfaction* were the main terms in this cluster, relating other, more general terms, representing various aspects of personal and professional life.

The second cluster included terms: absenteeism (24), anxiety (36), association (71), burnout (98), cost (56), depression (45), emotional exhaustion (23), high level (23), home (52), intervention (95), job insecurity (41), mediating role (27), pandemic (230), participant (95), psychological well (31), resilience (82), self (60), self-efficacy (24), social support (45), staff (54), woman (29), work engagement (26), and workload (35). The main term that dominated this cluster was *pandemic*. This term was more than twice as common as the next most mentioned one, i.e. *burnout*. Many of the terms in this group defined the area of not-well-being characteristics such as *burnout*, *job insecurity*, *costs*, *depression*, *anxiety*, or *emotional exhaustion*. Some of the identified terms could be envisioned as solutions or helpful tools for such non-well-being as *social support*, *staff*, *psychological well*, *resilience,* or *self*. Furthermore, terms related to the context of change such as *intervention, association,* or *mediating role* stood out.

The third cluster included terms: action (44), corporation (43), country (195), CSR (40), employment (73), firm (49), government (42), group (109), happiness (25), inclusion (27), inequality (55), lack (34), policy (103), region (44), stakeholder (64), and world (91). *Country* level perspective dominated in this cluster, involving various levels of *stakeholders* such as *government*, *group*, and *corporation* (firm). In addition, levels of *region* and *world* were revealed during the analysis. The research in this cluster had a high

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emphasis on the *policy*, reflecting on *actions*, *employment*, *lack*, *inequality*, and positive aspects like *happiness* or *inclusion*.

The fourth cluster included terms: business (106), city (38), digitalization (21), future (41), goal (62), HRM (49), human resource management (40), SDGs (42), sustainability (94), sustainable development (31), sustainable development goal (23). *Sustainability* together with *SDGs* and *sustainable development* dominated in this cluster. *Businesses* with *goals* are supposed to contribute to the *future*, while such terms as *digitalization* and *HRM* could reflect to the tools for its sustainability.

The fifth cluster included terms: expatriate (34), family (34), intention (41), job performance (28), psychological wellbeing (25), supervisor (29), support (121), and work environment (63). *Support* led the group of terms in this cluster, related to the context of *expatriates* and *family*. Some characteristics of work like *work environment*, *supervisor*, *support*, and *job performance* were found to be essential here. In addition, the psychological area was revealed as an important one because of the *psychological well-being* and *intentions*.

The sixth cluster included terms: China (42), community (54), migrant (53), migrant worker (34), organizational commitment (29), and turnover intention (28). Migrant related research area of this cluster was not presented in VOSviewer in Figure 9 as it was the smallest one of the identified clusters. However, it directly relates to the aim of this study. Migration research covered *migrants*, *migrant workers*, *communities*, and *China*. In addition, this cluster included *organizational commitment* and *turnover intention* that may play a specific role for migrants.

Concerning the clusters identified, they differ in size and thematic areas. If the first cluster had more than 1600 terms, the last one had only 240 of them. While the first one provided the systematic approach to the research area, presenting the variety of personal and work life, the last one reflected on basic concepts and limited research areas.

FUTURE RESEARCH DIRECTIONS

For future research directions (RQ3) on the well-being of global employees, recommendations were developed based on the largest thematic clusters and the least explored terms within them:

1. To enhance the diversity of research on global employees, future studies should broaden their scope to include different groups, such as self-initiated expatriates, assigned expatriates, working refugees, business travelers, and others. This recommendation is supported by the cluster analysis,

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which revealed a predominant focus on migrants (Cluster 6) and expatriates (Cluster 5). Additionally, there is a need to expand the geographical focus of these studies to include a wider range of countries, providing a more comprehensive understanding of global employee well-being across diverse contexts.

2. The contribution of global employees to the competitive advantage of companies, countries, and regions could be revealed as the next step of the research, including not only the analysis of global employee performance but also their engagement and psychological contract. Other concepts related to the global employee and their well-being would provide knowledge for companies pursuing higher corporate performance.

3. Research of the dark side of global careers related to specific negative aspects similar to emotional exhaustion or anxiety could help reveal uncovered areas of global employees. Moreover, the attention could be drawn to the less explored phenomenon of global employees that have a direct price for corporate performance like absenteeism or moonlighting in relation to the well-being of employees. As far as the fourth cluster has shed light on an unexplored area of digitalization, we see the unrevealed value of it and advanced technologies and call for a search for digital tools and solutions for the negative side of global employees' activities.

4. Finally, we would like to draw the attention of researchers to the impact of global careers on the well-being of the families, social life, and personal life of global employees in comparison to their value for companies or countries.

CONCLUSIONS

The bibliometric analysis on the well-being of global employees highlighted several research trends, opening opportunities for future research in the mentioned field. The results of the bibliometric analysis revealed main authors, countries, and universities, researching the well-being of global employees.

First, the increasing interest in the topic of well-being and global employees could be recognized, while the publication number on the analyzed Scopus data base continuously risen ever since 2014, with the highest so far number of publications during the last (2024) year. The leading subject area for the researched topic was Business, Management, and Accounting, supporting the tendency of well-being to be researched not only from the health but also from the management perspective. The leading countries for the publications were the United States, India, the United Kingdom, Australia,

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and China, signifying several interconnected processes. Despite the possible country size correlation with the publication number, the tendency of rising awareness of the importance of the well-being of employees, as well as changing attitudes towards work migration and migrant integration in leading economies could be recognized.

In addition to this, the term co-occurrence map based on text data indicated the terms with the most occurrences during the chosen period were pandemic, job satisfaction, country, quality, and support, revealing the influence of COVID-19 in the area of the research of the well-being as well as the rising importance of the exploration of the means of support for global employees. The analysis of the most cited articles confirmed the influence of the COVID-19 pandemic on the topic of the well-being of global employees', while research as such was the most cited.

Lastly, six thematic clusters were highlighted: (1) Job Satisfaction and Professional/Personal Quality, (2) Well-being and Pandemic-Related Challenges, (3) Country-Level and Policy-Oriented Perspectives, (4) Sustainability and Future Business Goals, (5) Support for Expatriates and Family, (6) Migration and Community. They provided valuable insight into the researched areas, hinting at less explored angles for future research, such as the competitive advantage of global employees, specific challenges and negative aspects of global careers as well as digitalization and digital tools for global employees' support.

In general, bibliometric analysis of thematic clusters revealed more than just the result of the coverage of each cluster. The clusters are interrelated, with lots of connections between the identified terms. Researchers may identify new research ideas in areas that are not currently connected.

This study has several limitations. First, it relies exclusively on the SCOPUS database, excluding others such as the Web of Science. Although SCOPUS is well-suited for such studies and helps avoid duplicate entries from the Web of Science, this approach may have omitted relevant literature available in other sources. Second, the study includes only papers written in English. While English is the predominant language of scientific research, this criterion may have excluded valuable insights published in other languages. Third, the focus on peer-reviewed journal articles means that grey literature and reports, which could provide alternative perspectives on migration drivers, were not considered. Finally, the study’s timeframe may have excluded novel insights into the well-being of global employees.

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BEYOND THE TAP: UNRAVELING TRUST AND RISK IN CONTACTLESS PAYMENTS

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ABSTRACT

Contactless payment technologies have gained significant traction in retail due to their efficiency, speed, and convenience. Data security and privacy concerns remain key obstacles to widespread adoption despite these advantages. This study explores the impact of perceived risk on consumer trust and adoption of contactless payment technologies, drawing upon the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT).

The research employs a quantitative methodology, utilizing a structured online survey to collect data from 259 respondents, of whom 239 are active users of contactless payment systems. The study applies Partial Least Squares Structural Equation Modeling (PLS-SEM) to test security, privacy, risk perception, trust, and adoption hypotheses. Results indicate that consumer trust is significantly influenced by perceived security and privacy, while perceived risk negatively affects trust. Additionally, perceived usefulness and ease of use are crucial in shaping adoption behavior. Interestingly, social influence was found to have a limited effect on adoption decisions.

Findings highlight the necessity for enhanced security measures, transparent data protection policies, and user education to mitigate perceived risks and foster trust. The study contributes to the literature by expanding TAM and UTAUT to include perceived risk and trust as central constructs in adopting contactless payment technologies. From a practical perspective, businesses and financial institutions can leverage these insights to develop consumer-centric strategies that promote digital payment solutions' secure and seamless integration.

Keywords: Contactless payment, consumer trust, perceived risk, security, privacy, technology adoption.

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INTRODUCTION

The retail sector has undergone significant transformation with digital advancements, particularly in contactless payment technologies. These systems enhance transaction speed and convenience by utilizing near-field communication (NFC) and similar innovations (Karjaluoto et al., 2019). However, despite operational benefits, data security and privacy concerns remain major adoption barriers (Rawat et al., 2024). Consumer trust is crucial in financial technologies and is strongly linked to perceptions of security and privacy (Ashraf et al., 2018). While constructs like perceived usefulness and ease of use have been explored (Davis, 1989; Venkatesh et al., 2003), the role of perceived risk in trust formation—financial, performance, and psychological risks—remains underexamined (Ahmadinejad et al., 2014; Wu et al., 2011).

To address this gap, this study examines how security and privacy concerns affect consumer trust in contactless payments, drawing on TAM (Davis, 1985) and UTAUT (Venkatesh et al., 2003). It evaluates key trust factors, security effectiveness, and strategies for adoption. Given retail's reliance on seamless payment solutions, understanding consumer concerns is crucial for enhancing customer experience, operational efficiency, and competitiveness (McKinsey, 2020). Addressing security and privacy expectations also ensures continued innovation and regulatory compliance (Rawat et al., 2024).

This study contributes by extending technology adoption models with a detailed analysis of perceived risk and trust. It provides actionable insights for retailers on secure, consumer-friendly payment systems, ultimately fostering broader adoption of contactless payments.

CONTACTLESS PAYMENTS AND OMNICHANNEL INTEGRATION

Contactless payment technologies have transformed retail transactions, offering secure and efficient payments (Taylor, 2016). Payment data is transmitted seamlessly using NFC or wireless technology, enhancing convenience and speed (Karjaluoto et al., 2019). These systems are particularly valuable in fast-service environments, where transaction efficiency is key (Taylor, 2016). Digital wallets and contactless cards also enable loyalty program integration and personalized marketing, boosting customer engagement (Hopalı et al., 2022).

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Beyond payments, contactless technology enhances omnichannel retail by supporting inventory management, customer analytics, and targeted promotions, transforming POS systems into multifunctional tools (Taylor, 2016; McKinsey, 2020). This integration ensures a seamless shopping experience, connecting physical and digital touchpoints (McKinsey, 2020).

However, security, trust, and privacy concerns remain adoption barriers (Rawat et al., 2024). Trust influences consumer confidence, while security risks—such as data breaches, fraud, and identity theft—affect adoption (Rawat et al., 2024). Addressing trust-building and security vulnerabilities is crucial to fostering consumer confidence and widespread use. Despite these challenges, contactless payment adoption is rising, driven by mobile security advancements and consumer demand for faster transactions (Aslam et al., 2017).

Using TAM to understand contactless payments

The Technology Acceptance Model (TAM) (Davis, 1985) explains technology adoption through Perceived Usefulness (PU) - how a technology enhances performance—and Perceived Ease of Use (PEOU)—the effort required to use it (Davis, 1985; Davis et al., 1989). These factors shape user attitudes, influencing behavioral intentions and actual usage. TAM has evolved to include external variables such as system design and user training, which affect PU and PEOU (Venkatesh & Davis, 1996). Its predictive power has been demonstrated in Internet banking, mobile payments, and e-learning (Alalwan et al., 2016).

For contactless payments, TAM offers insights into adoption behavior. Their speed and convenience strongly align with PU, as users are likelier to adopt systems that provide faster transactions and improved efficiency (Davis, 1989; Pikkarainen et al., 2004). PEOU also plays a crucial role, as intuitive systems lower adoption barriers and enhance user experience (Davis et al., 1989). Security assurances and user-friendly designs further enhance PU and PEOU, fostering trust and positive adoption attitudes (Alalwan et al., 2016). These factors become even more pronounced in retail environments, where speed, efficiency, and trust are priorities. Applying TAM to contactless payments clarifies the interplay between perceived benefits, usability, and contextual factors, helping develop consumer-centric payment systems that drive adoption, especially in retail settings where convenience is key.

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Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT model (Venkatesh et al., 2003) predicts technology adoption through Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, which directly influence Behavioral Intention and Use Behavior. Moderating variables like age, gender, experience, and voluntariness refine these relationships. For contactless payments, Performance Expectancy emphasizes faster transactions and convenience (Venkatesh et al., 2003; Oliveira et al., 2016), while Effort Expectancy highlights the importance of ease of use (Venkatesh et al., 2003). Social Influence reflects peer and retailer recommendations (Venkatesh et al., 2003; Alalwan et al., 2016), and Facilitating Conditions stress the role of infrastructure, such as widespread payment terminals and reliable support (Venkatesh et al., 2003; Zhou, 2014). These constructs, combined with demographic and contextual factors, shape consumer behavioral intentions and adoption of contactless payment technology.

Perceived Risk in Digital Payment Systems

Numerous studies highlight the importance of perceived risk in business (cf., Martins et al., 2014). Customers prioritize security, preferring safe transactions over exposure to potential risks. Qalati et al. (2021) define perceived risk as a customer's assessment of potential negative consequences or transaction uncertainties. In contactless payments, this includes concerns about security and reliability. Simbolon et al. (2020) and Tho et al. (2017) describe it as a belief in the likelihood of negative or ambiguous outcomes, often linked to fraud and unauthorized access, concerns that apply to digital payments as well. Wu et al. (2011) characterize perceived risk as a subjective loss during transactions, affecting users' ability to assess pros and cons, leading to uncertainty fully. This psychological ambiguity impacts trust and satisfaction with contactless payments (Ashraf et al., 2018), creating hesitation before adoption.

The perceived risk significantly shapes consumer behavior in contactless payments. Ashraf et al. (2018) stress that addressing these concerns is crucial for building trust and satisfaction. Furthermore, computer security research highlights threats such as malware, service interruptions, unauthorized data access, and poor system configurations, reinforcing the need for robust security measures to drive adoption.

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Customer Trust and Confidence

The adoption of contactless payment systems has grown significantly in the last decade, driven by technological advancements and changing consumer preferences. Understanding the factors influencing customer trust in these systems is crucial for their wider acceptance and ongoing innovation (Kishnani et al., 2024). Trust is defined as confidence in the reliability and decisions of others (McAllister, 1995) and often involves confidence in credible, competent entities (Robinson, 1996). In the case of contactless payments, trust is shaped by factors like security, privacy, and ease of use (Alayli, 2024). Research shows that consumers associate secure, private systems with superior usability, underlining the relationship between functionality and user experience in building trust (Kishnani et al., 2024). The simplicity of these systems further boosts confidence, as they are marketed as faster and more convenient than traditional methods (Putit et al., 2021). Ultimately, trust in contactless payments depends on security, privacy, ease of use, and ethical technology application. Addressing these factors comprehensively will improve trust, drive adoption, and enhance user satisfaction, making trust a key factor in the success of these systems (Kishnani et al., 2024).

HYPOTHESIS FORMULATION

Security plays a critical role in establishing trust within digital payment systems. Studies indicate that the use of technologies such as encryption and tokenization substantially bolsters consumer confidence by reducing the risks of fraud and identity theft (Rawat et al., 2024). Trust is cultivated when consumers recognize the presence of strong security measures designed to protect sensitive financial information (Alayli, 2024). Based on this understanding, the following hypothesis is proposed:

H1: Perceived security has a positive impact on consumer trust in contactless payments.

Privacy concerns remain a significant obstacle to the widespread adoption of contactless payment systems. Research emphasizes that clear communication regarding data management practices and the implementation of strong privacy protections can foster greater trust (Lutfi et al., 2021). When consumers are confident that their personal information is safeguarded and will not be misused, their trust in these technologies increases, enhancing the likelihood of adoption. Accordingly, the following hypothesis is formulated:

H2: Perceived privacy has a positive impact on consumer trust in contactless payments.

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Perceived risk (concerns about fraud, system failures, and unauthorised access) is negatively associated with consumer trust. Unclear or unfavourable perceptions of risk can create reluctance to adopt new technologies. Trust is undermined when consumers perceive high financial or performance risk levels in contactless payment systems (Martins et al., 2014). Based on this, the following hypothesis is proposed:

H3: Perceived risk negatively impacts consumer trust in contactless payments.

Trust is widely acknowledged as a key mediator in technology adoption, linking consumer concerns, such as security and privacy, and the decision to embrace new technologies. Putit et al. (2021) assert that trust instils confidence in the reliability and usability of payment systems, encouraging adoption. Based on this perspective, the following hypothesis is proposed:

H4: Consumer trust positively impacts the adoption of contactless payments.

TAM suggests that perceived usefulness—the belief that technology improves task performance—is a key predictor of adoption (Davis, 1989). In the case of contactless payments, the convenience and efficiency offered by these systems play a significant role in shaping consumer behavior. Based on this, the following hypothesis is proposed:

H5: Perceived usefulness positively impacts the adoption of contactless payments.

Ease of use, defined as the extent to which a technology is perceived to require little effort, is another essential construct of TAM. Davis et al. (1989) suggest that technologies perceived as easier to use are more likely to be considered valid. This relationship is especially important in overcoming barriers to adopting contactless payment systems. Therefore, the following hypothesis is proposed:

H6: Perceived ease of use positively impacts perceived usefulness.

The UTAUT framework highlights the importance of social influence—the degree to which individuals perceive that others believe they should use a technology—in influencing adoption behavior (Venkatesh et al., 2003). Recommendations from peers, family, or retailers' promotional efforts can significantly impact consumer decisions (Alalwan et al., 2016). Based on this, the final hypothesis is proposed:

H7: Social influences have a positive impact on the adoption of contactless payments.

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The proposed model (Figure 1) suggests that concerns related to data security, privacy, and perceived risk significantly affect trust, which in turn serves as a mediating factor driving adoption. Specifically, the hypotheses indicate that perceptions of security and privacy have a positive impact on trust, while perceived risk negatively influences it. The model incorporates elements of TAM, emphasizing that perceived usefulness and ease of use are critical drivers of adoption. Perceived ease of use positively affects perceived usefulness, directly influencing the decision to adopt contactless payment systems. Social influence, derived from UTAUT, further enhances the model by recognizing the impact of external factors, such as peer recommendations and social norms, on consumer behavior.

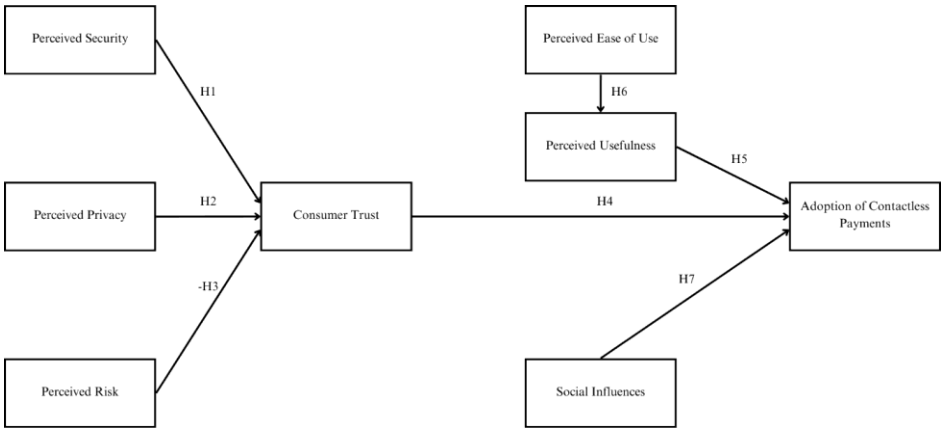


Figure 1: Proposed Model

METHODOLOGY

Given the study's objective to quantify relationships between constructs and test hypotheses, a quantitative methodology was deemed the most appropriate. The research model, which integrates constructs from the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), provides a robust theoretical foundation to explore the determinants of consumer trust and adoption of contactless payment technologies.

A structured online survey was developed and distributed to analyse the proposed relationships. Since the target respondents were Portuguese, the survey was translated from English to Portuguese and back-translated to ensure linguistic and conceptual consistency in this research project. The survey was structured into thirteen sections, each designed to collect specific data relevant to the research objectives. The first section presented an introductory text to contextualize the respondent and outline the purpose of the survey.

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Construct	Items/ Statements	References
Perceived Security	"I believe that contactless payments are secure."	Rawat et al. (2024)
	"Security measures (e.g., tokenization, encryption) in contactless payments are effective."	Alayli (2024)
	"Contactless payment systems are sufficiently protected against unauthorized access."	Rawat et al. (2024)
	"I feel confident using contactless payments due to the security measures implemented."	Alayli (2024)
Perceived Privacy	"I trust that providers (banks, apps) protect my privacy when using contactless payments."	Akana & Ke (2020); Lutfi et al. (2021)
	"I receive clear information about how my data is used in contactless payments."	Lutfi et al. (2021)
	"Contactless payment providers respect the confidentiality of my personal data."	Lutfi et al. (2021)
	"Contactless payments allow me to control how my personal data is used."	Akana & Ke (2020)
Perceived Risk	"There is a risk of financial loss when using contactless payments."	Martins et al. (2014); Akiyama et al. (2021)
	"I am concerned that the contactless payment system might fail during a transaction."	Martins et al. (2014)
	"Using contactless payments could lead to unexpected financial consequences."	Akiyama et al. (2021)
	"I am worried about my data being accessed by third parties without permission."	Martins et al. (2014)
Consumer Trust	"I trust that contactless payments work consistently and without failure."	Putit et al. (2021)
	"I trust that providers effectively resolve issues related to contactless payments."	Putit et al. (2021)
	"I recommend the use of contactless payments to others."	Putit et al. (2021)
Perceived Usefulness	"Contactless payments make my purchases more convenient."	Davis (1989); Pikkarainen et al. (2004)
	"I believe that contactless payments are the best available payment solution."	Davis (1989)
	"Contactless payments help me save time when making purchases."	Davis (1989)
	"Contactless payments are more convenient than other available payment methods."	Pikkarainen et al. (2004)
Perceived Ease of Use	"It is easy to learn how to use contactless payments."	Davis et al. (1989)
	"Contactless payments are simple and intuitive to use."	Davis et al. (1989)
	"It is easy to set up and start using contactless payments."	Davis et al. (1989)
	"Contactless payments require little effort to use properly."	Davis et al. (1989)
Social Influences	"The opinions of my family and friends influence my decision to use contactless payments."	Venkatesh et al. (2003)
	"Retailers promoting contactless payments influence my decision to use them."	Venkatesh et al. (2003)
	"Recommendations from people around me motivate me to adopt contactless payments."	Venkatesh et al. (2003)
Adoption of Contactless Payments	"I intend to continue using contactless payments in the future."	Putit et al. (2021)

Tabela 1: Constructs and Indicators

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The second section collected demographic data, including age, gender, and educational level. The third section determined whether the respondent uses contactless payment technologies, followed by the fourth section, which explored the frequency of use and the devices employed for such transactions. The subsequent sections focused on analyzing key constructs of the study (Table 1). For these sections, respondents were asked to indicate their level of agreement with statements using validated 5-point Likert scales ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The sample for this study was composed of individuals with varying degrees of familiarity and experience with contactless payment technologies. A total of 259 participants were recruited using a non-probabilistic convenience sampling method, ensuring a diverse representation of age, gender, education level, and frequency of contactless payment usage. Among these, 239 respondents were users of contactless payment technologies (final sample), while 20 were non-users. Demographic distribution analysis showed that most respondents were aged between 45 and 54 years old, with a gender representation of 37,5% male and 62,5% female. Educational background varied, with a significant proportion holding higher education degrees while others had completed secondary education. The data analysis followed a two-stage approach - confirmatory factor analysis and hypotheses testing (Hair et al., 2019).

RESULTS

Confirmatory Factor Analysis

A Confirmatory Factor Analysis (CFA) was conducted to assess the validity and reliability of the measurement model. Discriminant validity was verified using HTMT ratios (Table 3). All factor loadings exceeded the recommended threshold of 0.70 (reliability); Cronbach's Alpha values exceeded 0.80; Composite Reliability (CR) values surpassed 0.83 (internal consistency); and the AVE exceeded 0.50. In this study, all AVE values were above the 0.50 (convergent validity) (Table 4).

	Adoption of Contactless Payments	Consumer Trust	Perceived Ease of Use	Perceived Privacy	Perceived Risk	Perceived Security	Perceived Usefulness	Social Influences
Adoption of Contactless Payments								
Consumer Trust	0.692							
Perceived Ease of Use	0.454	0.356						
Perceived Privacy	0.464	0.741	0.346					
Perceived Risk	0.319	0.541	0.148	0.443				
Perceived Security	0.570	0.708	0.332	0.737	0.529			
Perceived Usefulness	0.547	0.479	0.602	0.342	0.142	0.411		
Social Influences	0.030	0.245	0.072	0.254	0.104	0.098	0.217	

Tabela 3: HTMT Ratios

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Model fit indices indicated a satisfactory model fit, with SRMR values of 0.066 for the saturated model and 0.091 for the estimated model, confirming that the theoretical structure adequately represented the observed data.

Items	Factor Loadings	CR	AVE	Cronbach's Alpha
Adoption of Contactless Payments (M = 4.326; SD = 0.745)				
AP1	1.000			
Consumer Trust (M = 3.614; SD = 0.812)		0.893	0.737	0.822
CT1	1.006			
CT2	1.012			
CT3	0.984			
Perceived Ease of Use (M = 4.601; SD = 0.537)		0.891	0.671	0.836
PEOU1	0.970			
PEOU2	0.964			
PEOU3	1.062			
PEOU4	1.035			
Perceived Privacy (M = 3.451; SD = 0.840)		0.872	0.630	0.806
PP1	0.873			
PP2	1.188			
PP3	0.974			
PP4	1.042			
Perceived Risk (M = 3.110; SD = 0.934)		0.838	0.566	0.748
PR1	0.904			
PR2	0.912			
PR3	1.091			
PR4	1.009			
Perceived Security (M = 3.753; SD = 0.814)		0.929	0.765	0.897
PS1	0.954			
PS2	0.874			
PS3	1.118			
PS4	1.059			
Perceived Usefulness (M = 4.289; SD = 0.691)		0.888	0.665	0.832
PU1	1.077			
PU2	1.178			
PU3	0.770			
PU4	1.092			
Social Influences (M = 2.464 ; SD = 1.100)		0.888	0.726	0.823
SI1	0.942			
SI2	0.986			
SI3	1.053			

Tabela 3: Results of CFA - Factor Loadings, CR, AVE, Cronbach's Alpha

Structural Model Analysis

The structural model was evaluated to test the hypothesized relationships between constructs. The results, presented in Table 7, indicated several statistically significant relationships. Perceived Security had a positive and significant influence on Consumer Trust ($\beta = 0.310$, $p < 0.001$); Perceived Privacy had a positive and significant influence on Consumer Trust ($\beta = 0.342$, $p < 0.001$); Perceived Risk had a negative and significant influence on Consumer Trust ($\beta = 0.342$, $p < 0.001$); Consumer trust had a positive and significant influence on the Adoption of Contactless Payment Technologies ($\beta = -0.159$, $p < 0.001$), confirming that higher Perceived Security, higher Perceived Privacy, and lower Perceived Risk led to greater adoption likelihood mediated by Consumer Trust. Perceived Ease of Use

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had a positive and significant influence on Perceived Usefulness ((β = 0.652, $p < 0.001$), and Perceived Usefulness had a positive and significant influence on the Adoption of Contactless Payment Technologies, meaning that Perceived Ease of Use had a positive and significant indirect influence on the Adoption of Contactless Payment Technologies mediated by Perceived Usefulness.

The model's explanatory power was measured using R^2, which indicated that the model explained 49.1% of the variance ($R^2 = 0.491$) in the Adoption of Contactless Payment Technologies, demonstrating moderate-to-high explanatory capacity.

Hypothesis	Model Path	Path coefficients	*t - values*	*p - values*	Results
H1	Perceived Security -> Consumer Trust	0.310	3.973	***	Supported
H2	Perceived Privacy -> Consumer Trust	0.342	5.226	***	Supported
H3	Perceived Risk -> Consumer Trust	-0.159	3.558	***	Supported
H4	Consumer Trust -> Adoption of Contactless Payments	0.496	10.600	***	Supported
H5	Perceived Usefulness -> Adoption of Contactless Payments	0.325	5.163	***	Supported
H6	Perceived Ease of Use -> Perceived Usefulness	0.652	9.081	***	Supported
H7	Social Influences -> Adoption of Contactless Payments	-0.089	2.046	0.041	Not Supported

*** $p < 0.001$;

Tabela 7: Evaluation of the significance of the hypothesis

The results provide strong empirical evidence supporting the proposed theoretical model. The findings establish the role of key constructs in influencing adoption behaviors and contribute to the broader understanding of consumer decision-making in the context of contactless payment technologies.

CONCLUSION

The findings of this study underscore the central role of consumer trust in the adoption of contactless payment technologies, with perceived security, privacy, and risk serving as key antecedents in shaping trust perceptions. The empirical results indicate that trust is the most influential determinant of adoption behavior, confirming its mediating function in the relationship between perceived security, privacy concerns, and risk perceptions. Specifically, perceived security was found to exert a positive and significant effect on trust, underscoring the necessity for robust and transparent security measures to mitigate concerns about fraud, unauthorized access, and data breaches. Similarly, perceived privacy strongly and positively impacted trust, highlighting consumers' increasing importance on data protection, anonymity, and the ethical handling of personal information in digital transactions. In contrast, perceived risk demonstrated a significant negative

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association with trust, reinforcing that heightened financial, psychological, and technological concerns inhibit consumer confidence in contactless payment systems.

The strong effect of security and privacy on trust aligns with previous findings that consumers are more likely to adopt digital payment technologies when they feel assured of secure transactions. Moreover, the negative effect of perceived risk confirms that concerns related to fraud, data breaches, and unauthorized access remain significant adoption barriers. Interestingly, social influence did not emerge as a strong predictor of adoption, contradicting the core tenets of UTAUT. The original hypothesis suggested that Social Influence would positively impact the adoption of contactless payments. However, empirical findings indicate that it does not significantly influence adoption behavior. Unlike other consumer technologies where peer recommendations and normative pressures are critical, contactless payment adoption appears more individualistic and risk-sensitive. Moreover, the results confirm the theoretical assumptions of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) by demonstrating the substantial influence of ease of use and perceived usefulness on adoption intentions. The strong positive association between ease of use and perceived usefulness indicates that a seamless, intuitive, and user-friendly payment interface contributes directly to consumers' perceptions of the technology's utility, enhancing their willingness to adopt contactless payment methods.

The managerial implications of these findings are substantial for businesses, financial institutions, and policymakers aiming to foster greater adoption of contactless payment technologies. Organizations must prioritize the implementation of advanced security mechanisms, such as end-to-end encryption, tokenization, multi-factor authentication, and biometric verification, to enhance consumer confidence in the integrity of digital payment transactions. Equally important is the transparent communication of these security features to users, as consumers are more likely to trust payment technologies when they clearly understand the protective measures in place. Financial service providers and regulatory bodies must also establish stringent privacy policies that align with global data protection regulations. Providing consumers greater control over their data—such as opt-in mechanisms, customizable privacy settings, and clear disclosure of data-sharing practices—can further strengthen trust and mitigate privacy concerns. From a user experience standpoint, improving the intuitiveness and accessibility of contactless payment systems can significantly enhance perceived ease of use, which, in turn, influences perceived usefulness and adoption intentions. Perceived risk has a demonstrable negative effect on trust. Thus, institutions should engage in proactive consumer education campaigns that address common misconceptions about transactions in contactless payment systems.

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Despite the valuable insights generated by this study, several limitations must be acknowledged. One key methodological decision concerns operationalising the "Adoption of Contactless Payments." The construct was measured using a single indicator initially linked to Consumer Trust, reassigned due to conceptual alignment and the need for at least one measured item in PLS-SEM analysis. Future research should develop a more comprehensive measurement approach incorporating factors such as usage frequency and preference over other payment methods. Beyond methodological choices, the study's sample, primarily Portuguese consumers, limits generalizability. Digital payment adoption patterns may differ across cultures, making cross-country comparisons valuable. Additionally, the study's cross-sectional nature prevents capturing how consumer trust and risk perceptions evolve over time. A longitudinal approach could provide deeper insights into these dynamics, particularly in response to technological advancements, regulatory changes, or security breaches.

In conclusion, this study reinforces the critical role of trust in adopting contactless payment technologies, with security, privacy, and risk perceptions shaping consumer confidence. While ease of use and perceived usefulness remain important, organizations must prioritize security measures, transparency, and regulatory compliance to foster widespread adoption. As digital payments evolve, continuous efforts to strengthen trust and mitigate perceived risks will be essential for the long-term success of contactless payment systems.

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PRECARIOUS WORK, CONFLICT MANAGEMENT AND MENTORING IN HOTEL ORGANIZATIONS AFTER THE PANDEMIC.

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ABSTRACT

The purpose of this study is to examine the influence of precarious work and specifically its temporariness nature on conflict management styles and mentoring received in the hospitality industry after covid-19 crisis. It also considers gender as a moderating factor within the conceptual model. The data were collected of 590 temporary employees working in 3*, 4* and 5* hotels in Greece from January 2024 to August 2024. Linear regressions as well as the Hayes (2013) moderation test were applied to test the hypotheses. In addition, the Markov regime-switching regression model was applied for a robustness test. The results showed that temporariness is positively related to the integrating conflict management style and mentoring. Also, female temporary employees tend to adopt the avoiding conflict management style compared to male temporary workers who tend to adopt the compromising conflict management style. Additionally, temporariness had a greater negative effect on mentoring for women than for men. Regarding the robustness test of Markov switching regression model, the results indicated an instability between two regimes. The high volatility regime (high season) had a more significant negative impact on conflict management styles and mentoring. This research proposes to fill a significant research gap, by examining how precarious work impacts conflict management styles and mentoring with a gendered lens in a post-pandemic landscape.

Keywords: Precarious work, temporariness, conflict management styles, mentoring, gender, hotels, pandemic

INTRODUCTION

The hospitality industry is highly susceptible to various uncertainties (Ghazi *et al.*, 2024). The phenomenon of precarious employment because of debit crisis suggested by job insecurity, limited career prospects, bad working conditions, and the ever-increasing levels of uncertainty in the Greek labor market (Livanos and Tzika, 2022). Various empirical studies have examined aspects and the impact of precarious work on employees, which significantly influences workplace behavior

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especially during crises such as the pandemic of Covid-19 (Khawaja *et al.*, 2022). Furthermore, HR practices like mentoring are widely applied by high-performing hotel organizations to strengthen their employee branding (Zografou and Galanaki, 2024). According to Harris (2022) mentoring promotes pathways to career success for women, enhancing gender equality in the workplace. Unfortunately, there is limited knowledge about the influence of mentoring in precarious employees. Previous studies focus on the impact of leadership styles on the hotel employees (Hardaker, 2023; Ghazi *et al.*, 2024; Serhan *et al.*, 2024; Vassou *et al.*, 2024).

In addition, building on gender role theory, men and women often place different levels of importance on work and family roles, due to stereotypes associated with their respective roles. Precarity in Greece has shown a growing tendency during the past decade affecting mainly female employees (Livanos and Tzika, 2022). A limited number of studies have examined the precarious employment in Greece (Livanos and Tzika, 2022). It is relevant to note that Greece experienced a significant reduction in the labor employment rate gaps between male and female genders, yet at the same time, still suffers from a gender gap in precarious work, with men being paid higher salaries compared to women (Eurofound, 2020).

Alongside the above theoretical concepts, the context of precarious employment may experience resource depletion due to job insecurity, lack of benefits, and lower job control. The current study draws on Conservation of Resources (COR) Theory to explore how precariousness affects the conflict management styles and mentoring support of hotel employees. The objective of this study was to investigate the effects of temporariness on employees' conflict management style and mentoring received after the pandemic. To the authors' knowledge, although precarious work has received attention from management and leadership scholars, there are no previous studies investigating conflict management and mentoring in hospitality. Previous studies have shown that precarious employment and specifically its temporary nature, is actively being promoted by policy-makers in the Greek hospitality industry, with more Greeks drawn to such agency-mediated employment contracts on a yearly basis (Maroukis, 2016). Taking into account that Greek hotel industry relies more on seasonal work and thus temporary but full-time contracts (Papadopoulos and Ioannou, 2023) this study attempts to answer the following questions:

RQ1: How does temporariness affect two genders after crises such as the Covid-19 pandemic?

RQ2: How does temporariness affect conflict management and mentoring received?

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This study makes several important theoretical and practical contributions. Firstly, drawing on COR theory (Hobfoll, 1989) we offer valuable insights for hotel managers on the conflict management styles and mentoring received regarding precarious employees. Second, drawing on gender role theory, we explore how the attitudes of precarious male and female workers differ in conflict situations in the hotel sector. Third, this study highlights that hotel managers can play a crucial role in transforming their staff's work environment after a crisis, by being proactive in managing conflict, addressing gender inequalities, and encouraging the career development of all employees, especially women.

HYPOTHESES DEVELOPMENT

Precarious work and Conflict Management Styles

Wu (2023) suggested that workers' happiness and life satisfaction can be enhanced by having a permanent contract, perceiving job stability, and experiencing less precarity in the workplace. Other scholars have found that excessive use of temporary contracts relaxes the relationship between employees and creates low-trust labor relations (Bloise *et al.*, 2022). McNamara *et al.* (2011) showed that temporary employees with limited control over their work hours were more prone to experiencing higher levels of interpersonal conflict and violence. According to Benitez *et al.*, (2018) in service organizations, a single front-line employee rarely provides full service to one customer, and they mostly have to work in units involving high levels of task interdependence requiring high levels of relational coordination for the effective delivery of services to customers resulting teams face the same (interpersonal) problems. The same authors indicated that the use of more integrating conflict style by team members might mitigate the negative effects of relationship conflicts. On the other hand, while the compromising style is one of the most favored in stable employment (Kabanoff, 2006), it has been found to be the least preferred in the case of temporary employment (Musah *et al.*, 2017).

Previous studies have argued that they may be caught in a loop of resource loss, since the resources that provide advantages to other frontline workers may not have the same positive impact on them, due to their precarious employment status, leading to conflict (Cooper *et al.*, 2019; Wallace and Coughlan, 2023). In a similar vein, Dahiya *et al.* (2025) found that workplace relationship conflict leads to employee ostracism behavior, due to resource preservation and protection caused by the nature of relationship conflict, which often leads to resource depletion (Hobfoll, 1989). Therefore, precarious employees may often be caught in a resource-loss spiral thereby avoiding or easing conflicts (Wallace and Coughlan, 2023). Similarly, Yu *et al.*, (2022) indicated that according to the COR

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theory, resource investment can prevent resource losses, recover from resource losses, and acquire new resources resulting in the choice of avoiding conflicts.

Literature suggests that further research is needed, even in specific geographical or periodical contexts, to further enhance the current studies behind conflict management and precarious employment in the industry (Vassou *et al.*, 2019). We expect that temporary workers may prefer integrating style because it helps them build relationships, demonstrate competence, and prevent future problems in order to have an opportunity for a permanent career in the organization.

In this light, the following hypotheses are proposed:

H1. Temporariness is positively associated to integrating.

H2. Temporariness is negatively associated to avoiding.

H3. Temporariness is negatively associated to compromising.

Precarious work and Mentoring

In the hospitality industry, literature has established the prominence of mentoring on job satisfaction (Kim *at al*., 2015; Tsagkanou *et al.*, 2022). Yang *et al.* (2019) found that hospitality employees who get effective mentorship are more likely to integrate into their business and profession, leading to increased retention rates. Tulucu *et al.*, (2022) indicated that hospitality managers might adopt a mentoring program to create high performance norms for young hospitality workers. However, empirical evidence indicated that when temporary workers feel that they lack control over their weekly working hours or the ability to negotiate their work schedule, they may experience a decrease in workplace support (Creed *et al.*, 2020) and feelings of insecurity in other areas of their lives (Campbell and Price, 2016).

According to Hu *et al.* (2022), subjective career plateau, along with its subdimensions, hierarchical plateau and job content plateau, as can been seen in temporary and casual employment, are negatively associated with mentoring support. Overhaul, studies have shown that temporary employees feel less supported by their supervisor (Gordon *et al.*, 2019). This relationship is further magnified when either the mentor or the protege are unsuccessfully managing their resources or caught in a resource-loss spiral, as indicated by the premises of the COR theory (Hu *et al.*, 2022). Social and supervisor support, such as mentoring, is recognized as a resource in the context of the COR theory (Hobfoll, 2001). This kind of support aids in the conservation of valuable resources, but the

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absence of it can also lead to the depletion of one's resources (Hobfoll, 1989). It has been found to have the potential to mitigate the impact of stressors on job performance, since it is a resource that can facilitate attainment and safeguard an individual's valuable resources (Darvishmotevali *et al.*, 2017). Karatepe (2009) found that frontline hotel employees who have long tenure received more supervisory support resulting in a lower intention to quit. In the same vein, Yoon and Thye (2000) showed that employees who have worked for an organization longer will perceive higher levels of supervisor support.

We therefore hypothesize:

H4. Temporariness is negatively associated to mentoring.

The moderating role of employee gender

According to Nienhuis and Lesser (2020), nowadays women outnumbered men in reporting work-related changes, such as reduced hours and loss of job, and showed more generalized anxiety symptoms. In the hospitality industry, women concentrated in lower status positions that attract poorer pay and opportunities for progression (Mooney and Ryan, 2009). While female executives face significant barriers to career advancement, most female hospitality employees are precarious workers (Morgan and Pritchard, 2019). Furthermore, a masculinized 'ideal' hospitality and tourism worker discourse continues to hold back women's careers (Costa *et al.*, 2017).

According to Sheppard and Aquino (2017), gender norms and roles had a significant impact on the understanding of how to handle workplace conflict. Associations were discovered between men, masculinity, and task focus in conflict management, as well as between women, femininity, and relationship focus in conflict management. Most of previous studies have shown that conflict management style is strongly correlated with gender role orientation, organizational position (Mwantu *et al.*, 2018). Rahim *et al.* (2022) found that the preferred conflict management style is influenced by factors such as one's own gender, the gender of their supervisor, and the country in which they reside. Recent study has indicated that men tend to prioritize their own interests and strive to protect their reputation within the organization, while women are more likely to prioritize the interests of others (Zhang *et al.*, 2022).

The gender role theory proposes that women may not view their work roles as being central to their identities (Akerlof and Kranton, 2000). More women than men reported work-related changes, and these women showed more generalized anxiety symptoms compared to women who had not

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experienced these changes (Nienhuis and Lesser, 2020). Rahim and Katz (2020) have found evidence supporting the idea that there are distinct differences in conflict management styles based on gender. Previous researchers have found that male employees tend to have a particular preference for dominating, while female employees are more likely to use avoiding, integrating, and compromising (Brewer *et al.*, 2002; Korabik *et al.*, 1993).

On the other hand, although workplace mentoring programs are designed to support both men and women, it has been found that men benefit more than women because these programs run the risk of labeling women as a "problem" that needs to be "fixed" to help them perform better within organizational structures and hierarchies (De Vries *et al.*, 2006). Dashper (2019) showed that women's access on mentoring programs may both challenge and reinforce gender inequality. Remington and Kitterlin-Lynch (2018) indicated the absence of mentoring negatively impacts women's achievement of leadership positions in the hospitality industry.

We therefore hypothesize:

H5. Employee gender will moderate the relationship between temporariness and integrating such that the relationship will be stronger for women.

H6. Employee gender will moderate the relationship between temporariness and avoiding such that the relationship will be stronger for women.

H7. Employee gender will moderate the relationship between temporariness and compromising such that the relationship will be stronger for women.

H8. Employee gender will moderate the relationship between temporariness and mentoring such that the relationship will be stronger for women.

METHODS

Sample and data collection

The research was conducted on a sample comprised of 590 temporary employees working in 3*, 4* and 5* hotels in Greece. Data were collected from January 2024 to August 2024 by distributing self-administered questionnaires. The researchers contacted hotel CEOs or HR managers by phone or e-mail to explain the objectives and scope of this study. The hotel managers of each department distributed the survey questionnaires to their employees, and they got them back within ten days.

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Inclusion criterion for the research was that the participants were temporary workers in each hotel. To ensure their anonymity and confidentiality the employees left the completed ones in the sealed envelope in a box. After the deadline, the hotel managers sent the completed questionnaires to the researchers via courier. A total of 712 questionnaires were distributed and 624 were returned, of which 34 could not be used due to errors or significant missing information.

Our sample was 53.6% male and 46.4% female workers in the hospitality sector. A total of 40.8% were between the ages of 18-25, 39.3% were between the ages of 26-33, 15.6% were between the ages of 34-41, 3.4% were between the ages of 42-49% and 0.8% were 50 and older. In terms of employees' work departments, 37.8% worked in food and beverages, 33.1% worked in housekeeping, 6.1% worked in human resources, 18% worked in front office, 5 % in other departments. Of the 590 respondents, 75.8% had a high school diploma and 24.2% had a bachelor's degree. In all, 75.4% were unmarried and 24.6% were married.

Measures

The survey data were presented in Greek and underwent rigorous back-translation for accurate translation from English into Greek. All constructs used five-point Likert-type scales.

Precarious work: To measure precarious work the revised Employment Precariousness Scale (EPRES-2010) was adopted by Vives *et al.* (2010). It is a six-dimensional scale with 21 items including "temporariness", "disempowerment", "vulnerability", "wages", "rights", and "exercise rights".

Conflict management: The five conflict handling styles were assessed with the 28-item scale by Rahim (1983); "integrating", "avoiding", "dominating", "obliging" and "compromising".

Mentoring received: was measured using 7 items on a five-point response from Dreher and Ash (1990); "career mentoring", "socioemotional mentoring", "role mentoring".

Gender moderates the relationship between precarious work and conflict management and then again, the relationship between precarious work and mentoring. Gender was dummy coded for analysis, with 0 indicated female and 1 indicated male.

Control variables: age, gender and average working hours per week used as controls, in line with extant literature (McNamara *et al*, 2011).

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ANALYSES AND RESULTS

Validity and reliability

Exploratory factor analysis with varimax rotation was conducted to test the validity of the measures. The adequacy of sampling was tested through Kaiser-Meyer-Olkin test (KMO) and the strength of the relationship among variables was assessed through Bartlett's test of sphericity. The findings showed that for the multidimensional scale of *precarious work* the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity ($\chi 2$) were satisfied in terms of significance (KMO = 0.503, $\chi 2$ = 1679.147, $p<0.001$). The eight factors are extracted accounting for a combined of 68.765% of the total variance. The internal consistency estimate (Cronbach's a) for the temporariness was 0.844. A high level of Cronbach a (>0.5) shows that the items in the test are highly correlated. For the other factors, Cronbach's a showed that there was no good internal consistency (<0.5) and they were excluded.

The findings showed that for the scale of *conflict management* the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity ($\chi 2$) were satisfied in terms of significance (KMO =0.944, $\chi 2$ =19765.749, $p<0.001$). The three factors were extracted (integrating, avoiding and compromising) accounting for a combined of 73.259% of the total variance. The factors "dominating" and "obliging" were excluded because their items showed negative loading and did not fit in the scale. The internal consistency estimates (Cronbach's a) for the three domains were 0.904 for integrating, 0.918 for avoiding and 0.887 for compromising.

The findings suggest that for the scale of *mentoring* the Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity ($\chi 2$) were satisfied in terms of significance (KMO = 0.893, $\chi 2$ =3940.361, $p<0.001$). For this scale only one component was extracted accounting for a combined 72.472% of the total variance. The internal consistency estimate (Cronbach's a) for this factor was 0.917.

Hypothesis tests

We analyzed our data using IBM-SPSS Statistics version 29 and no missing data were identified during the data checking process. To confirm discriminant validity of the scales the correlation matrix with the square root of the AVE on the diagonal correlations is presented in Table 1.

Variable	1	2	3	4	5	6	7	8
Temporariness	1							
Integrating	,221**	1						
Avoiding	-,094*	,000	1					
Compomising	-,096*	,000	,000	1				
Mentoring	-,134**	-,785**	-,322**	-,297**	1			

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Average hours	-,035	-,110**	-,123**	-,005	,146**	1		
Age	-,093*	,068	,187**	-,069	-,087*	,021	1	
Gender	-,140**	-,819**	-,376**	-,257**	,906**	,170**	-,085*	1

*Note:*p<0.05;**p<0.01*

Table 1. *Intercorrelations between variables*

Next, to check the main hypotheses regarding direct effects, linear regression analysis was performed as presented in Table 2. *H1* predicted that temporariness is positively associated with integrating. The results of linear regression supported *H1* (b = 0.110, t = 4.653, p <0.001). *H2* predicted that temporariness is negatively associated with avoiding. The results of linear regression supported *H2* (b = -0.135, t = -3.572, p <0.001). *H3* predicted that temporariness is negatively associated with compromising. The results supported *H3* (b = -0.146, t = -3.659, p <0.001). *H4* predicted that temporariness is negatively associated with mentoring. This is confirmed by the linear regression results (b = -0.008, t = -0.475, p <0.05).

Dependent Variable	Independent Variables	Unstandardized B	t-Value
Model 1 Integration Adjusted R-squared: 0.681	Temporariness	0.110	4.653***
Model 2 Avoiding Adjusted R-squared: 0.182	Temporariness	-0.135	-3.572***
Model 3 Compromising Adjusted R-squared: 0.091	Temporariness	-0.146	-3.659***
Model 4 Mentoring Adjusted R-squared: 0.821	Temporariness	-0.008	-0.475*
Notes: *p <0.05; ***p<0.001 control: age; gender; average working hours per week			

Table 2. *Linear regressions*

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In addition, to check the moderating effect of gender PROCESS macro developed by Hayes (2013) was used with 5,000 bootstrapping samples (Table 3). *H5* predicted that employee gender will moderate the relationship between temporariness and integrating such that the relationship will be stronger for women. The interaction term was found to be non-significant (*b*= 0.8398, *p*>0.05), so gender does not moderate the relationship between temporariness and integrating. Thus, *H5* was not supported. Further, the results showed that employee gender moderate the relationship between temporariness and avoiding such that the relationship will be negatively stronger for women (*b*= -0.2286, *p*<0.01), thus *H6* was supported. *H7* was partially supported because the results showed that employee gender will moderate the relationship between temporariness and compromising such that the relationship is negatively significant only for men (*b*= -0.2046, *p*<0.01). Finally, the results confirmed that employee gender moderate the relationship between temporariness and mentoring such that the relationship will be negatively stronger for women, thus *H8* was supported *(b*=-0.2602, *p* <0.05*).*

Model Summary Temporariness (X)	B	S.E	T	P
Model 1 R-squared: 0.0541 Outcome variable: Integrating (ϒ) Moderator: gender Interaction	 0.3087 0.2482 0.0284	 0.1021 0.1411 0.1403	 3.0236 1.7582 0.2022	 0.0026 0.0791 0.8398, p>0.05 < H5 not supported
Model 2 R-squared: 0.0479 Outcome variable: Avoiding (ϒ) Moderator: gender Interaction	 -0.2286 -0.4093 0.1225	 0.0597 0.0871 0.0872	 -3.8271 -4.6966 1.4057	 0.0001 0.0000 0.0603 < H6 supported (b=-0.2286 ** for women)
Model 3 R-squared: 0.0437 Outcome variable: Compromising (ϒ) Moderator: gender Interaction	 -0.0491 -0.3424 -.01555	 0.0657 0.0839 0.0851	 -0.7470 -4.0793 -1.8266	 0.4554 0.0001 0.0683< H7 partially supported (for men) (b= -0.2046**)
Model 4 R-squared: 0.0296 Outcome variable: Mentoring (ϒ) Moderator: gender Interaction	 -0.2602 -0.2029 0.4688	 0.1324 0.1930 0.1930	 -1.9654 -1.0513 2.4286	 0.0498 0.0000 0.0155<H8 supported (b=-0.2602*)
Note:*p<0.05;**p<0.01				

Table 3. *Moderation effect of gender Robustness test*

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To exclude the fact that our results were influenced by the time periods in which the survey questionnaires were collected (low season, high season), we applied the Markov regime-switching (MS) regression model (Hamilton, 1989) using Eviews 12. We used this model to analyze the association of temporariness with conflict management styles (integrating, avoiding, compromising) and temporariness with mentoring during the low (first period) and high (second period) volatility regimes. A Markov chain is a discrete stochastic process in which the probability of future states is determined solely by the current state of the system or the immediately previous state (Gagniuc, 2017). The estimation results of the Markov-switching regression are reported in Table 4.

Depend. Variable	Coefficient	Std. Error	z - Statistic	Prob.
Regime 1				
Integrating	-0.574806	0.040312	-14.25885	0.0000
Constant	-0.757633	0.032253	-23.49024	0.0000
Regime 2				
Integrating	-0.552030	0.043297	-12.74976	0.0000
Constant	0.868920	0.035376	24.56211	0.0000
Regime 1				
Avoiding	0.039625	0.040041	0.989615	0.3224
Constant	0.341195	0.080250	4.251669	0.0000
Regime2				
Avoiding	-0.631943	0.087056	-7.259053	0.0000
Constant	-0.602160	0.051545	-11.68223	0.0000
Regime 1				
Compromising	0.024082	0.031260	0.770380	0.4411
Constant	-0.059638	0.046902	-1.271537	0.2035
Regime 2				
Compromising	-2.416623	0.292203	-8.270342	0.0000
Constant	0.643640	0.026656	24.14622	0.0000
Regime 1				
Mentoring	-0.742363	0.058785	-12.62839	0.0000
Constant	-0.936924	0.035127	-26.67237	0.0000
Regime 2				
Mentoring	-1.018488	0.053206	0.025391	0.0000
Constant	0.873897	0.025391	34.41722	0.0000

Table 4. *Markov switching regression model from one period to another (low volatility – high volatility) with independent variable the Temporariness*

During the low volatility regime (low season) the coefficient of integrating is negative and significant (*p-value* of 0.0000), in contrast to coefficients of avoiding and compromising which are not significant (*p-value*> 0.05). This implies that low volatility does not affect avoiding and compromising. In addition, the coefficient of mentoring is significantly negative (*p-value* of 0.0000). Moving on to the

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high volatility regime (high season) the integrating still has a negative and significant value (*p-value* of 0.0000) which is not particularly different from regime 1. In the same regime the coefficients of avoiding, compromising and mentoring are negative and significant (*p-value* of 0.0000). These findings are consistent with the simple linear regression model. Compared to the low season period, the association between temporariness and mentoring is more pronounced in high season period. Therefore, an increase in volatility has a greater negative impact on conflict management styles and mentoring received.

CONCLUDING REMARKS

The findings of the linear regressions supported our hypotheses, indicating that temporariness is positively related to integrating and negatively related to avoiding and compromising. In addition, we found that temporariness is negatively related to mentoring. Regarding the moderation test, the findings did not support *H5*, which means that gender does not moderate the relationship between temporariness and integrating. The findings also indicated that female temporary workers tend to adopt the avoiding conflict style compared to male temporary workers who tend to adopt the compromising. Moreover, temporariness was found to have a greater negative effect on mentoring for women than for men. Regarding the robustness test of Markov switching regression model, the results indicated an instability between two regimes. The high volatility regime (high season) had a more significant negative impact on conflict management styles and mentoring.

This study provides some important theoretical contributions to existing literature. First, our findings coincide with previous research which revealed that integrating is the style which preferred during the scheduling and sequencing of conflict demands, as it can help maintain a fair balance among all stakeholders (Cooper *et al.*, 2019). In addition, while the compromising style is one of the most favored cooperative conflict management styles in stable employment (Kabanoff, 2006), it has been found to be the least preferred in the case of temporary employment (Musah *et al.*, 2017). Our results confirm this argument. A possible explanation is that temporary employees are less confrontational during a conflict situation, as they tend to remain restrained in showing dissatisfaction compared to permanent employees.

Second, this study highlights the negative association of temporary employees with mentoring support. This is consistent with Jeske and Linehan's (2020) recent study showed that length of temporary contract did not increase mentoring satisfaction and the longer the contract, the more likely employees were to have a mentor. Similarly, Cateridge *et al.* (2024) established that even while many

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mentoring initiatives are instigated to tackle the barriers of inequality for new and existing employees, their effects in the creative industries after the pandemic are compromised by precarious employment. Furthermore, our research didn't confirm the COR theory that recognizes mentoring as a resource for temporary employees (Hobfoll, 2001), suggests that mentoring programs may not be accessible, well-structured, or prioritized for temporary workers, particularly women, during times of crisis such as the covid-19.

Third, our empirical results reveal the moderating effect of gender on the relationship between avoiding with temporariness and compromising with temporariness. This is partially consistent with recent studies which found that the preferred conflict management style is influenced by gender (Rahim and Katz, 2020; Rahim, 2022). On the other hand, Hardaker *et al.* (2023) revealed that employees take a gender-neutral approach while dealing with conflict situations. Our results support this only in the relationship between temporariness and integrating. Empirical evidence suggests that men may exhibit more negative attitudes toward work than women when their roles lack prestige or authority, as in the case of temporary employment (Boyce *et al.*, 2007). Our results also align with previous literature based on gender role theory, showed that female temporary employees have increased positive work-related attitudes (Selvarajan *et al.*, 2015). Women may be more inclined to sacrifice job-related benefits in exchange for jobs that offer flexibility to focus on non-work activities (Bender *et al.*, 2005).

Fourth, the results showed that gender moderates the relationship between temporariness and mentoring such that women temporary employees tend to receive even lower mentoring compared to men. This begs the question "does mentoring lead to women's job satisfaction, retention and promotion?". Considering that we received the questionnaires from women who worked in all departments and not only traditionally in cleaning, our results contribute to related literature which indicates the benefits of mentoring for women career (Allen and Eby, 2004; Leenders *et al.*, 2020). Furthermore, previous study showed that mentoring increases the number of women in managerial roles (Kalev *et al.*, 2006). Fifth, the robustness of the results gains a stronger basis through the Markov Switching regression model which leads in similar results.

This study provides some important theoretical contributions. In a post-pandemic landscape, hotel managers play a pivotal role in mitigating gender inequality and effectively managing conflicts among temporary workers. By implementing inclusive practices, promoting open communication, providing career development opportunities, and ensuring gender equality in all aspects of the workplace, hotel managers can help reduce tensions, support workers, and create a more resilient and

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equitable work environment, after a social and financial crisis such as covid-19 pandemic. Moreover, it would be fruitful for hotel managers to cultivate a supportive environment even during periods of volatility, such as low and high work periods. This reflects the need for effective conflict management, teamwork, and implementation of both formal and informal mentoring programs to continuously improve employee performance and engagement.

Future research could use control variables such as work position, wage, and marital status to uncover differences among temporary employees. In addition, this study focused on the gender perspective of precarious workers in Greek hospitality. Future research could be directed towards examining the precarious employment conditions faced by both migrant and young workers in the hospitality industry, as well as the evolving vulnerabilities of virtual employees. In current study we are focused in one-dimensional approach of precarious work (temporariness), which seems to fit the Greek hotel industry. Future studies could test the multi-dimensional employment precariousness scale (EPRES) in relationships with conflict management and mentoring across different socio - demographic characteristics.

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GENERATIVE AI IN BUSINESS MANAGEMENT EDUCATION: A LITERATURE REVIEW AND EMPIRICAL APPLICATION

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ABSTRACT

The increasing integration of generative artificial intelligence (GenAI) into higher education presents both significant pedagogical opportunities and complex ethical challenges, particularly within specialized business disciplines such as maritime economics and logistics. This study provides a systematic, data-driven examination of GenAI use in a capstone business course to evaluate its impact on student utility, engagement, cognitive skills, and ethical perceptions. A comprehensive survey was administered to a near-complete cohort of 81 final-year undergraduate students in the "Strategic Business of Forwarding Companies" course at the University of Genoa. Data were analyzed using descriptive statistics, correlation analysis, and k-means clustering to identify latent student profiles. Results indicate high perceived utility and engagement, with students reporting that GenAI significantly aided text comprehension (M=5.52/7) and production (M=5.69/7) and enhanced perceptions of job-market readiness (M=5.64/7). Simultaneously, students expressed structured concerns regarding academic integrity and authenticity (M≈4.5–5.1), though these concerns did not correlate negatively with perceived utility. Cluster analysis revealed three distinct profiles: "Enthusiasts" (33.3%), "Cautiously Positive" (46.9%), and "Critical/Skeptical" (19.8%), demonstrating significant heterogeneity in student attitudes. The findings underscore the dual nature of GenAI in business education, where its practical benefits are appreciated alongside a clear awareness of its risks. Effective integration requires differentiated pedagogical strategies and explicit institutional guidelines, which were found to mitigate ethical concerns while preserving innovation. This research contributes robust empirical evidence to a specialized field, highlighting the necessity of a balanced approach to harnessing GenAI's transformative potential responsibly.

Keywords: Generative Artificial Intelligence, Large Language Models, Education, Business Management, Bibliometric Analysis, Innovative Marketing Education, Decision Support, Experimental Design

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INTRODUCTION

The evolution and widespread accessibility of generative artificial intelligence (GenAI) technologies, particularly sophisticated large language models (LLMs) like ChatGPT, have initiated a paradigm shift across numerous sectors of society. This technological disruption has profound implications for higher education, where it is simultaneously hailed as a transformative pedagogical tool and scrutinized as a significant ethical and cognitive challenge (Akpan et al., 2024)(Kadaruddin, 2023). The integration of these tools into academic workflows is no longer a futuristic projection but a present-day reality, compelling educational institutions to fundamentally reconsider long-standing practices related to teaching, learning, and assessment. GenAI's capacity to generate coherent text, synthesize complex information, and engage in interactive dialogue provides novel opportunities for creating more dynamic, personalized, and engaging learning environments (Chaivisit et al., 2024; Sharma et al., 2025). This transformative wave is not confined to traditionally technical fields; it is reshaping pedagogical practices in disciplines that require a sophisticated blend of managerial insight and technical depth, thereby creating a new frontier for educational research and practice (Mtotywa, n.d.)(Jambol et al., 2025).

Within the domain of business education, the advent of GenAI presents a particularly complex and pressing set of considerations. Business curricula are designed to cultivate a range of core competencies, including critical thinking, strategic analysis, data-driven decision-making, and effective communication, all of which are directly impacted by the capabilities of LLMs (K.-B. Ooi et al., 2025; Xu and Babaian, 2021). The modern business landscape is characterized by increasing digitization, globalization, and a demand for professionals who can navigate complex information ecosystems with agility and integrity. Consequently, the integration of GenAI into business education is not merely an option but a necessity for preparing graduates for a workforce where proficiency in leveraging AI tools is becoming a baseline expectation (Jermakowicz, 2023; Wang and Wang, 2023). These tools offer the potential to simulate real-world business scenarios, automate routine analytical tasks, and augment creative problem-solving. This dual role of GenAI—as both a subject of study and a tool for learning—creates a unique pedagogical dynamic, forcing educators to balance the development of foundational business acumen with the cultivation of advanced digital literacy (Mtotywa, n.d.; Zhao et al., 2024). This study focuses specifically on a highly specialized and technical subfield of business: maritime economics, logistics, and transport. This context is particularly salient for examining the impact of GenAI for several reasons. First, this discipline is characterized by a high degree of complexity, involving intricate global supply chains, extensive regulatory frameworks, and a specialized technical lexicon. GenAI tools can serve as powerful aids for students navigating this

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dense material, helping to clarify concepts and articulate complex ideas. Second, the field is inherently international, attracting a diverse student body with varied linguistic backgrounds. The multilingual capabilities of LLMs offer a promising avenue for promoting equity and inclusion by providing support for non-native speakers, thereby bridging potential language barriers in comprehension and production (Malatya Turgut Ozal University, Malatya, Turkey et al., 2024). Third, the logistics and transport industries are at the forefront of digital transformation, with a high demand for graduates who possess not only domain-specific knowledge but also advanced digital skills. Integrating GenAI into the curriculum provides students with direct, hands-on experience with technologies they will encounter in their professional careers, enhancing their employability and readiness for the future job market (AlAli and Wardat, 2024; K.-B. Ooi et al., 2025).

The promise of GenAI is, however, juxtaposed with significant pedagogical and ethical perils that warrant rigorous investigation. The primary concern articulated throughout literature centers on academic integrity. The ease with which students can generate sophisticated, human-like text raises fundamental questions about authorship, originality, and the potential for plagiarism on an unprecedented scale (Albadarin et al., 2024; Chaivisit et al., 2024; Kamalov et al., 2023). Beyond cheating, a more subtle but equally important risk is the potential for cognitive offloading, wherein over-reliance on AI tools may erode students' development of essential higher-order skills such as critical thinking, analytical reasoning, and writing proficiency (Kamalov et al., 2023; Sharma et al., 2025). There are also broader ethical issues related to algorithmic bias, the propagation of misinformation, and data privacy, which are critical considerations in any educational application of AI (Malatya Turgut Ozal University, Malatya, Turkey et al., 2024; Mulaudzi and Hamilton, 2025; Sharma et al., 2025). This inherent duality, the technology's potential to both enhance and undermine learning, creates a critical tension that educators and institutions must navigate. A failure to address these challenges proactively could lead to a degradation of educational standards and a failure to equip students with the robust, independent intellectual skills required for long-term success.

A review of the current scholarly landscape reveals that while the volume of literature on GenAI in education is growing exponentially, a significant portion consists of theoretical discussions, opinion pieces, or broad bibliometric analyses that map research trends at a macro level (Jambol et al., 2025; Mtotywa, n.d.). While these studies are invaluable for framing the discourse, there remains a comparative scarcity of granular, empirical research that examines student attitudes, behaviors, and perceptions within specific, real-world educational contexts. Much of the existing empirical work has focused on general university populations or on disciplines like computer science and medicine (Chaivisit et al., 2024; Demïrel, 2024). There is a demonstrable gap in research that provides a detailed,

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quantitative account of how students in a specialized business program perceive and utilize GenAI when it is formally integrated into a high-stakes course. It is not yet fully understood how students balance the perceived utility of these tools against their awareness of ethical risks. Furthermore, little is known about the heterogeneity of student responses and whether distinct typologies or profiles of users emerge based on their attitudes and usage patterns.

This paper seeks to address this gap by presenting a systematic, data-driven examination of GenAI use in a capstone course, "Strategic Business of Forwarding Companies," offered as part of the bachelor's degree in Economics of Maritime Companies, Logistics, and Transport at the University of Genoa. Our central objective is to elucidate the pedagogical, ethical, and cognitive implications of integrating GenAI into this specialized business curriculum by leveraging quantitative data from a near-complete student cohort. The study aims to achieve the following specific objectives: (1) to assess student perceptions of GenAI's utility for text comprehension and production, its impact on engagement, and its effect on the development of critical thinking and professional skills; (2) to explore the structure and intensity of students' ethical concerns regarding academic integrity, authenticity, and the potential for misuse; (3) to analyze the statistical relationship between perceived utility and ethical concern to determine if these are opposing or independent dimensions of the student experience; and (4) to identify latent profiles among student users through cluster analysis to understand the diversity of attitudes within the sample. By providing a robust empirical analysis grounded in a unique and highly relevant educational setting, this research aims to move beyond speculation and contribute actionable insights that can inform evidence-based pedagogical strategies, curriculum design, and institutional policymaking for the responsible and effective integration of generative AI in business education (Jermakowicz, 2023; Mulaudzi and Hamilton, 2025; Wang and Wang, 2023).

LITERATURE REVIEW

Scholarly literature on generative artificial intelligence in higher education has witnessed remarkable growth, a trend confirmed by numerous bibliometric analyses tracking publication outputs since the technology's mainstream emergence (Akpan et al., 2024). Initial academic discourse centered on the theoretical potential of AI to revolutionize traditional pedagogy, whereas more recent studies have adopted empirical methodologies to quantify its effects on student learning outcomes, engagement, and cognitive processes (Jambol et al., 2025; Mtotywa, n.d.). The applicative trajectory of GenAI in educational contexts has been systematically mapped across disciplines, revealing an interdisciplinary convergence that holds relevance for business education, where technical proficiency and strategic

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thinking are paramount (Wang and Wang, 2023). Empirical research consistently demonstrates GenAI's utility in supporting text comprehension and production, which is a significant benefit in technical fields like logistics and maritime transport where specialized language and precision are critical (Chaivisit et al., 2024; Jermakowicz, 2023). Studies further indicate that GenAI fosters personalized learning experiences that cater to individual student needs, thereby enabling more effective knowledge acquisition and deeper engagement with complex curricular content. Common usage patterns identified in the literature include idea generation, text drafting from prompts, concept clarification, and technical reformulation, all of which contribute to enhanced academic performance and better preparation for the professional labor market (Jermakowicz, 2023; Malatya Turgut Ozal University, Malatya, Turkey et al., 2024). Positive correlations between GenAI's perceived utility and its impact on higher-order cognitive skills, such as critical thinking and strategic decision-making, suggest the technology functions not merely as an information retrieval tool but as a catalyst for advanced analytical reasoning (K. B. Ooi et al., 2025; Sharma et al., 2025).

The promise of GenAI is, however, accompanied by significant challenges, and a substantial body of literature is dedicated to exploring the associated ethical concerns. Research consistently highlights issues such as the risk of academic dishonesty, compromised authenticity of student work, and potential biases embedded within AI-generated content, which pose a direct threat to educational integrity (Albadarin et al., 2024; Chaivisit et al., 2024). These ethical dilemmas are compounded by the opaque nature of many AI algorithms, complicating efforts to ensure transparency and accountability in academic settings (Malatya Turgut Ozal University, Malatya, Turkey et al., 2024; Sharma et al., 2025). Studies reveal that while many students recognize the immense utility of GenAI, a notable subset exhibits significant concern regarding its ethical implications, a dichotomy that underscores the need for explicit educational guidelines and intervention strategies (Sharma et al., 2025). An emerging research agenda therefore focuses on developing pedagogical frameworks and institutional policies to support the responsible integration of GenAI. Several authors advocate for the implementation of explicit tutorials and clear rules to help students navigate the complexities of ethical AI usage while capitalizing on its educational benefits (Kamalov et al., 2023; Malatya Turgut Ozal University, Malatya, Turkey et al., 2024; Sharma et al., 2025). The provision of clear guidance not only enhances student satisfaction with AI-assisted learning but also significantly reduces concerns related to academic honesty, fostering an environment where innovation and integrity can coexist (Mulaudzi and Hamilton, 2025; Sharma et al., 2025). This is particularly salient in internationalized educational contexts, where GenAI may serve as a compensatory tool for non-native speakers, thereby promoting inclusivity (Malatya Turgut Ozal University, Malatya, Turkey et al., 2024). Research has also identified distinct clusters of student attitudes toward GenAI, ranging from enthusiastic adoption to cautious

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optimism and outright skepticism, pointing to the need for differentiated pedagogical strategies that accommodate diverse student profiles (Mtotywa, n.d.; Sharma et al., 2025). Our study aims to contribute to this body of knowledge by providing a granular, empirical analysis within a specific, high-stakes business education course, addressing the intersection of pedagogical innovation and ethical risk management in a discipline defined by technological advancement and global complexity (AlAli and Wardat, 2024; Demïrel, 2024).

THE EXPERIMENT

The increasing integration of generative artificial intelligence (GenAI) in higher education is provoking renewed attention toward its pedagogical, ethical, and cognitive implications. Within technical and managerial disciplines, such as those related to maritime economics, logistics, and transport, the adoption of advanced language models (LLMs) is particularly relevant due to the field's complexity, the internationalization of its student body, and the high demand for digital skills in professional contexts. This study presents a systematic, data-driven examination of GenAI use in a capstone course, "Strategic Business of Forwarding Companies," offered in the final year of the bachelor's degree in Economics of Maritime Companies, Logistics, and Transport at the University of Genoa. The analysis leverages the responses of 81 undergraduate students, constituting nearly the entire cohort for the 2024–2025 academic year, thereby providing a statistically robust foundation for both descriptive and inferential exploration.

MATERIALS AND METHODS

Sample and Course Context

The survey respondents (N = 81) were enrolled in the third year of the "Corso di Laurea in Economia delle Aziende Marittime, della Logistica e dei Trasporti" (Bachelor's in Economics of Maritime Companies, Logistics, and Transport). The specific course, "Strategic Business of Forwarding Companies," focuses on decision-making and management within shipping, forwarding, and logistics enterprises, emphasizing both strategic frameworks and operational tools. The context of the survey is thus characterized by a high degree of technicality, international relevance, and a curriculum increasingly exposed to technological innovation.

Survey Design and Data Collection

- The questionnaire was developed in alignment with current research on educational technology

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and ethics. The instrument included both background variables (e.g., degree obtained, mother tongue, GenAI tool used) and an extensive set of closed-ended questions, almost all rated on a 1–7 Likert scale (1 = not at all, 7 = very much).

These items measured: Perceived utility of GenAI for text comprehension and production (e.g., "To what extent did GenAI help you understand the text, considering that the instructions were in Italian?"; "To what extent did GenAI help you produce the text?"). Technical correctness and appropriateness of AI-supported output.

- Ways GenAI was used, including idea generation, technical reformulation, concept clarification, and group facilitation.

- Quality and clarity of GenAI outputs.

- Perceived impact on engagement, critical thinking, and employability. Ethical and authenticity concerns, such as the risk of compromising learning integrity or affecting academic honesty.

- Awareness of ethical challenges after the GenAI experience. Perceived value of tutorials or rules for mitigating risks. No personally identifying data were included in the analytical dataset. All analyses complied with university data protection guidelines.

Data Preparation and Statistical Procedures

All Likert-scale responses were converted to numeric values. Descriptive statistics (means, standard deviations, minima, maxima) were computed for each item. The internal consistency of key scales (e.g., perceived utility, ethical risk) was assessed using Cronbach's alpha, yielding values above 0.8, indicating acceptable reliability.

For bivariate relationships, Pearson correlation coefficients were computed for all pairs of numeric variables, with p-values reported where appropriate. To analyze latent respondent profiles, k-means clustering was conducted with the number of clusters determined via the elbow method and silhouette analysis, with a focus on utility, engagement, and ethical concern variables. Differences between clusters and subgroups (e.g., by native language or AI tool used) were assessed using independent samples t-tests and one-way ANOVA, with post hoc Tukey HSD tests to localize significant differences.

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Missing data were minimal (< 2% of all cells); pairwise deletion was used for correlations, and mean imputation was used for descriptive statistics. All analyses were conducted in Python (pandas, numpy, scipy, sklearn) and double-checked for accuracy.

RESULTS

Descriptive Statistics: Utility, Engagement, and Personalization

Across the sample (N = 81), students reported high perceived utility of GenAI for both comprehension and production of text. Specifically, the item "To what extent did the use of GenAI help you understand the text, considering that the instructions were in Italian?" produced a mean score of 5.52 (SD = 1.45, range 1–7), while "To what extent did GenAI help you produce the text?" resulted in a mean of 5.69 (SD = 1.34, range 1–7). The perceived improvement in technical correctness of writing due to GenAI assistance was also high, with a mean of 5.74 (SD = 1.32).

Analysis of the various ways in which GenAI was employed shows significant diversity in usage patterns. The most frequent use cases were "generating initial ideas" (mean = 5.18, SD = 1.62), "drafting text directly from the assignment prompt" (mean = 5.32, SD = 1.54), and "clarifying concepts" (mean = 4.91, SD = 1.62). "Reformulating sentences in technical language" received a somewhat lower mean of 4.67 (SD = 1.80). Use of GenAI for facilitating group consensus or overcoming disagreement was much less common, with a mean of 2.52 (SD = 2.08), suggesting that students primarily use AI as an individual tool rather than for collaborative writing.

Regarding the impact on learning engagement and personalization, students generally agreed that GenAI made the learning process more engaging (mean = 5.77, SD = 1.36) and added a personalized dimension to the learning experience on the subject of Mobility as a Service (MaaS) (mean = 5.48, SD = 1.44). These results suggest broad acceptance of GenAI as a useful pedagogical aid.

Impact on Cognitive and Professional Outcomes

Beyond basic comprehension and text production, several items probed GenAI's effect on critical thinking and perceived job-market readiness. The item, "Did the tool help you improve your critical thinking and decision-making skills?" yielded a mean of 5.34 (SD = 1.45). The question, "How much do you think experiences like this prepare you for the future job market?" produced a mean of 5.64 (SD = 1.47). These results indicate that students generally perceive the use of GenAI in coursework as

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enhancing not only their academic skills but also their employability, an important consideration in a field characterized by digital innovation.

Ethical Concerns, Integrity, and Authenticity

Student perceptions regarding the risks and ethical challenges associated with GenAI use were more nuanced. The item, "How worried are you about the ethical implications of GenAI use in education?" yielded a mean of 4.46 (SD = 1.81, range 1–7), with responses distributed across the scale, indicating heterogeneity of opinion. The question, "Do you believe GenAI in education could compromise learning integrity?" had a mean of 4.61 (SD = 1.94), while "How much do you think GenAI can affect the authenticity of students' work?" received a mean of 5.13 (SD = 1.69).

The perception that AI could influence academic honesty was similarly mixed (mean = 4.37, SD = 1.87). These data reflect a significant level of concern, although the mean values for utility and engagement remain higher, suggesting that students are able to hold both positive and critical attitudes simultaneously.

Clarity and Quality of GenAI Output

Students were also asked to rate the clarity and overall quality of the information provided by GenAI tools. The item, "Were the AI-provided responses clear and easy to understand?" had a mean of 6.08 (SD = 1.10), indicating near-universal satisfaction with this aspect of AI performance. "How do you rate the overall quality of the work produced with GenAI support?" yielded a mean of 5.73 (SD = 1.21), again reflecting positive appraisal.

Post-Experience Ethical Awareness

The question, "Has this experience increased your understanding of the ethical challenges associated with GenAI in education?" received a mean of 5.60 (SD = 1.28), indicating that for a majority of students, direct exposure to GenAI in coursework prompted greater awareness of ethical issues.

Relationships and Correlational Structure

Pearson correlations between items were computed to assess the degree of association between perceived utility, engagement, ethical risk, and other dimensions. A high degree of internal consistency was observed among the items measuring utility and engagement. For example, "To what extent did GenAI help you understand the text?" correlated strongly with "To what extent did GenAI

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help you produce the text?" ($r = 0.57$, $p < .001$) and with "Did GenAI help you write in a technically correct and context-appropriate way?" ($r = 0.53$, $p < .001$). All of these items formed a coherent cluster (Cronbach's alpha = 0.84). There was a moderate correlation between "Did the tool help you improve your critical thinking and decision-making skills?" and "How much do you think experiences like this prepare you for the future job market?" ($r = 0.41$, $p < .001$). These findings suggest that perceptions of GenAI's value for employability are closely linked to its perceived support for higher-order cognitive skills.

Regarding ethical concerns, "How worried are you about the ethical implications of GenAI use in education?" correlated strongly with "Do you believe GenAI in education could compromise learning integrity?" ($r = 0.63$, $p < .001$) and with "How much do you think GenAI can affect the authenticity of students' work?" ($r = 0.59$, $p < .001$). The correlation with "Do you believe AI tools such as LLMs could influence academic honesty?" was also high ($r = 0.59$, $p < .001$). These data indicate that ethical concern is not a diffuse sentiment but rather a coherent attitudinal dimension.

It is noteworthy, however, that the correlation between overall perceived utility ("To what extent did GenAI help you understand/produce the text?") and ethical concern ("How worried are you about the ethical implications?") was low and not statistically significant ($r \approx 0.07$, $p > .1$), indicating that students can appreciate the utility of GenAI while maintaining vigilance regarding its potential risks.

Cluster Analysis: Latent Profiles Among Students

To better understand the diversity of perspectives in the sample, k-means cluster analysis was performed, focusing on key variables: perceived utility (average of comprehension and production items), ethical concern (average of items on ethical worry, integrity, authenticity), and engagement/personalization (average of engagement and personalization items).
The optimal number of clusters was determined to be three ($k = 3$) by the elbow method and validated by silhouette scores (average silhouette = 0.41). The clusters can be characterized as follows:
· Cluster 1: Enthusiasts (n = 27; 33.3%). This group reported the highest scores on all measures of utility (mean = 6.41), engagement (mean = 6.33), and job-market preparation (mean = 6.22), while registering the lowest scores on ethical concern (mean = 2.69). Members of this cluster were most likely to use GenAI for a wide range of tasks and expressed strong satisfaction with its impact on their learning.

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· Cluster 2: Cautiously Positive (n = 38; 46.9%). This, the largest group, exhibited moderately high utility and engagement scores (mean = 5.56 and 5.42, respectively), but their ethical concern scores were also moderate to high (mean = 5.14). These students recognized both the pedagogical value and the risks of GenAI, often advocating for explicit rules and tutorials to mitigate misuse.

· Cluster 3: Critical/Skeptical (n = 16; 19.8%). This group reported below-average utility (mean = 3.72), low engagement (mean = 3.63), and the highest ethical concern (mean = 6.07). Members tended to use GenAI infrequently or for limited purposes and were more likely to doubt its relevance for both academic and professional outcomes. Analysis of variance confirmed that the clusters differed significantly on all primary dimensions ($F(2, 78) > 23.1$, $p < .001$ for utility; $F(2, 78) > 21.4$, $p < .001$ for ethical concern).

Subgroup Analyses: Tool Use and Language Background

Among the 81 respondents, the overwhelming majority used ChatGPT (n = 74; 91.4%), with a smaller subset also experimenting with Google Gemini (n = 21; 25.9%). Students who reported using both tools scored slightly but significantly higher on personalization (mean difference = 0.46, $t(79) = 2.05$, $p = .043$) and comprehension (mean difference = 0.41, $t(79) = 1.93$, $p = .057$), though the latter difference did not reach conventional significance.

Regarding language background, 7 respondents (8.6%) were non-native Italian speakers. These students reported higher mean scores on both the "comprehension" (mean = 6.13 vs. 5.48, $t(79) = 1.95$, $p = .055$) and "production" items (mean = 6.24 vs. 5.65, $t(79) = 2.09$, $p = .039$). Although these subgroup sizes are small, the trend supports the hypothesis that GenAI may act as a compensatory tool for linguistic minorities.

No significant differences in utility, engagement, or ethical concern were observed by prior degree or gender.

The Role of Tutorials and Explicit Guidance

The item, "Do you think the presence of a brief tutorial or clear rules from the teacher improved your GenAI-supported learning experience?" was rated highly by most students (mean = 5.91, SD = 1.22). Notably, regression analysis (linear OLS) revealed that higher scores on this item predicted lower concern about academic honesty ($\beta = –0.28$, $p = .008$) and higher satisfaction with overall work quality ($\beta = 0.24$, $p = .017$), controlling for cluster membership. This finding suggests that students perceive explicit scaffolding and guidelines as effective means of maximizing benefits while minimizing risks.

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Additional Findings: Self-Evaluations and Motivation

Several items explored students' self-evaluated expertise in GenAI (mean = 4.32, SD = 1.56), perceived accuracy of GenAI responses (mean = 5.38, SD = 1.29), and the degree to which the experience increased their motivation to learn more about GenAI tools (mean = 5.44, SD = 1.39). These items were positively correlated with overall utility and engagement (r range: 0.31–0.44, all $p < .01$).

DISCUSSION

The results of this quantitative analysis, derived from a near-complete cohort (N = 81) of final-year undergraduates in a logistics and maritime economics program, provide a detailed empirical map of student attitudes, usage patterns, and concerns regarding GenAI integration in business-oriented higher education.

The central finding is the high perceived utility and engagement associated with GenAI tools, especially for comprehension, text production, and technical accuracy. The strong internal consistency among utility-related items and their uniformly high means (all above 5.5) indicate that students regard GenAI as a practical and effective aid in the academic context of "Strategic Business of Forwarding Companies." This finding is notable given the field's emphasis on technical language, strategic reasoning, and operational detail.

Moreover, the impact of GenAI extends beyond cognitive and technical support to affect motivational and affective dimensions of learning. High scores on engagement and personalization (means ≈ 5.5–5.8) indicate that students not only use these tools instrumentally but also perceive them as enhancing their agency, adaptability, and relevance for future employment. The significant correlation between engagement and job-market preparation ($r = 0.41$) underlines the tight connection between educational technology adoption and professional self-concept in this cohort.

At the same time, the study reveals significant, structured concern regarding the ethical risks posed by GenAI. The clustering of items on ethical worry, integrity, authenticity, and academic honesty (mean scores ≈ 4.5–5.1; inter-item correlations all $r > 0.5$) suggests that these are not isolated anxieties but a coherent dimension of student perception. Notably, the lack of strong negative correlation between utility and ethical concern indicates that students do not experience these as mutually exclusive; rather, many participants are both enthusiastic users and critical evaluators of AI's risks.

The presence of three clear clusters—enthusiasts, cautiously positive, and skeptics—underscores the heterogeneity of responses and highlights the need for differentiated pedagogical strategies.

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Approximately one third of students are unambiguously positive, leveraging GenAI across a range of functions and expressing minimal concern about negative consequences. Nearly half fall into a middle group, combining recognition of GenAI's value with significant, but not paralyzing, ethical worries. A smaller, but non-negligible, minority remain skeptical, using GenAI rarely and maintaining high levels of concern about authenticity and integrity. These clusters differ significantly on all major outcome variables, and their size distribution reflects similar findings in the emerging literature on digital technology adoption in higher education.

The positive effect of explicit tutorials and clear rules, as revealed in regression and group comparisons, is especially salient for practical curriculum design. Students who report having received explicit guidance are both more satisfied with their GenAI experiences and less concerned about academic dishonesty, suggesting that institutional scaffolding can successfully mitigate risks while preserving pedagogical innovation.

Finally, the data point to the potential of GenAI as a tool for inclusion. Non-native speakers, while a small fraction of the sample, consistently report higher utility scores for comprehension and production tasks, supporting the thesis that GenAI can help bridge linguistic gaps in internationalized academic environments.

This comprehensive statistical exploration thus highlights both the promise and complexity of GenAI integration in business education. It suggests that successful adoption will require attention not only to technology access and skill-building but also to ethical literacy, differentiated support, and ongoing dialogue between students and instructors regarding appropriate use and institutional values.

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MOBILITY AS A SERVICE IN NON-URBAN CONTEXTS: A SIMULATED CASE STUDY USING AGENT-BASED MODELING

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ABSTRACT

The integration of geographic information systems and agent-based modelling (ABM) offers the possibility of linking agents to "real world" places. These tools make it possible to evaluate different hypotheses and theories of urban change, thus leading to a greater understanding of how cities work. Cities are, in fact, complex systems with many dynamically changing parameters and large numbers of discrete actors.

The present research introduces an agent-based model and simulation (ABM) approach in the field of sustainable mobility, intending to discover the advantages and shortcomings of this methodology and encourage applications of agent-based models in this field. Part of the study involves an in-depth (both theoretical and practical) analysis of the integration of Geographic Information System (GIS) in ABM. The models built following this approach are not limited to the simulation of mechanical motion, but also introduce autonomous agent-level decision-making.

Transportation systems, which are complex, dynamic, stochastic, and heterogeneous, meet these characteristics and are, therefore, ideal for being modelled and analyzed using agent models. The application of this modeling approach, in this context, is carried forward using a case study and is accompanied by considerations of its applicability and potential contribution to models of transition to sustainable mobility.

Keywords: Sustainability, Mobility as a Service, Geographical Information Systems, Agent-based model, Urban transportation policy

1. INTRODUCTION

In recent decades, the mobility of people and goods has increased significantly globally. Cities, especially those where major commercial activities are concentrated, have seen enormous investment and economic growth activities, and there has been an increase in population flows and, consequently, in the means of transportation for moving people and goods. Sustainable mobility, particularly in urban areas, is becoming a national and global priority, and this issue has become paramount given the need to rapidly curb the environmental, social and economic impacts caused by the presence of

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transportation systems currently unable to guarantee the growing demand for mobility and, above all, compliance with those principles of environmental and social sustainability that have become a global goal (Gudmundsson and Höjer, 1996). The transportation sector (freight and people) is responsible for 25 percent of carbon dioxide emissions and 30-50 percent of other pollutants. To effectively meet the challenges of sustainable mobility, several strategies need to be directed, including facilitating individual travel, particularly by using electric vehicles, environmentally friendly vehicles, and transportation reservation organization systems (Keyvanfar et al., 2018). The growing need to integrate public and private mobility to optimize the use of public and, in general, low-impact transportation systems, to increase the sustainability of travel, especially in large metropolitan areas, has found the use of digital technologies to be the arguably indispensable reference tool. On the other hand, several factors have made and continue to make modal integration an indispensable element in the reconfiguration of modern mobility paradigms: on the one hand, those related to the complexity and breadth of services available, and on the other hand, those related to the need to manage congestion phenomena, without neglecting the need to have systems that are resilient and at the same time able to entice users to active forms of mobility.

When this integration and the corresponding shift from individually managed forms of mobility to a system of integrated services, made available through a sort of virtual "showcase," can develop at a "node" constituted by the digital channel that allows users to plan and book services for a fee in an integrated manner, it is possible to speak of MaaS (Mobility as a Service). The concept of "Mobility as a Service" (MaaS) aims to provide user-oriented mobility services. These are integrated services characterized by flexibility and efficiency. Private and non-integrated modes of transportation transition to the use of integrated multimodal mobility solutions consumed as services. Maas is based on the integration of multiple transport services, public and private, into a single digital mobility service. The service is offered by an integrated platform that transforms traditional transport into flexible and different transport services, through the use of a single digital channel that provides the best travel solution, in response to individual needs (Smith et al., 2018). The key concept of MaaS is to put users (whether passengers or freight) at the center of transportation services, empowering them with tailored mobility solutions (Sochor et al., 2018a) (Eckhardt et al., 2018) (Audouin and Finger, 2018)(Utriainen and Pöllänen, 2018). Among the main aspects of Maas it is possible to highlight the integration of multiple modes of transportation, different payment options, and the use of various technologies that allow for a single interface and platform, putting the user at the core of the service. (Jittrapirom et al., 2017a)(Liimatainen and Mladenović, 2018), (Hensher et al., 2020). Several studies have identified what are the distinguishing characteristics of Maas (Alyavina et al., 2022), (Cruz and Sarmento, 2020), (Sochor et al., 2018a): Integration of transportation modes, payment options, one

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platform, multiple actors, customization, personalization, use of technology, service packages. The main challenge includes environmental, social and economic aspects. Globally, transportation has significant effects on the social and environmental spheres, with direct consequences on the economic sphere (Lindkvist and Melander, 2022). The first research question of the present research, therefore, is:

i. How can mobility be improved in the case of businesses that, for organizational and structural reasons and space requirements, are located outside cities?

Other research questions of the present research, that could be answered, include the following:

ii. How to design seamless personalized services, including all modes?
iii. How to design a sufficient and efficient shared vehicle system?
iv. How to design an efficient infrastructure for electric vehicles?
v. How to create behavior change toward sustainable modes?
vi. What is the impact of future mobility on city design?

2. LITERATURE REVIEW

2.1 Mobility as a Service (MaaS)

Mobility as a Service (MaaS) is an integrated mobility concept that seeks to combine various modes of transportation—public transport, car-sharing, bike-sharing, ride-hailing, and other mobility solutions—into a single, digital platform that is accessible on demand (Jittrapirom et al., 2017b). The goal of MaaS is to offer a user-centric, seamless, and sustainable alternative to private car ownership, enabling multimodal trip planning, booking, and payment through a unified interface. Most of the academic and policy discussions around MaaS have focused on urban contexts, where high population density, diversified mobility supply, and digital infrastructure support the development and scaling of such integrated services (Sochor et al., 2018b). Key benefits identified in these contexts include reductions in car dependency, improved accessibility, and environmental sustainability (Smith and Hensher, 2020). However, the implementation and impact of MaaS in non-urban or rural contexts remain underexplored.

2.2 MaaS in Non-Urban Contexts

Non-urban areas, including rural, peripheral, or low-density regions, face unique mobility challenges, such as car dependency, lack of public transport alternatives, and limited digital infrastructure (Rongen et al., 2023). Despite the difficulties, the potential for MaaS to address these issues is increasingly being recognized. Tailored MaaS solutions could improve accessibility and social inclusion in sparsely populated areas, especially for people without access to private vehicles (Wong

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et al., 2020). However, barriers such as insufficient demand, lack of multimodal options, and economic feasibility limit MaaS development in these contexts (Militão et al., 2025).

2.3 Simulation Approaches for MaaS Evaluation

Given the nascent stage of MaaS implementation in many regions, simulation has emerged as a key tool for exploring potential impacts, design trade-offs, and user adoption scenarios. Simulations can test MaaS system performance under various policy and behavioral assumptions, offering decision-makers evidence to support planning and design processes. Approaches vary widely, including system dynamics, discrete-event simulations, and more recently, agent-based modeling (ABM) (Ali Nayeem et al., 2024). Each method provides different strengths: while system dynamics can model aggregate trends, agent-based models are particularly suited to capturing the heterogeneity of individual behaviors and interactions in complex transportation systems.

2.4 Agent-Based Modeling (ABM) and Mobility

Agent-based modeling has gained traction in transportation research as a way to simulate and understand emergent mobility patterns resulting from the interactions of autonomous agents—individual travelers—with each other and with transportation systems (Macal and North, 2010). In the context of MaaS, ABM enables the modeling of user choices, preferences, learning processes, and adaptation to service configurations, pricing schemes, and incentive strategies (Mehdizadeh et al., 2022). Several studies have used ABM to evaluate MaaS in urban environments, but relatively few have applied these techniques to non-urban contexts. The flexibility of ABM is particularly advantageous in rural settings, where standard mobility patterns may not apply, and localized factors such as demographics, road infrastructure, and service availability strongly influence outcomes.

2.5 Research Gap and Contribution

While MaaS continues to evolve as a promising mobility solution, there is a clear gap in the literature concerning its applicability and potential in non-urban areas. Moreover, few studies employ agent-based models to simulate MaaS deployment in such contexts, where traditional modeling assumptions may not hold. This study aims to contribute to this emerging field by developing and applying an agent-based simulation to a non-urban case study. It assesses the impacts of different MaaS configurations on user behavior and mobility outcomes, offering insights into the feasibility and effectiveness of MaaS beyond the urban core.

3. METHODS

The method used in the present study is based on the process behind sustainable mobility for business travel. The study includes an analysis of research literature, reports, and surveys to identify

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the key factors that determine the development and propensity to adopt sustainable and shared mobility options. The paper consists of a more properly theoretical part and one with a more empirical character. The theoretical part briefly introduces and discusses MaaS as a context and GIS and NetLogo as the tools later used in the empirical part, where an application to case studies of the Milan area is provided. This paper uses an instrumental case study method by which an attempt is made to corroborate the framework described in the theoretical part through the analysis of case studies. To date, given the impossibility of conducting real large-scale experiments on sustainable mobility in urban areas, a simulation-based methodology is suitable for evaluating and studying the potential impacts and developments of these systems.

3.1 Case studies

A case study refers to a company based in Peschiera Borromeo, an Italian municipality in the Lombardy region, located on the outskirts of the metropolitan city of Milan and home to a complex of about 100,000 square meters, home to offices, laboratories, auditoriums, multinationals and minor activities, in a strategic position with respect to the main communication routes and public transport. An estimate is made to assess the level of pollution that may characterize the areas due to employee travel. Subsequently, through the NetLogo software (Gaudou et al., 2017) (Alkhatib et al., 2022), an agent model is implemented to reproduce a real phenomenon in a virtual environment. The objective is to simulate the movement of employees of a company in Peschiera Borromeo from Milan Central Station to the company's headquarters. The map imported into NetLogo is first reconstructed through the QGIS software (La Guardia et al., 2022) (Shafabakhsh et al., 2017), where it is possible to assign properties to links and nodes, which will then be recognized and used by NetLogo.

4. THE MODEL

Within the study area, which goes from the city of Milan to Agrate Brianza, up to Peschiera Borromeo, some study models are applied in order to determine routes, deposits, warehouses and charging stations for the promotion of a more sustainable mode of transport. The three cities, which represent the three points around which the whole study is based, are chosen mainly for five reasons: their central location, their importance as the headquarters of major companies, points of large influx of employees, the expected added value for poorly accessible areas and for the possibility for users to reach these points by various means of transport, public or private. Through the application of the *Shortest Path Problem* it is possible to determine the shortest path from one point to another within a graph consisting of nodes and arcs. In particular, this study will determine the shortest route that connects the city of Milan to Agrate Brianza, as an application to determine the route that employees must travel to go to the company, following the shortest route. By applying the *PMedian Problem*

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within the city center of Milan, it can be described how to establish points as potential bikesharing stations and then identify an optimal point that minimizes the logistical costs for refueling bike depots. Through the *Fixed Charge Problem* it is then possible to place supply centers for the distribution of goods to demand centers so that this is satisfied; Therefore, it will be a matter of placing a bicycle warehouse to transport these from here to the other depots. Subsequently, through the application of GIS to an agent-based model, it will be illustrated how to simulate the movement of the employees of the company based in Peschiera Borromeo from Milan central station and Milan Linate airport to the company's headquarters through the use of public or private transport. The analysis will also provide a picture of how the use of sustainable means can contribute to the reduction of CO2 production, caused by the use of private vehicles for employee travel. Ultimately, the placement of charging stations for electric vehicles at crucial points between the two cities, will allow the movement of employees through the rental of electric vehicles, allowing the recharging of vehicles if parking is available in the stations.

4.1 Simulation model

The purpose of a simulation is to set a model of any kind in motion in a virtual environment, saving the costly operations required to do so in vitro or otherwise in a real, physical environment (Fagnant and Kockelman, 2014) (Scheltes and de Almeida Correia, 2017) (Shen et al., 2018). Netlogo was developed at the Center for Connected Learning and Computer-Based Modeling at Northwestern University and uses the Logo language to create agent-based models.

The purpose is to simulate the movement of company employees from Milan Central Station or Linate Airport to the company's headquarters. One can also introduce, via sliders, the possibility of another route supported by shuttles connecting Milano Centrale station to Linate airport. Employees can use public transportation, which runs along defined routes, or private vehicles. Both actual travel time and satisfaction on arrival are stored and have an impact on employees considering whether or not to change their mode of transportation. Using the GIS extension, this model imports a simplified road network with roads that are links and nodes that are spokes located at the intersections of the links. Through QGIS v.3.26.0 software, it is possible to assign properties to links and nodes, which will then be recognized in NetLogo. For example, it is possible to assign each node the property of being a bus stop point or of belonging or not belonging to a route of travel. Similarly, properties regarding length, travel speed, travel time, belonging to a city line, starting node, and ending node can be assigned to links. Employees have the choice of reaching their destination by their own vehicle or by public transport. Private vehicles are randomly deployed in various ways, while public transport users are positioned only in bus or shuttle hubs. The shuttles and buses always travel the same route, back and forth, the buses from the Innovation Campus headquarters to Milan central station and to Linate

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airport and vice versa while the shuttles from Milan central station to Linate airport and vice versa. Other vehicles are randomly placed in various ways for the purpose of creating and simulating traffic. The buses and shuttles follow the shortest routes that connect the three points examined (Milan station, Linate airport and Innovation Campus), determined by QGIS. Through Netlogo it is possible to import some useful extensions for some properties; in particular, in this model, gis, nw and csv extensions are imported. Using the nw extension, a Djikstra algorithm is executed to determine the shortest route of the employees' departure point and the shuttle/bus to their destinations. Once the simulation starts, both private and public transport users will move to their destinations along the links defined in QGIS. Once an agent has reached his destination, he will stop and have time to search for parking and will remain in that position to carry out his activity. People using public transport are generated along bus and shuttle routes, and their destinations will be one of the three public transport generation points. Both shuttles and buses have their own route and have their own list of nodes that they must cross to reach their final location. In this simplified model, destinations are located in Milan Centrale, Linate Airport and the company headquarters. Private vehicles that move randomly to simulate traffic, are concentrated in two sections of road that are particularly busy because they connect the various parts of the Milan suburbs. These vehicles reach their destination and then return back to their initial location in order to create traffic. The simulation has a duration of 14000 ticks, which corresponds to almost 4 hours. Carbon dioxide was chosen as the reference gas to measure how much each action is responsible for global warming. For example, to produce 1 kg of plastic, the amount of CO2 equivalent emitted is about 6 kg. This means that to produce 1 kg of plastic, as much as 6 kg of CO2 is released into the atmosphere. The CO2 savings can be translated into planting new trees, while the increase in emissions is equivalent to cutting them down. In this study, the analysis will focus on CO2 because forests, through their growth, can store carbon in their tissues, as well as use it for photosynthesis processes. The carbon footprint calculation is not an end in itself but is done to know the value of the equivalent CO2 to be offset. Flora naturally removes CO2 from the atmosphere through the process of photosynthesis and fixes carbon within its fibres. It is not easy to determine how much CO2 is absorbed by a plant, as many factors affect a tree's growth kinetics and consequently its level of CO2 uptake. Referring to a National Research Council study conducted at the Institute of Biometeorology in Bologna on the CO2 uptake values of various plant species, the curly maple can be defined as the plant with the highest CO2 uptake value.

Norway maple = 190 kg/anno CO2 absorption

In the model, through the use of the chooser, it is also possible to set up a different scenario involving the simulation of a group of shared electric vehicles. Six charging stations were installed at locations considered to be equidistant from each other, along the shortest route for the connection between

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Milano Centrale station, Linate airport and the company's headquarters. At the beginning of the simulation, the number of electric vehicles and the number of parking spaces for each station can be set via a slider. A customer requesting the use of an electric vehicle is randomly generated, and electric car routes are defined, connecting one station to another. At the end of each established route, the electric car is parked at the arrival station if parking spaces are available there, otherwise it goes to the nearest station that has at least one available parking space. When a vehicle is parked, its electric charge status is checked, whether greater or less than a critical threshold, set by the slider (Chen et al., 2016). In case of insufficient charge, the electric vehicle remains in the station to recharge until a charging capacity equal to a value set by the slider is reached. If at the time of the electric car trip request, no car is available at the station where the customer was generated, the customer is rejected, and this value is recorded in the monitor. The effectiveness of this electric vehicle rental system consists of the percentage of customers served out of the total number of customers who requested the rental. The electric vehicles will be colored green when the vehicle is available to provide service, white when the vehicle is searching for an available parking space, and red when the vehicle is under electric charge.

5. RESULTS, FUTURE DEVELOPMENTS AND CONCLUSIONS

5.1 Results from case studies

The simulation has a fixed duration (14000 ticks) that allows for some useful results to make some considerations. As seen above, through the chooser option, it is possible to implement the private and public vehicle part and the electric vehicle part separately. By going to assign a different type of fuel to the cars of the "resident-drivers" randomly, it is possible to get the number in the monitors of the cars present with the different types of fuel. In case information is possessed on the fuel type of the cars on the road or values that are close to the actual data, it might be useful to substitute them to get the real and not assumed situation. Based on car and fuel type data, useful results are obtained in terms of CO2, amount of plastic produced for the same amount of CO2 emissions, and number of trees to be planted to absorb the amount of CO2 produced by vehicles on the road. It is possible to assume that a car during a day consumes about 2 liters of fuel, and since 6 kg of CO2 is emitted to produce 1 kg of plastic, this comparison can be made. For an environmental assessment, in case the task was to see how many plants would have to be planted each year to absorb all the CO2 produced in an entire year by these vehicles whose daily CO2 emission calculated, it is possible to consider one tree, the Norway maple, which absorbs about 190 kg of CO2 per year. In this case, more than 1000 of these trees could absorb the amount of CO2 emitted by the vehicles in a year. As for employee cars, the pollution assessment has been set up and values can be obtained in terms of minimum, maximum and average

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value. By carrying out the simulation for the part of electric vehicles with a different number of electric vehicles and a different number of parking spaces located in each station, results can be obtained that allow to verify what can be the optimal number of vehicles available according to customer demand and the number of parking spaces available for each charging station. For different combinations of number of electric vehicles and number of parking spaces, five simulations were carried out and the average of some values was obtained which are shown in the following table:

Table 2 - El-vehicles results.

Number of refused customers	Number of times electric vehicles charge is < 0	Number of request for recharge electric vehicles	Total number of journey	Number of Service-journey with customers	Emissions [g CO2/km]
96,8	60	20,4	60	54	59248
81	60	58	60	54	63756
136,8	36	24,4	36	30	33764
140	30	26,2	30	24	27416

It can therefore be observed, from the results obtained, how the number of rejected customers is higher when the number of parking spaces available for charging is not sufficient, the number of times electric vehicles are discharged is greater when there are not enough parking spaces available for charging. The greater the number of trips made, both with and without a customer, the greater the number of electric vehicles available. As for total emissions, how much CO2 can electric cars really save compared to cars that use other types of fuel? (Jochem et al., 2015) To make this comparison, all available elements such as the amount of CO2 emitted when producing electricity or burning fuel, as well as the carbon impact of extracting resources for batteries or building a power plant are taken into account (the amount of CO2 emitted by an electric vehicle is about 92 g / km). The origin of the electricity used to recharge the electric-vehicles has an important impact on the total emissions. Countries with large amounts of renewable energy (wind, solar, and hydro) have a low-carbon electricity mix, while countries with high amounts of coal have a high-carbon electricity mix.

5.2 Discussion and future directions

By using an agent-based model for a study based on sustainable mobility, different objectives can be achieved, and different research questions answered. Human sociology, behavioral changes, environmental, infrastructural, and energy aspects have their consequences in terms of mobility, and different parameters can be analyzed to derive important data for improved sustainability in various aspects (Wang et al., 2019). The results show that a small number of employees choose to switch from their vehicles to public transportation, and average satisfaction remains quite high. A future development of this model could relate to public transportation, including the maximum capacity of each, so as to create an important element that could be instrumental in making the decision to change the vehicle that each employee is using. This same aspect could relate to the insertion in the study of a

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choice command to be able to select the day of the week, so as to create even more of an approach to reality, really setting the times of greatest traffic on the roads during the hours of entering and leaving work. This fact would make it possible to set up additional public services during the hours of highest demand. Another aspect that could be implemented concerns the placement of intermediate stops made by the public service for company employees. These stops should be placed in areas with greater vehicular flow, thus in more populated areas and thus of greater accessibility from other neighboring areas, but they should also be placed in areas where there is the possibility for employees to leave their means of transportation (car, bike, scooter...) without parking problems. As for public vehicles shuttling between the station and the airport, they should have a frequency dictated by the requests of the employees themselves, linking to this also a mobility statistic of public citizens who could use the shuttle service once they land at the airport or station, to travel to their destination. For the number of electric vehicles, the location of charging stations, and the number of parking spaces, the same argument still applies, i.e., conducting an analysis of employees' willingness to use this service to travel to work instead of using public transportation, perhaps by sharing the rental of an electric car with other employees. This assessment could be done only after a data analysis that could follow an evaluation of questionnaires or interviews done with employees. Future efforts should focus on overcoming the current limitations of ABM, allowing flexibility and more information about the real-world variables that determine the nature of changes in mobility behavior. These limitations are overcome through programming models, which allow decisions to be made during simulation, which could make the models even more malleable to reality. Trying to give an answer to the research questions listed above, the observations in this regard are reported below:

ii. When focusing on the entire journey, you look at the entire journey and how to connect all the modes in a seamless passenger journey. It may seem complicated to connect all modes. Offering all modes should offer personalized services to the passenger where he/she has the possibility to choose the preferred mode. Mobility does not have to be seen as a means but as an end in itself where one should look at the goal of mobility. In order to search for interactive multi-decision models to direct users towards choices, more variables are always included. These variables concern not only personal preferences but also previous decisions, previous experiences on various possible alternatives, all variables that can influence people's preference. Mobility-as-a-service must become the best proposition for both public and private users, helping them to meet their mobility needs and remedy the disadvantageous parts of individual travel.

iii. One way to control and manage the problem of the capacity of the mobility system is shared vehicles. To this end, it is necessary to design a suitable infrastructure to have the right capacity in the most suitable place. The integration between shared mobility services is possible thanks to

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the availability of new digital technologies and the multiplication of combinations available by those who, to move, intend to access a mobility service instead of using their own means of transport. Integration between mobility services can take place:

a. along the route, i.e. between the origin and final destination of a journey (intermodality);
b. over time, or in the succession of movements that cyclically repeat themselves in a day, a week, etc. (multimodality). Shared mobility vehicles must also comply with better emission standards than the average of vehicles in circulation and the fact that they are used for a specific journey (urban, short distance, long distances..) means that shared vehicles must provide services at the lowest possible cost.

iv. The mobility system also concerns the electrification of vehicles. This does not only concern the vehicles themselves but above all the infrastructure that concerns them, the use of the battery for power and how to manage the transition of hybrid vehicles during the transition from diesel to electric. Infrastructure should also be designed with a view to other alternative fuels, such as hydrogen, which are being explored as possible alternatives to the fuels currently in use. The fleets of shared mobility services are on average more efficient than those of the average circulating fleet. Shared vehicles not only have better emission standards, because they are on average more modern, but also because they are often small, lighter, with less installed power and often equipped with electric power. The use of electric cars is rather easy in this type of mobility scheme, since the release takes place in predefined stations that can be equipped with charging systems (where urban conditions allow it). However, the adoption of electric cars is limited by two factors. The first is the higher purchase cost (or rental) which to date is not compensated by the lower operating cost given the current average distances that characterize this type of service. The second is the user's distrust of autonomy, given the use even on medium and sometimes long distances. Both barriers are destined to be overcome in the near future thanks to the gradual decrease in the costs of battery-powered cars and the progressive increase in the autonomy of this type of car. In addition to the charging infrastructure, it is necessary to verify the sizing of the fleet in light of the lower autonomy of this type of vehicle and a greater unavailability during the charging phase which is still longer than that required for vehicles powered by liquid fuels.

v. The offer of multi-modality to users should direct passenger behavior towards other modes or other travel times, focusing above all on sustainability and availability. Obviously the demand for a behavioral change raises the problem of how to request and obtain it. Talking about sustainability, are not only consider zero-emission systems and energy-neutral systems, but it is possible to talk about circularity, air quality, biodiversity and noise pollution. Mobility

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behaviours can be influenced through measures that can be implemented, such as integrated information strategies to draw users' attention to the negative impacts caused by individual motorised traffic and the positive effects of walking, cycling or public transport, including environmental and health impacts. Promotional campaigns concerning public transport, non-motorised means of transport and low-emission vehicles. The implementation of marketing and promotional activities related to mobility management can bring benefits to the community, individuals and companies.

vi. Mobility and its future can have important impacts on cities, on their design. The space reserved for autonomous vehicles and bicycles can significantly change the infrastructure dedicated to them. In the past, cars and their drivers played a central role in the design of cities, while nowadays the aim is to allocate more and more areas for pedestrians, cyclists and lanes dedicated to public transport and autonomous vehicles. The theme of the difficult public and active mobility in the suburbs of the vast urban and metropolitan areas in which a growing share of the population lives today recalls that of the offer of modal interchange nodes, an additional infrastructure to support active mobility. Although the nodes are essentially used for the exchange between vehicular modes (typically between private and public transport), they can also be used for that between micromobility means (especially bicycles) and private and public transport. Obviously on condition of being served by cycle paths, safe parking for bicycles and services suitable for charging electric vehicles.

This agent-based survey simulates the movement of travelers and their vehicles, private and shared, in the city of Milan and suburbs, while traveling to work. The model provides a basic framework for characterizing the environmental and travel implications of a fleet of vehicles, estimating how different contexts and different transfer strategies and different types of fuel affect transport times and environmental pollution. The results of the case studies indicate that a shared vehicle system could save the number of cars used to travel with owned vehicles but would involve waiting for public transport. The reduction in overall emissions will be further reduced both by the fact that shared means of transport will be newer and less polluting and by the use of electric vehicles. This last case, however, involves the problem of placing charging platforms located in the most suitable points. The problem of the growth of cities and the growing simultaneous demand for the capacity of transport systems and the sustainability of the latter is a widespread problem. It is not easy to determine the best strategy for the organisation of urban space in coordination with the sustainable management of mobility. Cities can be made more sustainable by integrating innovative types of transport; So, it is important that society takes on more responsibilities and challenges in order to organize and manage urban planning and mobility management. The balance to be found is that between transport systems,

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spatial planning, innovation, eco-sustainability and globalization. A more in-depth analysis of land use, linking it to transport planning, would make it possible to adapt the development of the city to the needs of the public transport road system, addressing it from a sustainable point of view.

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STRATEGIC DEMAND MANAGEMENT DRIVING EFFICIENCY AND GROWTH IN EMERGING MARKETS

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ABSTRACT

This paper examines the evolving importance of demand management in emerging markets, particularly in Europe and Latin America. Three decades ago, companies in these regions treated demand management as a basic estimate rather than a strategic process. As economies matured, an integrated approach became essential, influencing key performance metrics such as inventory levels, forecast accuracy, and customer service.

Strategic Demand Management (SDM) optimizes resource allocation, enhances operational efficiency, and promotes sustainable growth, especially in Europe's emerging markets (Shvidanenko et al., 2017). Countries in Central and Eastern Europe (e.g., Poland, Hungary, Romania) and Southeast Europe (e.g., Serbia, Bulgaria) face unique challenges due to rapid economic development, evolving consumer behaviors, and integration into the broader European economy.

The research highlights the transformative role of advanced analytics and technology in demand forecasting, aligning supply chain operations with actual demand patterns. It formulates hypotheses to examine the impact of modern demand management on operational efficiency and profitability.

Findings reveal a significant gap in effective demand management adoption in Latin America and other emerging markets, emphasizing the need for further research and implementation. Addressing these challenges can enhance efficiency and foster economic growth in developing regions.

Keywords: Strategic Demand Management, Emerging Markets, Advanced Analytics, Forecast Accuracy, Operational Efficiency

INTRODUCTION

In today's dynamic and ever-evolving global business environment, emerging markets have garnered increasing attention from companies seeking new sources of strategic growth and long-term competitiveness. These markets, characterized by their demographic advantage, dense population,

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and high growth potential, offer a unique combination of opportunities and challenges that demand a more nuanced and contextualized approach to business strategy—particularly in the area of Strategic Demand Management (SDM) (Deshmukh, 2013; Coleman, 2007).

Strategic Demand Management is a critical process that enables businesses and governments to optimize resource allocation, enhance operational efficiency, and stimulate sustainable growth, especially in the context of emerging economies (Shvidanenko et al., 2017). In regions such as Central and Eastern Europe (e.g., Poland, Hungary, Romania) and Southeast Europe (e.g., Serbia, Bulgaria), as well as in Latin America, companies are navigating rapid economic transformation, shifting consumer preferences, and increasingly complex supply chains. These environments call for demand management strategies that go beyond traditional forecasting tools and instead incorporate customer-centric, data-driven, and technology-enabled frameworks (Chakraborty & Jain, 2022).

Historically, however, demand management in emerging markets was undervalued or even absent from business planning. As recently as three decades ago, many companies in these regions treated demand forecasting as a peripheral task, based solely on simplistic models and without cross-functional collaboration or alignment with financial, production, or strategic plans (Safeer et al., 2022; Hilletofth et al., 2009). In most cases, the output of such forecasting models remained isolated from key stakeholders such as suppliers and customers. Only in developed economies has this perception gradually shifted, recognizing demand management as a critical input to competitive strategy (Goodwin et al., 2023).

This lag in implementation has created a research and practice gap that must be addressed. As Brenes et al. (2016) note, emerging markets are increasingly adopting more sophisticated strategic practices, and demand management must evolve accordingly. Still, limited empirical research exists on the real impact of SDM practices in these regions, particularly in Latin America. Moreover, models developed in industrialized countries often rely on assumptions deeply rooted in local consumer behavior, limiting their applicability in different cultural contexts (Du & Jiang, 2019).

In this context, this research seeks to explore and evaluate the critical role of Strategic Demand Management in improving the performance of manufacturing companies in emerging markets. Specifically, the study analyzes how demand management practices influence key operational and strategic indicators such as inventory levels, forecast accuracy, customer service, product portfolio management, innovation success, profit margins, and overall competitiveness (Rodríguez, 2021; Ramírez et al., 2022).

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To guide this inquiry, the following objectives are proposed:

To identify the current state of demand management practices in emerging markets, with a focus on Latin America and Europe's transitional economies.

To evaluate the relationship between strategic demand management and manufacturing performance, based on key performance indicators (KPIs) across supply chain operations.

To analyze the limitations and barriers that hinder the adoption of advanced SDM models in emerging economies, including cultural, behavioral, and technological factors.

To propose an integrated and adaptable model for demand management that aligns with the realities of emerging markets, incorporating modern analytics, customer-centric principles, and real-time decision-making tools.

To achieve these objectives, the paper also draws on best practices and tools from recent literature, including process mining and data-driven optimization techniques that aim to simplify demand visibility and enhance strategic agility (vom Brocke & Mendling, 2017). These tools support the development of frameworks that reduce organizational effort while maximizing impact and responsiveness to market needs.

Ultimately, this study contributes to both academic and managerial knowledge by emphasizing the need for context-specific strategies that bridge the gap between global best practices and local implementation realities. It calls for greater investment, research, and capacity-building in demand management as a lever for competitiveness, sustainability, and inclusive growth in emerging markets.

Importance of Strategic Demand Management in Emerging Markets

Strategic demand management plays a pivotal role in driving efficiency and growth in emerging markets. The rapidly changing nature of these markets, characterized by shifting consumer preferences, evolving regulatory environments, and dynamic economic conditions, necessitates a proactive and adaptive approach to managing demand (Rădulescu et al., 2015).

Effective strategic demand management enables companies to anticipate and respond to changes in consumer behavior, align production and distribution strategies with market demands, and optimize resource allocation to achieve maximum efficiency and profitability.

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By implementing strategic demand management practices, companies can enhance their competitiveness and resilience in emerging markets. These practices include:

• Continuous monitoring and analysis of market trends and consumer preferences

• Leveraging advanced analytics and data-driven insights to forecast demand accurately

• Aligning supply chain operations with demand patterns to minimize waste and optimize inventory levels (Deshmukh, 2013) (Rădulescu et al., 2015)

• Collaborating with suppliers and partners to enhance responsiveness and agility (Chase, 2012) (Melo & Alcântara, 2015) (Abbasimehr et al., 2020)

• Developing flexible and adaptable business models to capitalize on emerging opportunities (Melo & Alcântara, 2015) (Caniato et al., 2008)

Embedding strategic demand management into the core of their operations, companies can navigate the complexities of emerging markets and drive sustainable growth (Rădulescu et al., 2015).

Overcoming Challenges in Emerging Markets

The unique characteristics of emerging markets present a range of challenges that require a strategic approach to demand management. One of the key challenges is the unpredictability of consumer behavior, which can be influenced by factors such as cultural nuances, economic volatility, and rapid urbanization. (Panda, 2004)To address this, companies must invest in robust market research and data analytics capabilities to gain a deep understanding of evolving consumer preferences and patterns.(Vukasović, 2021)

Another challenge is the fragmented and often underdeveloped infrastructure in emerging markets, which can hinder efficient distribution and logistics. To overcome these challenges, companies must collaborate with local partners, leverage digital technologies, and develop innovative supply chain strategies that optimize resource utilization and minimize disruptions.

Furthermore, the regulatory environment in emerging markets can be complex and constantly evolving, requiring companies to stay agile and responsive to policy changes. Effective strategic demand management can help companies navigate these regulatory uncertainties by aligning their operations and strategies with the changing market conditions.(Upadhyay & Sharma, 2021)

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By addressing these challenges through strategic demand management, companies can drive efficiency, enhance customer satisfaction, and position themselves for long-term growth in emerging markets.

LITERATURE REVIEW

The literature review focuses on the theoretical and practical foundations of Demand Management (DM), covering key concepts, objectives, models, and its impact on business performance. It highlights the strategic importance of DM in emerging markets, emphasizing its role in improving operational efficiency and organizational growth (n.d.). A critical aspect of DM is the ability to anticipate and respond to shifting consumer preferences, especially given the dynamic and unpredictable nature of these markets (Omar & Williams, 2009).

Several studies emphasize the need for context-specific and adaptive approaches, as models developed in advanced economies may not always be directly applicable in emerging markets (Gupta, 2012; Sharma et al., 2018; Omar & Williams, 2009). To address these challenges, the literature suggests practices such as leveraging advanced analytics, aligning operations with demand, and developing flexible business models (McCann & McCarren, 2012; Omar & Williams, 2009). According to Jazairy et al. (2025), the adoption of artificial intelligence in S&OP reveals multiple operational tensions—such as balancing immediate decisions with long-term strategic initiatives and managing the trade-off between technological standardization and organizational flexibility.

The implementation of DM in emerging markets faces structural challenges such as fragmented infrastructure, regulatory volatility, and rapidly evolving consumer behavior. These issues often reduce DM to a basic forecasting exercise disconnected from strategic and collaborative decision-making. Nevertheless, other authors argue that DM is a fundamental process that supports short-, medium-, and long-term business vision (Kilger & Wagner, 2008; Stadtler et al., 2015).

The work of Hau and Chung-Yee (2007) stands out for comparing demand management processes in emerging versus developed markets. They note that Asia-Pacific and some Latin American countries often face production and capacity shortages, while the U.S. and Canada tend to have excess capacity. This contrast highlights the need for differentiated approaches. Additionally, Gil et al. (2020) define forecasting as a planning-based projection essential for manufacturing and trading operations. Tools like process mining have been proposed to bridge the gap between operational insight and strategic decision-making in IT demand management, particularly by enhancing visibility and alignment between business and technology processes (Novak et al., 2023)

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Forecast management involves analysis, planning, collaboration, and operational decision-making (Sharma et al., 2018; Roberts et al., 2015; Omar & Williams, 2009). However, factors such as globalization, trade agreements, innovation, e-commerce, and health crises have increasingly complicated the supply-demand relationship (Hau & Chung-Yee, 2007; Turban et al., 2018).

Recent literature also highlights the role of strategic demand planning and forecasting in improving supply chain performance within developing economies, while emphasizing the importance of supporting both local entrepreneurs and multinationals. It further underscores the potential of artificial intelligence and machine learning to enhance forecast accuracy, especially in uncertain and volatile market conditions common to emerging economies (Abbasimehr et al., 2020). See Table 1.

Aspect	Eastern and Southeastern Europe	Latin America
GDP Growth (%)	3.5 - 5.0 (average)	2.0 - 4.5 (average)
Population (millions)	Varies between 5 and 38 per country	From 3 to over 200 per country
Level of Industrialization	High in manufacturing and technology	Dependent on raw materials and manufacturing
Economic Integration	European Union, agreements with advanced economies	Regional agreements (Mercosur, Pacific Alliance)
Main Economic Sectors	Automotive, advanced manufacturing, technology	Agriculture, mining, manufacturing, services
Inflation Rate (%)	2.5 - 6.0	5.0 - 10.0
Infrastructure	Developed in transportation and energy	Deficient in transportation and logistics
Access to Technology and Digitalization	High internet penetration and AI adoption	Growing digital adoption, but uneven
Ease of Doing Business (Ranking)	40 - 70 (depending on country, WB 2023)	50 - 120 (depending on country, WB 2023)

Table 1. Comparison_of_Emerging_Markets (Europe and Latin America)

Source: The authors

Strategic demand management is crucial for companies operating in emerging markets, as it enables them to navigate the complexities and capitalize on the growth opportunities (Omar & Williams, 2009).

Demand forecasting is essential for effective supply chain management, inventory control, and customer satisfaction. By leveraging advanced analytics and data-driven insights, companies can improve the accuracy of their demand forecasts, enabling them to align supply chain operations with demand patterns. (Seyedan & Mafakheri, 2020)

Furthermore, strategic demand management involves aligning the company's overall strategy and decision-making processes with the evolving customer preferences and market dynamics in emerging markets. This includes developing flexible business models, optimizing pricing strategies, and collaborating with supply chain partners to enhance responsiveness and agility.(Levenson, 2014)

Companies that excel at strategic demand management in emerging markets are better positioned to drive efficiency, maximize growth, and maintain a competitive edge.

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The literature suggests that combining traditional forecasting techniques with artificial intelligence algorithms can generate more accurate demand forecasts, particularly in the context of fast-changing data and new product introductions, which are common in emerging markets. (Chase, 2012)

Objectives and importance of demand administration

Demand management is a strategic and operational function that aims to align the supply and demand of a company's products or services. The primary objectives of strategic demand management include:

Enhancing demand forecast accuracy: By leveraging advanced analytics and data-driven insights, companies can improve the accuracy of their demand forecasts, enabling them to align supply chain operations with demand patterns.

Optimizing inventory and production planning: Accurate demand forecasts allow companies to optimize inventory levels, production schedules, and procurement activities, leading to cost savings and improved customer service.

Improving customer satisfaction: By aligning supply with customer demand, companies can better meet customer needs and expectations, leading to increased customer loyalty and retention.

Driving efficiency and growth: Strategic demand management enables companies to navigate the complexities of emerging markets and capitalize on growth opportunities, ultimately driving efficiency and growth.

Coordinating supply chain activities: Strategic demand management involves aligning the company's overall strategy and decision-making processes with the evolving customer preferences and market dynamics in emerging markets.

In summary, strategic demand management is a critical capability for companies operating in emerging markets, as it enables them to improve demand forecast accuracy, optimize supply chain operations, and drive efficiency and growth.

By combining traditional forecasting techniques with advanced analytics and artificial intelligence, companies can generate more accurate demand forecasts and better align their supply chain activities with evolving customer preferences and market dynamics in emerging markets (Atwani et al., 2022)(Abbasimehr et al., 2020).

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Emerging markets and their relationship with demand management

Demand forecasting is a crucial aspect of supply chain management, particularly in the context of emerging markets. Many global and local companies complicate their permanence or entry into an emerging market by not adequately preparing the ground. A significant portion of multinational companies conduct most of their business and obtain the majority of their profits in developed countries, as emerging market (EM) businesses are smaller in absolute terms, perhaps because they do not understand them to a great extent (Pacek & Thorniley, 2008).

The emerging countries of Europe are typically classified based on their economic development, level of industrialization, and integration into global markets. According to organizations such as the International Monetary Fund (IMF), the World Bank, and consultancies like Morgan Stanley or FTSE Russell, the emerging markets in Europe 17 countries See Appendix 1.

These countries have growing economies but still encounter structural challenges such as developing infrastructure, economic reforms, and financial market volatility. See figure 2.

On the other hand in America, emerging countries are primarily found in Latin America and the Caribbean, with some exceptions in North America. The classification varies according to entities such as the International Monetary Fund (IMF), the World Bank, Morgan Stanley, and FTSE Russell. See appendix 2.

These emerging countries have growing industrial sectors, access to global markets, and attract foreign investment, but they also face challenges such as economic volatility, inequality, and dependence on commodity exports. See figure 3



Figure 2. Europe emerging countries



Figure 3. Latin America emerging countries

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According to the study conducted by Hofstede (1991), emerging countries exhibit a higher degree of uncertainty avoidance and greater power distance, while individualism and masculinity are characteristics that distinguish developed countries. These cultural and behavioral traits make it possible to evaluate the impact of demand management in production organizations based on the type of market—developed or emerging—according to market structure and behavior (Rodriguez-Marin, 2021).

Emerging markets are characterized by rapid economic growth, a large and growing middle class, expanding infrastructure, and increasing disposable income.

Additionally, the exponential growth rates, demographic changes, and rapid technological advancements observed in emerging markets require companies to adopt a more agile and tailored approach to demand management. Because emerging markets are characterized by high volatility, uncertainty, complexity, and ambiguity, traditional demand forecasting methods may prove insufficient. Incorporating advanced analytics and AI-powered forecasting techniques can help companies navigate the challenges of emerging markets and drive more accurate demand predictions (Abbasimehr et al., 2020).

FORMULATION OF HYPOTHESES

The hypotheses are as follows:

- **H1:** AD (demand analysis) is a management and administrative tool designed to improve the performance of a manufacturing company, particularly in emerging markets.

The second hypothesis is related to the identification of specific variables in the AD process that have the greatest impact on business performance, particularly in terms of operational efficiency (e.g., certain operational indicators), which, in the long term, improve the profitability of manufacturing companies.

- **H2:** Environmental analysis, the development of tailored models, and the use of best practices in AD are tools that positively influence operational indicators for achieving greater efficiency in a production corporation.

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Throughout the research, the aim is to determine the effect that the use of AD has on performance, based on a hypothetical-deductive approach under the characteristics of the methods, processes, and concepts of the field.

Method

The methodology employed in this study combines a qualitative and analytical approach, developed in three main stages: a literature review, a critical analysis of previous studies, and an investigation of representative cases. First, an exhaustive literature search was conducted in academic databases such as Scopus, Web of Science, and Google Scholar, using keywords related to the research topic. The selection of studies followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria, prioritizing articles published in the last five years in high-impact journals. Only studies relevant to the topic, peer-reviewed, and written in English or Spanish were considered, excluding duplicates, restricted-access articles, or those that did not directly address the object of study. The results of this review were organized into thematic categories to identify trends, gaps, and key contributions in the field.

Subsequently, a critical analysis of the selected studies was carried out, evaluating the methods, theoretical approaches, and main findings of each investigation, with an emphasis on their relevance and applicability to the present work. This analysis enabled the construction of a robust theoretical framework and identified areas of opportunity for future research.

To ensure a rigorous selection of relevant literature, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework was applied for the identification, selection, and evaluation of studies. Figure 1 presents the flow diagram of the process followed in this systematic review.

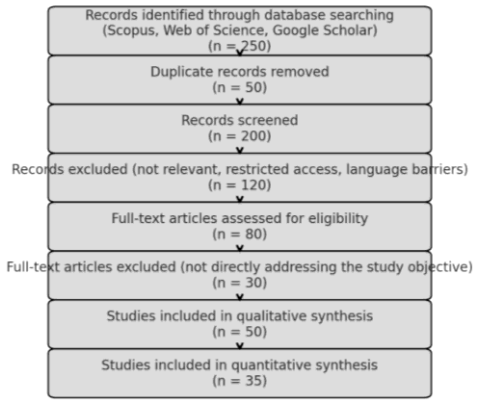


Figure 1. PRISMA Flow Diagram

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Source: The authors

In today's dynamic and interconnected global economy, emerging markets play a pivotal role in driving economic growth and industrial expansion. These markets, characterized by rapid economic transformation, evolving consumer behavior, and regulatory shifts, present unique challenges and opportunities for businesses seeking to optimize their operations. Among the key factors influencing business performance in these regions, Strategic Demand Management (SDM) has emerged as a critical driver of efficiency, profitability, and resilience.

Historically, demand management in emerging economies, particularly in Eastern and Southeastern Europe and Latin America, has been perceived as a reactive process rather than a strategic function. Three decades ago, companies in these regions relied on simplistic forecasting models, often disconnected from broader financial planning, production strategies, and supply chain operations. However, as these economies matured and integrated into global markets, the need for a more structured and technology-driven approach to demand management has become increasingly evident.

Eastern and Southeastern European markets, benefiting from their proximity to highly industrialized economies and integration with the European Union, have made significant progress in adopting advanced analytics, AI-driven forecasting, and structured Sales and Operations Planning (S&OP) processes. In contrast, Latin America, despite showing improvements in digitalization and demand planning practices, continues to face challenges such as longer lead times, higher stockout rates, and fragmented supply chain collaboration. These disparities underscore the need for tailored demand management strategies that address the structural and economic specificities of each region.

Table 2 presents a comparative analysis of key demand management KPIs between emerging markets in Eastern and Southeastern Europe and Latin America, highlighting structural differences in forecasting accuracy, inventory management, and service levels.

KPI	Eastern and Southeastern Europe	Latin America
Forecast Accuracy (%)	75 - 85	60 - 75
Fill Rate (%)	90 - 96	80 - 92
Inventory Turnover (times per year)	5-8	3-6
Lead Time (days)	7-15	10-30
Stockout Rate (%)	3-7	5-12
Customer Service Level (%)	85 - 95	75 - 90
Use of Advanced Analytics in Demand Planning	High (Widespread use of ERP & AI tools)	Moderate (ERP tools but limited AI adoption)
Collaboration in Demand Planning (Suppliers & Customers)	Moderate to High (Formal S&OP Processes)	Low to Moderate (Limited S&OP adoption)
Adoption of AI & Machine Learning in Forecasting	Growing adoption, mostly in large enterprises	Limited adoption, mainly in multinational firms

Table 2. Comparisonof Strategic Demand_Management

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Source: the authors

In the case study stage, real-world cases were identified and analyzed to illustrate the practical application of the research topic. The selection of cases was based on their relevance, availability of information, and representativeness in the global or regional context. Data collection included public reports, structured interviews with key stakeholders, where possible, and official documents. Each case was analyzed using a comparative approach to identify patterns, best practices, and lessons learned.

The findings from these three stages were synthesized and triangulated to ensure a coherent and well-supported interpretation. This approach integrated theoretical and practical perspectives, enabling the generation of conclusions that are relevant both academically and professionally.

RESULTS AND DISCUSSION

The research confirms that strategic demand management is essential for manufacturing success in emerging markets. The study refutes the initial hypotheses by revealing limitations in current demand management practices.

The first hypothesis, which proposes that demand analysis (AD) improves manufacturing performance, is challenged by the historical lack of integration of demand management in emerging market companies. This disconnection often leads to suboptimal results, indicating that AD alone, without a comprehensive strategy across business functions, is insufficient.

The second hypothesis, suggesting that environmental analysis and tailored models positively influence operational indicators, is also contested. Many firms in emerging markets continue using simplistic forecasting models that fail to address the complexities of their local environments. This reliance leads to ambiguous outcomes and limits potential gains in operational efficiency.

Cultural and behavioral differences further reduce the applicability of models developed in industrialized nations. Consumer behavior and cultural dynamics vary significantly, weakening the effectiveness of imported best practices and limiting their impact on operational indicators.

Although some companies have begun implementing demand management, many still regard it as secondary. This mindset hinders investments in essential tools and processes, ultimately contradicting the idea that AD and tailored models consistently enhance performance.

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The literature (Panigrahi et al., 2018; Melo & Alcântara, 2015; Dametew et al., 2020; Khan et al., 2020) underscores demand management as a driver of supply chain efficiency and growth, especially in emerging markets. It outperforms distribution management alone in its impact on performance (Rexhausen et al., 2012). Practices such as demand segmentation, adherence to structured processes, and the use of advanced analytics are particularly influential (Melo & Alcântara, 2015).

A critical analysis of prior studies indicates that demand management effectiveness depends on organizational maturity. A proposed four-stage maturity model includes information sharing, joint planning, performance metrics, and technological adoption.

In Latin America and other emerging regions, demand management has historically been undervalued. As these economies evolved, companies began recognizing its influence on forecast accuracy, inventory levels, and service quality. However, outdated models, lack of cross-functional integration, and limited adaptation to local dynamics persist.

Advanced analytics and technology are essential for improving forecasts and aligning operations with real demand. Yet, insufficient prioritization and investment remain widespread barriers.

The study concludes that an integrated and context-specific approach to demand management is vital for improving competitiveness, operational efficiency, and long-term growth in emerging markets. Further research and implementation are necessary to close existing gaps.

CONCLUSIONS

Strategic Demand Management (SDM) is a key driver of operational efficiency and growth in emerging markets. This study reveals both progress and persistent challenges in its implementation. Historically, SDM in these regions was limited to basic forecasting with minimal integration into financial planning or supply chain coordination. As markets matured, the strategic importance of SDM became more evident, influencing key performance indicators such as inventory levels, forecast accuracy, and customer service.

However, in regions like Latin America, outdated models still prevail, lacking alignment with local market complexities. This gap limits operational efficiency and reduces competitiveness. To address this, firms must transition from traditional forecasting to a holistic approach that connects demand planning with supply chain and financial strategies.

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Advanced analytics and artificial intelligence (AI) play a transformative role in improving forecast accuracy. Companies that adopt these tools can better manage market fluctuations, optimize inventory, and align production with actual demand. Yet, limited investment in digital technologies and insufficient professional training remain key barriers to adoption in emerging markets.

Cultural and structural differences also hinder the direct application of models developed in advanced economies. Variations in consumer behavior, regulatory environments, and economic volatility mean that standardized approaches may not yield consistent results. Therefore, companies must design demand management strategies tailored to local conditions and constraints. This study advocates for an integrated SDM framework that fosters collaboration across business units, aligns supply chain operations with demand, and incorporates digital solutions.

Finally, further research is needed to understand external influences like economic instability and to assess how AI and machine learning can refine forecasting methods. Strengthening workforce capabilities will also be critical for building robust SDM practices (Goodwin et al., 2023; Rodríguez, 2021; Ramírez et al., 2022; Abbasimehr et al., 2020; Shvidanenko et al., 2017).

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APPENDIX 1

Emerging markets in Europe

1. Central and Eastern Europe (CEE)

- Poland
- Hungary
- Czech Republic *(although in some indices it is considered a developed market)*
- Slovakia
- Romania
- Bulgaria

2. Southeastern Europe (SEE)

- Croatia
- Serbia
- Slovenia *(in some indices it is considered developed)*
- Bosnia and Herzegovina
- North Macedonia
- Montenegro
- Albania

3. Eastern Europe and the Caucasus

- Ukraine *(before the war, considered an emerging market; now facing severe economic challenges)*
- Georgia
- Moldova

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4. Turkey *(Special case)*

- Turkey is considered an emerging market in both Europe and Asia due to its strategic geographical position and rapidly growing economy, although it faces economic volatility.

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APPENDIX 2

Emerging markets in Latin América

1. Latin America and the Caribbean (LatAm)

These countries have developing economies with sustained growth but still face structural challenges:

- Brazil
- Mexico
- Argentina
- Chile
- Colombia
- Peru
- Ecuador
- Uruguay
- Panama
- Dominican Republic

2. North America (Special Cases)

- Mexico (Part of North America but also a key emerging market).

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CONSUMER INVOLVEMENT IN NEW PRODUCT DEVELOPMENT

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ABSTRACT

The current ever-changing business context forces a rapid evolution of organisations, leading to the emergence of the open innovation paradigm, emphasising consumer involvement in developing new products. Consumer participation in innovation projects enhances performance, efficiency, and effectiveness. However, it is essential to identify the NPD stages where consumer involvement most significantly impacts performance.

In this context, two structured quantitative questionnaires were developed and adapted from previous studies. The first was applied to companies that develop their activity in Portugal, obtaining 64 responses, of which 34 corresponded to organisations that already use co-creation. The second was aimed at Portuguese consumers, with 126 responses, of which 52 belonged to consumers who had already been involved with companies in creating products.

Subsequently, the suggested hypotheses were tested using multiple statistical techniques, such as Structural Equation Modelling. The results show consumer involvement in new product development positively influences the innovation project's performance and effectiveness.

Finally, this study contributes to the existing literature on consumer involvement in developing new products and to the management of Portuguese companies to understand the importance of adopting this new paradigm, given its benefits.

Keywords: Consumer Involvement; New Product Development; Co-creation; Innovation Project Performance; Financial Performance; Effectiveness of NPD

1. INTRODUCTION

New product development (NPD) processes constitute a strategic avenue through which firms can gain a competitive advantage by transforming novel ideas into commercially viable products. These processes typically unfold across three sequential phases: idea generation, product design and development, and product launch and commercialisation (W. Chang & Taylor, 2015; Herstatt *et al.*, 2006; Rautela *et al.*, 2020).

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Innovation has become imperative for organisational survival and growth in a rapidly evolving and increasingly competitive business environment. The open innovation paradigm has progressively supplanted the traditional model of innovation, centred exclusively on internal resources. This approach emphasises the integration of external stakeholders—particularly consumers—throughout the various stages of the NPD process, thereby facilitating knowledge exchange and enhancing innovation potential (Chesbrough, 2003; Loureiro, Romero and Bilro, 2020; Rautela, Sharma and Virani, 2020).

Consumer involvement in NPD can take several forms. Customers may serve as sources of information (CIS), co-developers (CIC), or independent innovators (CIN). The current study focuses on the co-developer role (CIC), wherein consumers actively collaborate with firms' innovation teams (Nambisan, 2002; Cui and Wu, 2017; Rautela, Sharma and Virani, 2020; Chen, Arnold and Tsai, 2021).

Although the literature increasingly acknowledges consumers as co-creators of value (Xie, Wang and Zhang, 2023; Yoon *et al.*, 2023), enhancing customer perceptions and online review behaviour (Khashan et al., 2024), empirical evidence regarding the impact of their involvement on NPD outcomes remains inconclusive (Anning-Dorson *et al.*, 2018).

This research seeks to address this gap by exploring the effects of consumer co-creation on NPD performance within Portuguese firms. The first objective is to assess how organisational orientation towards the consumer influences adopting co-creation practices (RQ1). The second objective involves identifying appropriate metrics to evaluate NPD performance, thereby addressing current ambiguities in the literature (RQ2 and RQ3). The third objective aims to determine which stages of the NPD process benefit most from consumer input to enhance innovation effectiveness and organisational growth (RQ4 and RQ5). Finally, this study also seeks to compare the perspectives of firms and consumers by conducting two parallel studies using independent questionnaires.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Model 1: Companies

Organisational orientation is frequently conceptualised as a balance between competitor and customer orientation. Excessive focus on competitors may lead firms to neglect customer needs, resulting in a reactive rather than proactive strategic posture (Y. C. Chang *et al.*, 2021). Given that customers ultimately define markets, it is from their preferences and behaviours that firms should derive their strategic direction (Lin and Germain, 2004; Svendsen *et al.*, 2011). Customer-centric firms aim to

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identify, understand, and respond to consumer needs, translating this knowledge into products that align with customer expectations and preferences (Fuchs & Schreier, 2011; X. Lin & Germain, 2004; Yang & Zhang, 2018). This orientation manifests through the active integration of consumers in product design, development, and evaluation (Lengnick-Hall, 1996; X. Lin & Germain, 2004).

Thus, the following hypothesis can be deduced:

Hypothesis 1 (H1): A company's degree of consumer orientation positively relates to consumer involvement as a co-creator.

Consumer involvement in the NPD process repositions the customer from a passive observer to an active contributor in value creation (Bettiga and Ciccullo, 2018; Pathak, Ashok and Leng Tan, 2022). Customers provide insights that enhance organisational learning and innovation in the ideation phase. During prototype development, selected consumers collaborate with firm experts to co-design promising solutions. In the final phase, consumers shape market positioning through their understanding of differentiators that add competitive value

As co-creators, consumers contribute to both product-level outcomes—such as innovation and quality—and process-level outcomes—such as project effectiveness and problem-solving capabilities. Product innovation represents the delivery of novel benefits, while quality encompasses performance attributes such as reliability and effectiveness (Anning-Dorson *et al.*, 2018; Guo *et al.*, 2020). Through relational interaction and iterative feedback loops, co-creation improves knowledge sharing, reduces design errors, and supports superior project execution (Nix and Zacharia, 2014; Yu, 2017).

Thus, the following hypothesis can be deduced:

Hypothesis 2 (H2): The degree of consumer involvement as a co-creator is positively related to the performance of the innovation project.

The performance of NPD projects may be evaluated across operational and market dimensions. Operationally, success is reflected in the efficiency and effectiveness of processes related to innovation and quality (Carbonell *et al.*, 2009). Market-level performance focuses on commercial outcomes such as sales, profitability, and market share. An innovation project is financially successful when it achieves these outcomes, justifying resource investment and reinforcing strategic goals (Cui and Wu, 2017; Chang, 2019).

Hypothesis 3 (H3): The performance of the innovation project is positively related to the product's

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financial performance.

Figure 1 depicts the conceptual model adopted for consumers.

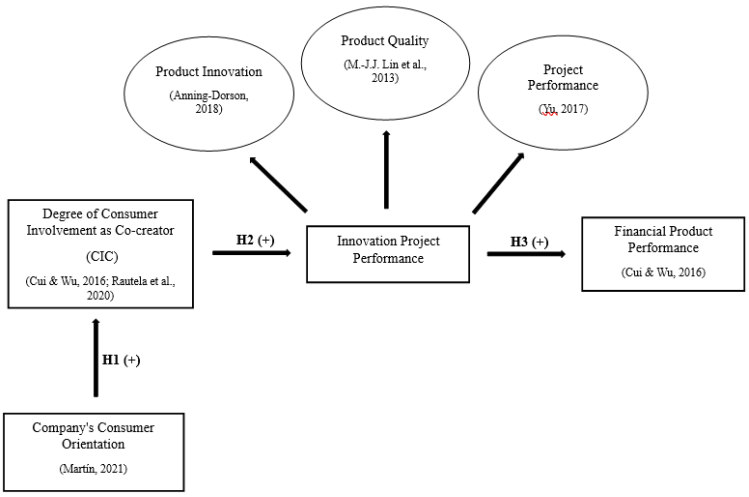


Figure 1 - Research Model Study 1

2.2. Model 2: Consumers

Consumer participation in NPD can occur across three interrelated stages: idea generation, product development, and product launch (Herstatt *et al.*, 2005; Chang and Taylor, 2015; Rautela, Sharma and Virani, 2020). Each stage presents opportunities to improve innovation outcomes through targeted engagement with end users (Kimita *et al.*, 2016; Rautela, Sharma and Virani, 2020).

During idea generation, consumers contribute suggestions and feedback, often identifying features that differentiate the firm from competitors. Their input enables firms to align offerings with actual market needs, enhancing predictive capabilities and reducing the risk of product failure (Carbonell *et al.*, 2009; W. Chang, 2019; Y. C. Chang *et al.*, 2021; Hoyer *et al.*, 2010; Rautela *et al.*, 2020). In the development phase, consumers act as technical collaborators, informing design decisions that increase product appeal and functionality (Hoyer *et al.*, 2010; Wang, Wu and Yang, 2013; Chang, 2019; Rautela, Sharma and Virani, 2020). In the launch phase, consumers test prototypes, offer feedback on usability, and help shape promotional strategies and product positioning (Hoyer *et al.*, 2010; Wang, Wu and Yang, 2013; Chang, 2019; Rautela, Sharma and Virani, 2020). Mainly, consumers may also participate in the creation of effective promotional messages and the improvement of the product's positioning and marketing-mix strategy (Y. C. Chang *et al.*, 2021; Rautela *et al.*, 2020; Y. Wang *et al.*, 2013).

Hypothesis 4 (H4): Consumer involvement in the idea generation phase is positively related to the

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effectiveness of NPD.

Hypothesis 5 (H5): Consumer involvement in the product development phase is positively related to the effectiveness of NPD.

Hypothesis 6 (H6): Consumer involvement in the communication and product launch phase is positively related to the effectiveness of NPD.

Effectiveness across these stages ultimately influences the financial performance of the organisation. Improved alignment with consumer preferences boosts willingness to pay, brand loyalty, and word-of-mouth promotion (Hoyer *et al.*, 2010; Kimita *et al.*, 2016). Furthermore, consumer-led content and promotional contributions enhance marketing clarity and outreach (Hoyer *et al.*, 2010; Kimita *et al.*, 2016; Chang, W.-H. Chiu, *et al.*, 2021).

Hypothesis 7 (H7): The effectiveness of NPD is positively related to financial performance.

Figure 2 depicts the conceptual model adopted.

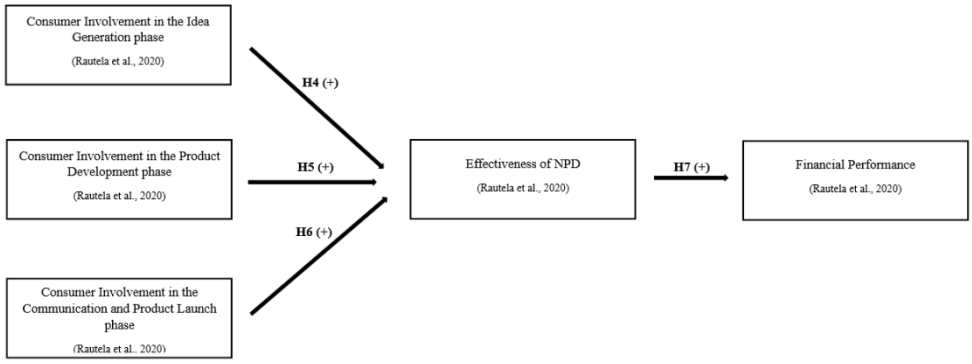


Figure 2- Research Model Study 2

3. METHODOLOGY

Two independent quantitative studies were conducted to address the proposed research objectives and test the developed hypotheses—one targeting firms and the other consumers. Each study employed a structured questionnaire, adapted from validated instruments in the literature.

3.1. Instruments & Data Collection

his research followed a quantitative approach, utilising online surveys as the primary data collection

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method. To ensure linguistic and conceptual accuracy, all items were subjected to translation and back-translation procedures (Iarossi, 2006). A pre-test was subsequently conducted to minimise potential interpretation biases and confirm the questions' reliability and clarity (Nunan, Birks and Malhotra, 2020).

The first study targeted firms operating in Portugal. This national context was deemed appropriate given that consumer co-creation is often more advantageous for smaller firms with lower levels of technological maturity (Chang and Taylor, 2015; Rautela, Sharma and Virani, 2020; Jin, Guo and Zhang, 2022). In Portugal, micro-enterprises constitute approximately 96% of all businesses, while small and medium-sized enterprises (SMEs) represent 3.3% and 0.6%, respectively (PORDATA, 2023). SMEs' innovation capacity is influenced by digitalisation and internal cultural processes, with the former driving international performance and the latter fostering product and process innovation (El Abiad et al., 2023; Harel et al., 2021).

The second study targeted Portuguese consumers. The aim was to capture experienced and non-experienced participants in co-creation activities to assess their willingness to engage in potential future collaboration. The consumer sample was likewise obtained through non-probabilistic methods, using social media and personal networks for dissemination (Nunan, Birks and Malhotra, 2020).

3.2. Measurement of Variables

3.2.1. Study 1: Companies

In Study 1, conducted with Portuguese companies, the questionnaire included four multi-item constructs measured using a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). These constructs were adapted from validated scales in the existing literature. The first construct, Consumer Orientation (CO), comprised six items adapted from Martín (2021) to evaluate the organisation’s commitment to understanding and addressing consumer needs and preferences. The second construct, Consumer Involvement as Co-Creator (CIC), was based on the work of Cui and Wu (2017) and Rautela et al. (2020) and included eight items designed to capture consumer engagement at different stages of the NPD process as well as overall involvement.

The third construct, Innovation Project Performance (IPP), was conceptualised as a second-order latent variable that integrates three underlying dimensions: Product Innovation (PI), Product Quality (PQ), and Project Performance (PP). These dimensions were operationalised through fifteen indicators to capture a comprehensive perspective of NPD performance. Finally, Financial Performance (FP) was

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assessed through three items adapted from Cui and Wu (2017), focusing on the degree to which the new product met financial objectives, such as sales growth, market share, and return on investment.

3.2.2. Study 2: Consumers

In Study 2, addressed to Portuguese consumers, five constructs were assessed using a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). These constructs were likewise adapted from Rautela et al. (2020). The first construct measured Consumer Involvement in the Idea Generation phase (IG), using four items to evaluate consumers' confidence in their ability to influence early-stage innovation. The second construct, related to the Product Development phase (PD), included three items assessing consumers' perceived ability to contribute technical and design knowledge. The third construct focused on the Communication and Product Launch phase (CP), employing five items to capture the extent of consumer participation in promoting and refining the product before market entry.

In addition, the questionnaire included a three-item construct to measure the Effectiveness of NPD (EF), reflecting consumers' perceptions of the outcomes of their involvement in product development. Finally, Financial Performance (FP) was evaluated through six items to assess the perceived organisational benefits—namely financial and strategic—of consumer participation in innovation initiatives.

3.3. Data Analysis Techniques

Data were analysed using Structural Equation Modelling (SEM) with SmartPLS4 (Ringle, Wende and Becker, 2024). The analysis proceeded in two stages (Hair *et al.*, 2019): first, the evaluation of the measurement model, including assessments of convergent validity (AVE), discriminant validity (HTMT ratio), internal consistency reliability (Cronbach's alpha and composite reliability), and multicollinearity (VIF and tolerance values) (Field, 2024); and second, the structural model assessment, focusing on hypothesis testing.

For Study 1, the analysis followed a two-step approach due to a second-order construct (IPP) composed of dimensions with unequal item counts. In contrast, Study 2 employed a direct SEM analysis as all constructs were first-order.

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4. RESULTS AND DISCUSSION

4.1. Study 1: Companies

Data collection for the first study occurred between 19 February and 28 April, resulting in 64 completed responses. Of these, 34 were considered valid for analysis, representing companies already engaging in consumer co-creation. The sample predominantly included firms from the northern region of Portugal, with a concentration in the industrial sector and a predominance of large enterprises. Respondents were balanced in gender and had an average age of 40 years.

The measurement model evaluation followed standard procedures in structural equation modelling (Hair *et al.*, 2019). Items with factor loadings below 0.70 or those that, when removed, improved internal consistency metrics were excluded. The reliability of all retained constructs was confirmed, with Cronbach's alpha and composite reliability values exceeding the threshold of 0.70 (see table 1). Discriminant validity was verified using the HTMT ratio, which remained below the maximum threshold of 0.85 (see table 2). Additionally, the cross-loadings matrix supported discriminant validity, as each item loaded more strongly on its respective construct than on others (see table 3). Convergent validity was also established, with the average variance extracted (AVE) values surpassing 0.50 (see table 1). Multicollinearity diagnostics showed no critical issue (see table 4), because the value of the VIF and the tolerance provided by 1/VIF are some criteria that need to be considered concurrently. VIF levels above 10 are regarded as critical. In terms of tolerance, scores below 0.2 suggest possible issues, while values below 0.1 indicate the presence of significant issues (Field, 2024).

All three hypotheses regarding the structural model were supported, with statistically significant path coefficients and the expected positive signs (see table 5). Hypothesis 1 confirmed that consumer orientation is positively related to the degree of consumer involvement as a co-creator. Thus, earlier work has been extended by demonstrating this relationship in a co-creation context within the Portuguese business environment (Svendsen *et al.*, 2011; Chang, W.-H. Chiu, *et al.*, 2021).

Hypothesis 2, posited a positive relationship between consumer co-creation and innovation project performance, was also supported. This finding contradicts earlier evidence by Cui and Wu (2017), who identified a negative effect of consumer involvement on innovation in experimental NPD settings. The discrepancy may stem from differences in methodological approaches or the types of companies studied. In the present research, co-creation is associated with improved relational dynamics and enhanced project outcomes. This aligns more closely with studies demonstrating the positive influence of co-creation on product quality and innovation (Lin *et al.*, 2013).

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Finally, Hypothesis 3 confirmed a positive association between innovation project performance and the financial performance of the resulting product. This finding is consistent with past research supporting that high-performing innovation processes contribute to stronger financial outcomes, including increased market share and return on investment (Gök and Peker, 2017).

Table 1- Study 1: Internal consistency and reliability

Construct	Cronbach's α	Composite Reliability	Average Variance Extracted
CO	0,944	0,96	0,856
CIC	0,917	0,936	0,708
IPP	0,836	0,901	0,752
FP	0,949	0,966	0,904

Table 2 – Study 1: Discriminant Validity (HTMT ratio values)

	CO	CIC	IPP	FP
CO				
CIC	0,689			
IPP	0,688	0,529		
FP	0,446	0,404	0,433	

Table 3 - Study 1: Cross-Factor Loadings Matrix

	CO	CIC	IPP	FP
CO1	0,886	0,532	0,514	0,395
CO2	0,924	0,555	0,517	0,541
CO3	0,938	0,655	0,576	0,265
CO4	0,951	0,644	0,655	0,375
C1	0,577	0,867	0,297	0,388
C2	0,608	0,813	0,429	0,494
C3	0,504	0,843	0,443	0,171
C4	0,556	0,794	0,380	0,136
C5	0,458	0,867	0,414	0,395
C6	0,556	0,864	0,428	0,347
Product Innovation	0,471	0,416	0,843	0,378
Product Quality	0,573	0,480	0,869	0,358
Project Performance	0,554	0,314	0,889	0,316
FP1	0,417	0,396	0,485	0,956
FP2	0,405	0,348	0,317	0,957

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FP3	0,363	0,340	0,311	0,939

Table 4 - Study 1: VIF and Tolerance

	VIF	Tolerance
CO1	3,721	0,269
CO2	5,395	0,185
CO3	6,962	0,144
CO4	8,882	0,113
C1	3,667	0,273
C2	2,907	0,344
C3	2,929	0,341
C4	2,452	0,408
C5	3,547	0,282
C6	3,254	0,307
Product Innovation	1,792	0,558
Product Quality	1,998	0,501
Project Performance	2,550	0,392
FP1	3,975	0,252
FP2	6,893	0,145
FP3	5,583	0,179

Table 5 – Study 1: Structural coefficient, Standard deviation, Statistical t, p-value, f^2, R^2 and adjusted R^2

	Hypotheses	Structural Coefficient	Standard deviation	Statistical t	p-value	f2	R2	R2 adjusted
CO -> CIC	H1 (+)	0,649	0,121	5,364	0,000	0,728	0,421	0,403
CIC -> IPP	H2 (+)	0,476	0,165	2,892	0,004	0,293	0,226	0,202
IPP -> FP	H3 (+)	0,408	0,113	3,629	0,000	0,200	0,167	0,141

4.2. Study 2: Consumers

For the second study, conducted between 31 May and 14 June, a total of 126 valid responses were obtained. Of these, 52 respondents had prior experience participating in co-creation activities with companies. Among experienced participants, women represented 52% of the sample, with 27% holding degrees in business and 42% having completed a master's programme. Among those without co-creation experience, women constituted 66% of the sample, with most respondents educated in business or social sciences. The average age was similar across both groups.

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The measurement model was evaluated through established SEM procedures, as in the first study. Constructs demonstrated acceptable reliability and validity, with AVE and loadings values above 0.50 (see table 6 and 8) and HTMT ratios below 0.85 (see table 7). No issues of multicollinearity were detected (see table 9). The structural model yielded support for all but one of the proposed hypotheses (see table 10).

Hypothesis 4, which expected a positive relationship between consumer involvement in idea generation and NPD effectiveness, was not supported. This contradicts the findings of Rautela et al. (2020), who found such involvement beneficial. One possible explanation for this divergence is the limited influence of consumers when their contributions are isolated from later stages. The absence of continuity across phases may reduce the strategic impact of early-stage input.

Conversely, Hypothesis 5 was supported, indicating that consumer involvement during product development significantly contributes to perceived NPD effectiveness. This finding contrasts Rautela et al. findings (2020), which had suggested minimal effects at this stage, possibly due to limited consumer expertise. In the present study, however, consumers appeared to possess sufficient technical or aesthetic knowledge to influence product refinement meaningfully.

Hypothesis 6 was also supported, which proposed a positive association between consumer participation in the launch phase and NPD effectiveness. This aligns with prior research, emphasising the importance of consumer feedback and promotional contributions at the final stage (Rautela, Sharma and Virani, 2020).

Finally, Hypothesis 7 was confirmed, indicating that NPD effectiveness significantly influences perceptions of financial performance. This result echoes prior findings, reinforcing the argument that well-executed consumer involvement enhances both innovation outcomes and commercial results (Rautela, Sharma and Virani, 2020).

Table 6 – Study 2: Internal consistency reliability

	α	CR	AVE
IG	0.883	0.928	0.811
PD	0.710	0.871	0.772
CP	0.833	0.897	0.743
EF	0.854	0.911	0.774
FP	0.895	0.919	0.654

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Table 7 – Study 2: Discriminant Validity (HTMT ratio values)

	IG	PD	CP	EF	FP
IG					
PD	0,750				
CP	0,426	0,328			
EF	0,596	0,783	0,681		
FP	0,640	0,766	0,627	0,681	

Table 8 - Study 2: Cross-Factor Loadings Matrix

	IG	PD	CP	EF	FP
IG1	0,863	0,518	0,325	0,451	0,532
IG2	0,931	0,584	0,322	0,476	0,497
IG3	0,906	0,533	0,337	0,474	0,525
PD2	0,606	0,915	0,325	0,617	0,665
PD3	0,439	0,841	0,134	0,462	0,418
CP3	0,312	0,287	0,873	0,434	0,585
CP4	0,264	0,151	0,860	0,298	0,371
CP5	0,373	0,253	0,853	0,278	0,445
EF1	0,513	0,571	0,313	0,873	0,509
EF2	0,466	0,594	0,330	0,860	0,612
EF3	0,385	0,471	0,440	0,853	0,479
FP1	0,440	0,413	0,509	0,442	0,873
FP2	0,557	0,568	0,461	0,637	0,860
FP3	0,545	0,585	0,465	0,445	0,853
FP4	0,408	0,505	0,330	0,488	0,873
FP5	0,410	0,496	0,488	0,445	0,860
FP6	0,402	0,488	0,477	0,450	0,853

Table 9 - Study 2: VIF and Tolerance

	VIF	Tolerance
IG1	2,049	0,488
IG2	3,422	0,292
IG3	2,888	0,346
PD2	1,434	0,697
PD3	1,434	0,697
CP3	1,589	0,629
CP4	2,379	0,420
CP5	2,362	0,423
EF1	2,765	0,362
EF2	2,120	0,472
EF3	1,961	0,510
FP1	2,316	0,432

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FP2	2,504	0,399
FP3	2,515	0,398
FP4	2,190	0,457
FP5	2,474	0,404
FP6	2,109	0,474

Table 10 – Study 2: Structural coefficient, Standard deviation, Statistical t, p-value, f^2, R^2 and adjusted R^2

	Hypotheses	Structural Coefficient	Standard deviation	Statistical t	p-value	f2	R2	R2 adjusted
GI -> EF	H4 (+)	0,154	0,105	1,474	0,141	0,026	0,463	0,449
DP -> EF	H5 (+)	0,469	0,073	6,416	0,000	0,258	0,463	0,449
CP -> EF	H6 (+)	0,221	0,071	3,129	0,002	0,079	0,463	0,449
EF -> FP	H7 (+)	0,611	0,060	10,223	0,000	0,595	0,373	0,368

5. CONCLUSION

This study aimed to examine consumer involvement's role in new product development (NPD), integrating perspectives from both companies and consumers. By applying two independent surveys and structural equation modelling, the research addressed key gaps in the literature concerning the effectiveness and impact of co-creation on the innovation process.

The first objective was achieved, which investigated the influence of firms' consumer orientation on their degree of co-creation engagement. The findings confirmed that firms with a stronger orientation towards understanding and responding to consumer needs are likelier to involve consumers as co-creators in innovation activities. The second objective involved operationalising a comprehensive performance construct for NPD projects, integrating product innovation, quality, and overall project performance. This construct was shown to be significantly influenced by consumer involvement, thereby validating its conceptual relevance. The third objective focused on identifying which stages of the NPD process benefit most from consumer input. While consumer engagement during the development and launch phases enhanced NPD effectiveness, involvement during the idea generation stage did not produce statistically significant effects. This suggests that isolated input at early stages may lack influence unless integrated across the entire process. The final objective—comparing company and consumer perspectives—was met by conducting parallel analyses highlighting convergence and divergence in perceived value creation across stakeholder groups.

5.1. Theoretical Implications

This study contributes to the theoretical discourse on open innovation by empirically demonstrating that consumer co-creation has a significant and positive influence on both innovation project

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performance and financial outcomes. Specifically, firms exhibiting a strong consumer orientation are more likely to integrate customers as co-creators throughout the NPD process (Svendsen et al., 2011; Chang, Chiu et al., 2021). By operationalising a multidimensional construct of NPD performance—encompassing product innovation, product quality, and project execution—this research provides a robust framework for assessing the outcomes of consumer participation (Cui & Wu, 2017; Carbonell et al., 2009). The findings also challenge previous assumptions that consumer involvement is most valuable only in early ideation stages (Rautela, Sharma & Virani, 2020), instead demonstrating that meaningful contributions during development and launch stages yield greater effectiveness.

Moreover, the dual-study design, incorporating both firm and consumer perspectives, offers a more holistic understanding of the mechanisms through which value is created and perceived in innovation ecosystems. This comparative insight enhances the explanatory power of co-creation models and lays the groundwork for cross-stakeholder alignment in future research.

5.2. Managerial Implications

From a managerial standpoint, the study underscores the strategic relevance of embedding consumer co-creation into the NPD process as a driver of competitiveness and innovation quality. Firms that adopt a consumer-oriented posture are better positioned to leverage co-creation for improved performance. Managers should not restrict consumer engagement to idea generation; rather, they should implement mechanisms to facilitate consumer input across all NPD stages, especially during development and launch phases where impact on effectiveness is more pronounced (Chen, Arnold & Tsai, 2021).

Furthermore, the study proposes empirically validated performance indicators that can support decision-makers in assessing the outcomes of co-creation initiatives. These metrics can assist firms—particularly SMEs in the Portuguese context—in monitoring innovation efficiency and aligning consumer participation with financial goals. This evidence-based approach can inform resource allocation and strategic planning in innovation management.

5.3. Limitations and Future Research

Despite its contributions, this research presents several limitations. First, the company-level sample was relatively small and geographically concentrated in Portugal, which limits the generalisability of the findings to other national or industrial contexts. Second, the cross-sectional design constrains causal inference and does not account for the temporal dynamics of consumer involvement.

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Future research should adopt longitudinal methodologies to examine how the effects of consumer co-creation evolve over time and influence innovation performance across cycles. Cross-country comparative studies would also be valuable in identifying how cultural and institutional differences shape co-creation practices and perceptions. Additionally, further investigation is warranted into how consumer roles vary across sectors and product types, and how digital platforms and AI technologies are expanding or redefining consumer participation in innovation processes.

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INTEL AND ISRAEL: A SUCCESSFUL CASE OF INDUSTRIAL POLICY?

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ABSTRACT

This paper examines the industrial policy of Israel with regard to Intel from the 1980s to the present. This policy consisted of Israel giving grants and tax incentive to Intel in order that Intel would build fabrication plants in Israel. During this period, Intel built two small plants in Jerusalem, both of which are no longer functioning, and two large plants, Fab 18 (online in 1999) and Fab 28 (online in 2008) in the town of Kiryat Gat in the Northern Negev. The Fab 18 plant was merged into the newer Fab 28 plant, which continues to produce semiconductor chips. Over the years between 3,000 and 4,900 workers have worked at the two fabrication plants, and the chips produced in the plants are a relatively large share of Israel's high-tech exports. The question is whether the benefits from these plants have justified the large grants that the Israeli government has given to Intel. In the paper, we point out the high cost per worker of these grants, but argue that the grants can be justified if they generated positive externalities. The problem is that it is difficult to determine and quantify the positive externalities of the grants to Intel, a problem that exist by many cases of industrial policy, and hence it is unclear whether Israel's industrial policy with regard to Intel was successful.

Keywords: Industrial Policy, Semiconductor Industry, Government Subsidies, Foreign Direct Investment (FDI), Economic Cost-Benefit Analysis

INTRODUCTION

According to the OECD, "Industrial policy refers to government assistance to businesses to boost or reshape economic activities, especially to firms or types of firms based on their activity, technology, location, size or age" (https://www.oecd.org/en/topics/policy-issues/industrial-policy.html, accessed March 2025). For example, when Joe Biden was President of the United States, the US undertook two major cases of industrial policy. One, in 2022, the Inflation Reduction Act gave government funding and tax incentives to firms to transition from producing electricity that pollutes to producing relatively cleaner energy. Two, also in 2022, in the CHIPS and Science Act, the US government granted funding and tax incentives for firms to produce semiconductor chips. The Economist (2025) noted that the CHIPS and Science Act was "arguably the biggest single bet on industrial policy by the (US) government in decades."

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Are industrial policies by a government effective in improving an economy and even if yes, are the benefits to the economy greater than the costs to the government and society? The answers to these questions are not obvious and it seems that for many people the answer to the questions depend on their economic philosophy. If a person believes in a *laissez-faire* approach to the economy, then the person will most likely have a negative view on industrial policy. For example, the editorial board of *The Wall Street Journal* (2024) commented:

> Industrial policy sounds nice when it's sold as patriotic nationalism, but it typically ends in special-interest pleading with business answering to politicians. Capital is steered for political reasons, rather than for its most productive use…Politicians always think they're better stewards of capital than business. They never are.

On the other hand, if a person is of a socialist bent, then the person will tend to be supportive of industrial policy. Nonetheless, even if a person accepts a *laissez-faire* approach to the economy, still there are times when one can argue that industrial policies generate positive externalities that would not have occurred without the government support that can justify government intervention in the economy. One example of these positive externalities are improvements in the environment, which was the goal of the Inflation Reduction Act, though since it is difficult to quantify these improvements in the environment, it hard to judge the effectiveness of industrial polices that aim to improve the environment. With regard to the CHIPS and Science Act, the Economist (2025) noted that:

> Early returns are impressive: the programme has catalysed about $450bn of private investments. And this money is spread across much of the industry, from high-tech packaging to memory chips. One marker of success is the production of the most advanced chips, measuring less than 10 nanometres in size. In 2022 America made few such chips. By 2032 it is on track to have a share of 28% of global capacity, according to the Semiconductor Industry Association, a trade group.

Many studies have attempted to judge the effectiveness of industrial policy. In a review of numerous studies, Criscuolo *et al*. (2022) concluded that while "well designed R&D tax credits and subsidies are effective in stimulating R&D and innovation, there is limited evidence on the effectiveness of targeted grants and subsidies."

In this paper, we will attempt to add to the literature on industrial policy with regard to the effectiveness of grants and subsides by examining the policy of the Israeli government of giving grants and subsidies to Intel to produce semiconductor chips over a period of forty years. We will begin

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with a brief review of Intel and then we will review the different grants and subsidies that the Israeli government has given to Intel. We then will examine Intel's effect on Israel's economy over the years from when it has received the grants and subsidies, and then we will offer our thoughts regarding the effectiveness of Israel's industrial policy in this particular case.

INTEL

Intel was founded in 1968 in Santa Clara, California, an area that today is part of the "Silicon Valley." The company was founded by Robert Noyce and Gordon Moore. Shortly afterwards they were joined by Andy Grove, who would become the president of the company, 1979-1997, its CEO, 1987-1998, and chairman, 1997-2005. The company began by creating memory chips, but then began creating and selling microprocessors, semiconductor chips that integrate the main units of computers, the CPU of the computer. In the 1980s, the company began to work with IBM and Windows, and Intel became one of the most important companies in the personal computer market in the 1980s and the 1990s. In 2005, Apple agreed to use Intel's chips for its Mac computer instead of buying the technology from Motorola, and Intel's technology was to be found in almost every single personal computer.

Intel was then at its height, but trouble was already brewing for Intel. Firstly, in 1999, Nvidia began to develop graphic processing units (GPU), while Intel stayed with the CPU for the personal computers. This would prove to be a huge mistake by Intel, as 25 years later, Nvidia would become one of the most valuable companies in the world. Secondly, in 2007, with the advent of the iPhone, Intel turned down the opportunity to develop microprocessors for the iPhone, as Intel decided to remain focused on the personal computer market. Four year later in 2011, when Intel recognized its mistake, it tried to develop microprocessors for the smartphone market, but was unsuccessful and this effort ended in 2016.

In 2019, Intel was still ranked 43 on the Fortune 500 companies, but it was having problems developing the most advanced microprocessors (The Economist, 2019). In 2021, Intel brought back one of its former top executives, Pat Gelsinger to be CEO and he tried to bring back Intel to its former dominance in the market, with an aggressive investment strategy of buying companies and building new foundries (semiconductor fabrication plants). He also was also one of the leading industry proponents of the CHIPS and Science Act (Fitch and Cohen, 2024). The Economist (2024) notes that Intel "has been promised more than any other under America's CHIPS Act… On September 16th (2024) it was awarded up to $3bn to make chips for the armed forces, in addition to up to $8.5bn of grants and $11bn of loans announced earlier in 2024." As noted by *The Wall Street Journal* (2024), this

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funding to Intel would be an example where industrial policy failed, as Intel had large losses in 2024, and Gelsinger was forced to resign in December 2024. Intel's market capitalization in March 2025, was 111 billion USD far lower than its market capitalization of 500 billion USD in August 2002, lower than its market capitalization of 273 billion USD in January 2020, right before the advent of corona, and similar to its market capitalization in the end of 2022, 109 billion USD. Due to these losses, Intel is retrenching and cutting costs, which has large implications for its branches in Israel. We now will review Intel's operations in Israel over the years.

INTEL IN ISRAEL

The relationship between Intel and Israel began in 1974, when one of Intel's first employees, Dov Frohman, who was raised in Israel, but had gone to California to get a PhD in electrical engineering, convinced Andy Grove, who was a Holocaust survivor, to have Intel set up a small chip design center in Haifa, a city in northern Israel, initially with four workers. Frohman (2006) relates:

> Few people know about, but this center designed the microprocessor for the original IBM personal computer (the 8088-math coprocessor). In 1984, we opened the company's first chip fabrication plant outside the United States, in Jerusalem. By the early 1990s, Intel Israel was a key outpost of Intel's global production system. The Jerusalem fab was responsible for about three-quarters of the global output of the 386 microprocessor, at the time the company's best-selling product. Meanwhile, our development center in Haifa was hard at work on new products that would be critical to Intel's future, including key components of what would become the Pentium microprocessor.

The fabrication plant (called Fab 8) in Jerusalem cost 700 million USD, and marked the first time that the Israeli government gave a grant to Intel, in this case 188 million USD (By Knowledge, 2014). This plant would continue to operate until March 2008. By then it was producing microelectronic components for flash memory processors, but this technology was considered to be obsolete, and the plant was closed. However, a year later in 2009, the plant was re-fitted and opened as a die prep plant (Reuters, 2009). This re-fitted plant was smaller than the previous plant as it only had 150 (when opened) to 170 workers (when closed), as opposed to 600 employees in the Fab 8 plant, and Intel closed it in 2016 (Azulai, 2016b).

Intel opened a second fabrication plant in Israel in 1999 in a town called Kiryat Gat, which is situated around 60 kilometers south of Tel Aviv in the Northern Negev. The plant, called Fab 18, was initially scheduled to make flash-memory chips, but then, even before the plant was finished, in 1997

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the plant was switched to make Pentium microprocessors (EETimes, 2003). Coincidentally Kiryat Gat had been the location of another case of Israel's industrial policy in 1961, when Israel tried to support textile industries, in this case a company called Polgat, which temporarily succeeded, but then it closed. In this case by Intel, Intel invested around 2.4 billion USD in building the Fab 18 factory, and the Israeli government contributed close to 600 million USD in grants (By Knowledge, 2014). This was the largest industrial investment in Israel until that point and the largest one-time grant to a private company from the Israeli government. Kiryat Gat was then considered an underdeveloped area in Israel, especially after the Polgat factory closed, and part of the idea of the government support was to help this area develop (Sandler 1995). Thus, Intel also agreed to help support educational programs in the city, and it has invested millions of shekels in these programs (Schechter, 2012).

In 2008, the Fab 18 plant became part of Numonyx, which was a joint venture of Intel Corporation, STMicroelectronics NV and Francisco Partners. In 2010, Numonyx sold the plant to Micron Technology and then in 2013, Intel bought the plant back from Micron. The plant was then combined with the newer plant, Fab 28, which was then up and running.

By 2006, the Fab 18 plant in Kiryat Gat was becoming dated, even though it had been upgraded to produce 90 nanometer resolution chips, and Intel decided to start building a new plant in Kiryat Gat, the Fab 28 plant. The cost of this new plant was 3.3 billion USD, and the Israeli government contributed 485 million USD, 15% of the construction costs. This plant came online in 2008, and produced processors with 45 nanometer technology, which was smaller than the Fab 18 plant, as every reduction enables the microchips to be smaller (Reuters, 2009).

In 2010, Intel began negotiating with the Israeli government for assistance for a new plant, but Intel thought that the offer from the Israeli government was stingy. Also, the Israeli government was insisting that the new plant be built in Beit Shean, which was an underdeveloped town, in the lower Galilee near the Jordan River far from the center of the country, but Intel wanted the new factory to be in Kiryat Gat. Consequently, Intel decided to set up the factory in Ireland, and this factory to build 14 nanometers chips became operational in 2014 (Globes, 2014). This decision by Intel caused the Israeli government to be more generous in the future to ensure that Intel would continue to invest in Israel.

In 2011, Intel expanded the Fab 28 plant at a cost of 2.7 billion USD and Israel granted Intel another $200 million USD (By Knowledge, 2014). With this upgrade, the Fab 28 plant began producing 22 nanometer chips. In 2014, Intel decided to further upgrade the Fab 28 plant and again asked for more assistance from the Israeli government, which agreed. In this new agreement, Intel agreed to invest six billion USD in the upgrade, and the Israel government granted Intel 300 million

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USD and lowered its tax rate for revenue from the plant to 5% for ten years, as opposed to the standard corporate then in Israel of 26.5% and the 12% tax rate Intel pays for revenue from its development center (Reuters, 2014). This investment by Intel was then the largest foreign investment in Israel, as it surpassed Intel's previous investments. The goal of this upgrade was for the Fab 28 plant to produce 10 nanometer chips, but this development was delayed until 2019, which was indicative of the decline in Intel's technological dominance in the semiconductor chips industry (*Economist*, 2019).

In 2018, Intel decided to double the capacity of the Fab 28 plant, though not upgrading the technology, with an investment of five million USD. In turn the Israeli government granted the company more grants of 180 million USD and extended the reduced tax rate of 5% until 2027 (Cohen, 2018).

The following year, 2019, Intel and the Israeli government agreed that the Israeli government would subsidize a new more advanced plant in Kiryat Gat (on a 75-acre plot south of the Fab 28 plant), what was referred to as Fab 38. The initial announcement was that Intel would invest around 11 billion USD, making this the largest foreign investment in Israel, and the Israel government would contribute around 900 million USD to the expenses of its construction USD (O. Cohen, 2019). Intel also committed to adding 1,000 to 2,000 new jobs at the new plant, as the Israeli government was concerned that the workers at the new plant would just be the old workers from the Fab 28 plant. However, just five months after this agreement, Intel stopped its plan to build the new plant to cut back on expenses (S. Cohen, 2019).

With the arrival of Gelsinger to be the CEO of Intel in 2021, and his strategy of building new foundries, the building of the Fab 38 plant was revitalized. Construction of the new plant began, and as part of this project, in the end of 2022, Intel imported to Israel some of the most advanced machines in the world for producing microchips using ultraviolet lithography technology from the Netherlands (Gilead, 2023). Furthermore in 2023, Intel agreed to invest another 14 billion USD in the expansion of the Fab 38 plant (altogether 25 billion USD), and the Israeli government agreed to contribute 12.8% of the 25 billion USD, around 3.2 billion USD, which includes the 900 million USD already agreed upon in 2019, for building the new plant (Israel's Ministry of Finance, 2023). Again, this was to be the largest investment of a foreign firm in Israel. However, in mid-2024, the work was stopped on building this plant due to Intel's worldwide cut back on costs, and, as of the writing of the paper, it has not re-started (Vaizberg, 2024a).

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In addition to these fabrication plants, over the years, Intel was also expanding its research and development centers in Israel. For example, in 2001, in the midst of the second *intifada* when foreigners were wary of investing or even coming to Israel for meetings, Intel opened a new development center in Yakum, a little south of Haifa. Afterwards in 2006 Intel signed a deal with the Haifa Municipality and Matam Industrial park in southern Haifa and purchased 20 dunam (approximately 5 acres) of land for 5.8 million USD, where Intel enlarged, without government aid, its largest research and development center in Israel to 40,000 square meters (Petersburg, 2006). In 2021, Intel announced that it would invest another 200 million USD to expand this center, but this expansion was cancelled in 2023 (Berkowitz, 2021 and Fitch, 2023). A third example of Intel's investment in research and development centers in Israel is that in 2019, Intel invested 187 million USD in building one of the most environmentally friendly building in the world in Petah Tikva (central Israel) for its corporate headquarters in Israel (Riba 2019).

Intel also has bought many Israel start-up companies, though many of these investments did not pan out. In 1999, Intel purchased the Israeli digital signal processors company DSPC for 1.6 billion USD, but sold the company to Marvell in 2006 for just 600 million USD. Also, in 1999, Intel purchased Dialogic Communications for 70 million USD, and then established a small development center (at its peak 35 workers) in Tefen in Northern Israel. This center was closed in 2003 and the workers were transferred to the R&D center in Haifa (Nass, 2003). In 2005, Intel acquired Oplus, which was developing video processors for TV screens and home cinema systems, for $100 million, but in 2008, Intel closed it down. In 2016, Intel paid 175 million USD for the Israeli company Replay Technology, but closed it down in 2021 (Gilead, 2021). In 2017, Intel bought Mobileye, which develops advanced driver assisted systems for cars for 15.3 billion USD, and then partially spun off the company, with an IPO in 2022, while retaining controlling interest in the company (Reuters, 2021).

Another notable purchase was Habana Labs, in late 2019 for two billion USD to help Intel enter the AI market, but, while Intel still owns Habana Labs, as of March 2025, its products have not succeeded in the market, and most of the engineers and managers from when Intel acquired the company have left (Shulman, 2025). In 2020, Intel bought Moovit, a company which has an app to help people use public transportation, for one billion USD, and Intel still owns this company as of March 2025 (Zerachovitz, 2020). In 2022, Intel bought Granulate, which developed software to reduce cloud computing costs, for 650 million USD, but closed it in two years in 2024 (Gilead, 2024). Also, in 2022, Intel announced it was going to purchase the Israeli company Tower Semiconductor for 5.4 billion USD, but in the end, this deal never went through, due to a failure to get Chinese regulatory approval. Instead, Intel paid a penalty of 353 million USD (Habib-Valdhorn, 2023). Finally, in 1991,

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Intel started an investment subsidiary, Intel Capital, which among its investments were various Israeli start-up firms, and in 2025, Intel decided that this would become a standalone entity (Lin, 2025).

This concludes our brief review of Intel's operations and investments in Israel from 1974 to the present and now we turn to discuss the economic effects of Intel's plants, research and development centers, and subsidiaries in Israel.

THE ECONOMIC EFFECTS OF INTEL ON ISRAEL'S ECONOMY

Overall, not counting the grants offered to Intel in 2019 and in the end of 2023, which Intel did not receive since it stopped building Fab 38, and the reductions in corporate taxes, Intel received around two billion USD from the Israeli government from 1985 through 2019. This was a benefit to the stock owners of Intel, but what did Israel receive from these grants?

We can look at several possible improvements to the Israeli economy due to the grants. One improvement is that the grants might have led to greater employment in Israel. In Table 1, we list the number of workers in Israel who worked for Intel, whether in the research and development centers, which Intel did not receive grants for them, and the subsidiaries, such as Mobileye and Habana Labs, which Intel also did not receive grants when it purchased the subsidiaries, and the workers in the fabrication plants, for which Intel received the grants over the years. For many of the data sources, there was no distinction between where the workers were located, just the total number of workers at Intel in Israel. If the data is entry is blank in the table, then there were either zero workers or the number of workers is unknown.

Year	Total workers	Workers in the Fab plants	Workers in R&D centers	Workers in subsidiaries
1974	4		4	
1995	1500	600?	900?	
2001	4000			
2003	5300			
2006			2000	
2007		3500 – Kiryat Gat 600 - Jerusalem		
2012	8300			
2013	8500	3000 – Kiryat Gat 160 - Jerusalem		
2014	10,000	4,500 – Kiryat Gat		
2017	12,000			1,000
2021	14,000	4,900 – Kiryat Gat	7,000	2,100
2025		4,250 – Kiryat Gat	4,250	

Table 1 – Numbers of workers for Intel in Israel. Sources: For 1995 from Sandler (1995), for 2001 from Ben Yehuda (2001), for 2003 from Nass (2003), for 2006 from (Petersburg, 2006), for 2007 from Shelah

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(2007), for 2012 from About Intel Israel (2012), for 2013 from Orbach (2013), for 2014 from Globes (2014), for 2017 from Cohen (2018), for 2021 from Berkowitz (2021) and for 2025 from Gilead (2025).

It should be noted that starting from at least 2012 through the present, Intel was the largest private employer in Israel. In addition, the decline in people working in Intel's research and development centers in 2025 began in the end of 2024, when due to the retrenching of Intel worldwide, Intel in Israel started offering voluntary retirement plans for the older workers and firing other workers (Vaizberg, 2024b).

A second contribution of Intel to Israel's economy is the value of the production of the chips in the plants, which is best estimated by Intel's exports since most of Intel's exports are from the plants. The value of Intel's exports from Israel is listed in Table 2. Also, Israel categories its exports based on the level of technology used in producing the goods, and for some years, Table 2 also lists estimates as to what percentage of Intel's exports were of the high technology exports of Israel.

Year	Value of exports in USD from Intel's Israeli plants	Intel's exports as a percentage of Israel's high-tech exports
2004	575 Million – Kiryat Gat (Fab-18) 151 Million – Jerusalem (Fab-8)	
2008	1.4 Billion	
2012	4.6 Billion	
2013	3.8 Billion	
2014	4.25 Billion	
2017	3.6 Billion	8%
2018	3.9 Billion	
2020	8 Billion	
2021	8.1 Billion	
2022	8.7 Billion	5.5%

Table 2 – Value of exports from Intel's Israeli fabrication plants. Sources: For 2004, from Manor (2005), for 2008 from *Reuters* (2009), for 2012 and for 2013 from Reuters (2014), for 2014 from Cohen (2015), for 2017 from Cohen (2018), for 2018 from *Reuters* (2019), for 2020 and 2021 from Dor (2022), for 2022 from About Intel Israel (2023).

Note the increase in exports from 2008 to 2012 was because the Fab 28 plant became fully operational after 2008 and the jump in exports from 2018 to 2020 was because the Fab 28 plant finally began to produce 10 nanometer chips in 2020.

In addition to these direct effects on Israel's economy, Intel also generated positive externalities for Israel's economy, though these are hard to quantify. One of these positive externalities is that the success of Israel's research and development centers most likely contributed to other multinational

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firms, such as Microsoft and Apple, setting up similar centers in Israel, though this effect is unrelated to Israel's industrial policy with regard to Intel since Israel did not give special grants to Intel to set up its research and development centers.

A second positive externality is that the building and maintaining of the plants in Jerusalem and Kiryat Gat provided work to numerous Israelis and Israeli firms who are not Intel employees. Intel, when they provide information about their operations in Israel, has noted these externalities. In 2016, Intel reported that in the previous ten years, it had spent annually on average one billion USD in purchasing supplies altogether from 1000 Israeli firms, and 80% of these purchases were for the manufacturing plants, while 20% were for the research development centers in Israel and even outside of Israel. Intel also noted that these procurements were greater than what the firm had agreed to in order to qualify for the grants (Azulai, 2016a). In Intel's report for 2017, it claimed that Intel was responsible for 40,000 workers in Israel beside the workers who were employed directly by Intel (Rosenberg, 2019). Similarly, in 2023, Intel (About Intel Israel, 2023) claimed that Intel's operations in Israel has led to an "additional 42,000 (workers) in indirect employment, and significant procurement of products and services from local suppliers." Presumably many of these additional workers and suppliers were from the area around Kiryat Gat, and the presence of Intel in the town boosted its local economy, and as mentioned, Intel also contributed to the school system of Kiryat Gat.

Other externalities are more difficult to measure. Did Intel's fabrication plants in Israel lead to a transfer of technology to Israel or improve the managerial style in Israel? Several workers from Intel in Israel went on to start very successful start-ups companies, such as Eyal Waldman who left Intel and founded Mellanox Technologies in 1999, which was sold to Nvidia for 6.9 billion USD in 2019. However, these workers who founded high-tech start-up firms came from Intel's research and development centers and not the fabrication plants, which received the grants. For sure the workers in these fabrication plants learned new technology and maybe also absorbed new management approaches that are not common in Israel, but then the question is, have these new skills and knowledge led to other economic endeavors in Israel that would not have happened had Intel not built and operated the fabrication plants?

CONCLUSION

In the end it is not simple to evaluate Israel's industrial policy with regard to Intel, and the evaluation is trickery since it is not clear what will be the future of Intel worldwide. It is conceivable that Intel will be bought by competitors and this could call into question the continued use of the Fab-28. Yet,

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as of March 2025, when the Fab 28 plant is still up and running, can one say that the Israel government was correct to give Intel all these grants with regard to the fabrication plants?

It is highly likely that Intel would not have built the Fab 18 and Fab 28 plants without the assistance of the Israeli government, as when the government was not more forthcoming in 2010, Intel set up a plant in Ireland and not Israel. Thus, a reasonable argument is that the grants led to the construction of the fabrication plants, which assisted the workers in the fabrication plants, the secondary workers who were suppliers to these plants, and increased Israel's exports. Accordingly, the grants had a positive economic benefit to Israel, but the what was the cost benefit ratio of these gains and what were the alternatives if the Israeli government had not given the grants to Intel?

A possible cost benefit ratio would be cost of the grants per worker who worked in the fabrication plants. If we ignore the grants to the plant in Jerusalem and for the Fab 38 plant which was not built, then Intel received around 1.75 billion USD from the Israeli government, and then on average from 1999 (when the Fab 18 plant came online) to 2024, it received approximately 70 million USD each year. In this period, based on the data in Table 1, we can estimate that there were on average 3750 workers each year, which would suggest that very roughly the Israeli government was paying Intel 18,667 USD per worker per year or 1500 USD per worker per month. Yet, even accepting all the approximations in this calculation, it is not precise for several reasons. One, each worker and even Intel pays Israeli income taxes, which returns some of the money to the government. Two, this calculation does not include the additional workers who worked indirectly for Intel. Including these workers in the calculation would lower the cost per worker of the grants. Thirdly, most (all?) of the Intel workers would have found other work in Israel, and then the government assistance was to allow the workers in the fabrications plants to choose to work in Intel as opposed to other job. This gain in the welfare of these workers from working for Intel is almost impossible to calculate, but theoretically would reduce the benefits of the grants. With all these disclaimers, if there were no other positive externalities to the grants to Intel, then it appears that the cost benefit ratio of the grants was high, and the Israeli government and Israeli taxpayers were generously subsidizing the workers at Intel's fabrications plants.

What were the alternatives to these grants? There were at least four other alternatives. One, the Israeli government could not have given the grants, and reduced its spending by some measure. This would have had led to a small reduction in its debt. Two, if the Israeli government had not given the grants and maintained its level of debt, then the government could have slightly reduced taxes, which would have increased consumer welfare and could have spurred other economic activity. Three, the

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government could have given the money to other companies, and then the question would be whether these companies would have been more or less successful than Intel? Four, the government could have used the money for other purposes, and here the options are almost endless, for infrastructure, education, health, etc.

To conclude, over the last forty years, the Israeli government has supported Intel to build fabrication factories. This was not a long-term strategic policy, but ad hoc responses to Intel's requests every time it wanted to build a new plant or upgrade a plant. The support has almost definitely led to Intel investing in Israel, and the support has helped Intel, the workers who work in Intel's fabrications plants, the people who are suppliers for the plants, and the local economy in Kiryat Gat. However, the support has been expensive for the Israeli government and the Israeli taxpayer, and its overall effect is difficult to ascertain since it is hard to identify and quantify positive externalities that resulted from the grants. Accordingly, it is unclear if Israel's industrial policy with regard to Intel can be considered a success or not. This indeterminacy, especially with regard to evaluating positive externalities, is a problem that exists by many cases of industrial policy, and the question as to whether industrial policy is effective or not in general is one that requires more research.

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OPPORTUNITIES AND CHALLENGES OF ADOPTING ARTIFICIAL INTELLIGENCE IN ACCOUNTING

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ABSTRACT

Artificial intelligence (AI) is increasingly influencing accounting. While AI adoption in accounting is still in its early stages, it holds significant potential for transforming workflows. At the same time, its implementation presents various challenges. This paper aims to explore both the opportunities and challenges that AI presents within accounting. To do so, we conduct a multivocal literature review (MLR), systematically analyzing both academic and practitioner-oriented sources to capture the dynamic and rapidly evolving landscape of AI in accounting. Our findings highlight key benefits, including efficiency gains through automation, error reduction by minimizing human mistakes, enhanced decision support through data-driven insights, and cost reduction. However, we also identify several challenges, such as ethical and regulatory concerns, data quality and transparency issues, data security risks, and the need for organizational adaptation. This paper provides a comprehensive and up-to-date analysis of AI in accounting, contributing to a more nuanced understanding of its benefits and challenges.

Keywords: Artificial Intelligence, Accounting, Automation, Digital Transformation, Machine Learning, Financial Technology, Risk Management, Ethical AI, GenAI, LLM

INTRODUCTION

Digital solutions have an increasing impact on the competitive advantage of firms. This increases the pressure on companies to take a closer look at the topics of digitalisation and the inclusion of AI in order to introduce the necessary changes in good time (McKinsey, 2024). The range of possible applications for AI is constantly growing and extends from robots in production to accounting (Bangemann and Hmyzo, 2023). The use of AI in accounting is still in its infancy in many areas, but has great potential (KPMG, 2024; Muzzu and Hmyzo, 2023). All relevant information for managing a company flow together in accounting (Wischermann and Weber, 2018). Since the advent of digitalisation, companies have acquired large amounts of data. In some cases, these ever-increasing

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volumes of data can only be processed inadequately using existing methods. New technologies are therefore needed to utilise the existing data (Muzzu and Hmyzo, 2023; Barenkamp, 2022). AI-supported systems will play a key role in this in the future. As the data in accounting mainly consists of figures and texts, the use of AI is conceivable (Hummel, 2024; Becker and Ulrich).

This use will fundamentally change the activities in the specialist departments. It can be assumed that monotonous recurring activities such as posting will decrease (KPMG, 2024). In turn, it is expected that human activities will focus more on the monitoring and interpretation of results. Moreover, the use of AI offers the opportunity to counteract the shortage of skilled labour (Barenkamp, 2024). However, despite the numerous opportunities AI presents, its adoption in accounting is accompanied by several challenges. These include concerns regarding data privacy (Leitner-Hanetseder *et al.*, 2021) and a different skillset of employees relevant (Li *et al.*, 2020).

This paper aims to explore both the opportunities and challenges that AI presents within accounting. To do so, we conduct a multivocal literature review (Garousi *et al.*, 2019) to capture the dynamic and rapidly evolving landscape of AI in accounting. By incorporating both scientific literature and practitioner-oriented grey literature (GL), this approach ensures a comprehensive understanding of the current state of research and development. It allows us to categorize and synthesize insights from both academic and industry perspectives, providing a holistic view of opportunities and challenges.

LITERATURE REVIEW

Incorporating AI in Accounting

The integration of AI applications in accounting has become increasingly important in recent years (Babatunde Adeyeri, 2024). The inclusion of AI takes place in a variety of ways and can manifest itself in both supporting and executing forms (Lee and Tajudeen, 2020).

In current practice, AI mainly has a supportive effect. It is used to automate repetitive and time-consuming tasks. Examples of this include invoice processing and fraud detection as well as creating or analysing documents (Schweitzer, 2024). In automated invoice processing, Optical Character Recognition (OCR) is used to read invoices and transfer them to accounting systems (Lee and Tajudeen, 2020; Ovington, 2024). This approach not only reduces manual effort, but also minimises the risk of human error (Ling *et al.*, 2020; Indrayani *et al.*, 2024). In addition to its supporting function, AI is also increasingly able to make independent decisions and take on more complex tasks. AI systems are already being used almost fully automatically, particularly in the areas of financial analysis,

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invoice processing and payment processing (Kommunuri, 2022). By using them, large amounts of data can be analysed almost in real time, which speeds up work processes (Leitner-Hanetseder *et al.*, 2021; Kommunuri, 2022). The use of self-learning algorithms makes it possible to continuously improve systems and thus enable them to master more complex tasks. Possible areas of application include tax planning or the consolidation of annual financial statements (Kommunuri, 2022; Zhao and Wang, 2024).

Although AI is increasingly taking over accounting tasks, human expertise will continue to play a central role (Leitner-Hanetseder *et al.*, 2021; Schweitzer, 2024). While AI is able to process data efficiently and make decisions based on what it has learnt, it lacks the ability to evaluate complex relationships in a broader context or to fully consider ethical and legal implications. There are also legal hurdles that prevent fully autonomous use. As a result, the role of accountants is increasingly shifting away from manual data processing towards tasks with greater strategic value (Hasan, 2022).

Related Work

There are already several literature reviews on this or similar topics (Fisher *et al.*, 2016; Losbichler and Lehner, 2021; Hasan, 2022; Lehner *et al.*, 2022; Dong *et al.*, 2024; Kureljusic and Karger, 2024; Li and Vasarhelyi, 2024; Smith and Lamprecht, 2024; Zhao and Wang, 2024).

With regard to the research objective, the existing research provides important points of reference, but for various reasons it is not sufficiently suitable to rely solely on it. One of the reasons for this is that they are not up to date, which is rapidly diminishing due to technological developments. On the other hand, most of the literature research only examined sub-areas, e.g. the effects of a specific AI technology or possible applications of the technology in a specialised area. There is no holistic view in the various areas of accounting. This paper aims to address this gap.

RESEARCH DESIGN

This study is based on a multivocal literature review (MLR) conducted on the overall topic of AI in accounting. The pool of literature identified through this MLR was used to analyze the theme of this paper – opportunities and challenges – as well as for a separately published analysis on prerequisites and suitable processes for AI in accounting.

The aim of this MLR is to collect, analyse and critically evaluate the existing findings on the use of AI in accounting. The review integrates both peer-reviewed academic literature and practitioner-oriented

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grey literature, ensuring a comprehensive understanding of current trends and challenges. A multivocal literature review (MLR) combines a systematic literature review (SLR) and a grey literature search (Garousi *et al.*, 2019). The SLR was conducted using the following search string in the Web of Science database:

((TI=("Accounting") OR TS=("Accounting and Controlling" OR "Accounting and Finance" OR "Accounting and Auditing"))) AND (TS=("AI" OR "artificial intelligence" OR "machine learning" OR "deep learning" OR "ChatGPT" OR "GenAI" or "LLM")))

The search resulted in 502 hits which were filtered by language (English) and category (Business Finance, Management, Computer Science Artificial Intelligence, Computer Science Information Systems, Business, Computer Science Interdisciplinary Applications). This left 284 articles. After screening the titles and abstracts, 27 titles remained for full-text analysis, of which 26 were relevant. A backward search resulted in four additional articles. This backward search increased the degree of coverage (Webster and Watson, 2002). The final sample of the systematic literature analysis thus comprised 30 articles (26 + 4).

The articles were selected and analysed on the basis of two pre-defined key questions. Each article found was manually scanned for relevant content to answer the key questions. Following Webster and Watson (Webster and Watson, 2002), the literature was systematically searched and the results recorded in a table. This procedure allows the selection process to be tracked, the content to be compared and facilitates discussion (Reiff and Schlegel, 2022).

Key questions for the literature analysis on the use of AI in accounting	
Q1:	What challenges and risks arise from the use of AI?
Q2:	What opportunities does the use of AI open up?

Table3 : Key questions on MLR

The WoS research was supplemented by a Google search to review grey literature. Entering the search terms resulted in around 240,000,000 hits. As it is impossible to review all articles with the existing resources, the stop criterion of effort limitation recommended by Garousi et al. (Garousi *et al.*, 2019) was used. This meant that only a fixed number of articles were viewed. Sponsored articles and other adverts were not taken into account. Using a web crawler, the search string was entered into the Google search and then the first 100 hits were automatically recorded in tabular form for each key date. After screening the titles and excluding duplicates with the SLR, 52 articles remained for full-text

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analysis. These consisted of 49 articles and 3 papers. Many of the 52 articles analysed dealt with similar problems, which led to thematic overlaps and a saturation of information (Garousi *et al.*, 2019). For this reason, not all from the grey literature were referenced in this paper, but all 52 relevant articles were evaluated and taken into account for the analysis.

RESULTS ON OPPORTUNITIES OF ADOPTING AI IN ACCOUNTING

The potential applications and associated added value of AI in accounting are diverse. The use of AI is often associated with the term efficiency (Hasan, 2022; Boritz and Stratopoulos, 2023; Schweitzer, 2024). Working more efficiently, e.g. by reducing routine activities, is also the most frequently mentioned opportunity in the MLR evaluation. For example, 30 out of 31 academic papers and 50 out of 52 grey literature contributions analysed mentioned the topic of efficiency (80/83). Closely related to efficiency are the topics of error reduction (67/83) and decision support (65/83), which were also directly addressed in many articles. Cost reductions achieved through the use of AI were explicitly mentioned in 37 out of 83 articles and are therefore another important driver for the use of AI. Furthermore, some literature sources mentioned other opportunities made possible by the use of AI. These included the improvement of customer support through the integration of AI-supported chatbots or the detection of attempted fraud (Zhao and Wang, 2024). The four most frequently mentioned terms are analysed in more detail below.

Efficiency

According to the analysis, increasing operational efficiency is the biggest driver for the use of AI in accounting (Kommunuri, 2022; Boritz and Stratopoulos, 2023). Posting transactions, auditing, preparing reports and calculating key figures are routine tasks that are traditionally time-consuming and labour-intensive (Takyar, 2023; Zhao and Wang, 2024; Fanarredha, 2024). With AI, these tasks can be performed more efficiently and with fewer resources (Hasan, 2022; Cook, 2024). According to the literature, the automation of repetitive tasks using software robots is one of the most effective and widespread ways of utilising AI (Kokina and Blanchette, 2019). The ability to use intelligent RPA solutions not only to automate process steps but also to accelerate entire workflows leads to considerable increases in efficiency (Upwork, 2023). Software robots are significantly faster than human users and are not subject to working time restrictions (Ling *et al.*, 2020; Indrayani *et al.*, 2024). In addition, AI has the ability to process large amounts of data reliably and quickly. Patterns, trends and risks can therefore be recognised almost in real time and made available to the user (Cao *et al.*, 2024; Kureljusic and Karger, 2024). This significantly reduces the time-consuming viewing and

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preparation of data (Babatunde Adeyeri, 2024). This also results in time savings and lower error rates (Li and Vasarhelyi, 2024). In addition, AI can recognise bottlenecks that are difficult to detect using traditional methods. For example, data mining enables the extraction of logical relationships from company data, which leads to proactive problem solving and contributes to more efficient work (Onyshchenko *et al.*, 2022; Yi *et al.*, 2023).

Error eduction

The use of artificial intelligence in accounting contributes significantly to reducing the error rate, as AI systems are able to perform tasks with high precision and consistency (Takyar, 2023; Indrayani *et al.*, 2024). One of the main causes of errors in accounting is the manual processing of data. Human errors, such as typos, incorrect allocations or postings, are often the cause. AI-based systems minimise these risks by performing standardised processes automatically, systematically and almost error-free (Bakarich and O'Brien, 2021; Kommunuri, 2022; Colson, 2024). A decisive factor for error reduction is the ability of AI to analyse large amounts of data in real time and to recognise patterns and anomalies (Takyar, 2023; Cao *et al.*, 2024). AI algorithms can identify inconsistencies and irregularities that indicate potential errors (Kureljusic and Karger, 2024; Zhao and Wang, 2024). In addition, AI systems are continuously learning through the use of machine learning (Ling *et al.*, 2020). Another advantage of AI is its independence from fatigue or distraction, which often lead to errors among employees. AI systems work consistently and precisely, even with high workloads or complex tasks (Ling *et al.*, 2020). In addition, AI supports compliance with regulations by providing employees with the applicable standards and laws and observing them when processing data (Ling *et al.*, 2020; Bose *et al.*, 2022; Kiley, 2023). Violations of rules, which are often caused by ignorance or negligence, can thus be reduced (Щирба *et al.*, 2024).

Decision support

By analysing large amounts of data, AI solutions can provide significant support in decision-making. The possibilities here are also diverse. Machine learning models are particularly good at recognising patterns and trends from large amounts of data or creating forecasts (Takamizawa, o. J.). These applications are suitable, for example, for testing and control purposes in controlling or risk management. Large language models (LLM), on the other hand, can analyse and summarise texts and thus support decision-making (Fisher *et al.*, 2016; Dong *et al.*, 2024). More complex issues such as insolvency predictions can be modelled using neural networks (Fisher *et al.*, 2016; Kureljusic and Karger, 2024; Takamizawa, o. J.). The use of AI also favours more objective decisions, as these no longer depend solely on human experience and judgement (Yi *et al.*, 2023).

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Cost reduction

Efficiency gains through automation, improved decision-making and fewer manual corrections due to a lower error rate all lead to AI solutions reducing costs in the medium term (Takyar, 2023; Babatunde Adeyeri, 2024). Furthermore, the use of AI enables employees to be reallocated to higher-value tasks, which can lead to direct or indirect savings and contribute to an increase in added value (Kokina and Blanchette, 2019; Vărzaru, 2022; Marques *et al.*, 2023). All measures generally contribute to optimising the company's success in the medium and long term. AI systems that work precisely and consistently therefore minimise costs and risks (Kommunuri, 2022; Babatunde Adeyeri, 2024). The following table shows the benefits mentioned in the SLR.

	Efficiency	Error reduction	Cost reduction	Decision making
Dong et al., 2024	1	0	1	1
Yi et al., 2023	1	1	0	1
Mihai and Duţescu, 2022	1	0	1	1
Zhao and Wang, 2024	1	0	1	1
Kommunuri, 2022	1	0	1	1
Lehner et al., 2022	0	0	0	0
Cao et al., 2024	1	0	0	1
Kureljusic and Karger, 2024	1	1	0	1
Zhang et al., 2023	1	1	0	1
Losbichler and Lehner, 2021	1	0	0	0
Щирба et al., 2024	1	0	1	1
Al Wael et al., 2024	1	1	1	0
Lee and Tajudeen, 2020	1	1	1	1
Vărzaru, 2022	1	1	0	1
Leitner-Hanetseder et al., 2021	1	1	0	1
Li and Vasarhelyi, 2024	1	1	0	1
Kokina and Blanchette, 2019	1	1	1	0
Stancu and Duţescu, 2021	1	1	0	1
Marques et al., 2023	1	1	1	1
Smith and Lamprecht, 2024	1	1	0	1
Indrayani et al., 2024	1	1	0	1
Fisher et al., 2016	1	0	0	1
Onyshchenko et al., 2022	1	1	1	1
Хомяк et al., 2022	1	1	1	1
Boritz and Stratopoulos, 2023	1	1	0	1
Shi	1	1	1	1
Bakarich and O'Brien, 2021	1	0	1	1
Ling et al., 2020	1	1	1	0
Chen et al., 2023	1	1	0	0
Bose et al., 2022	1	1	0	1
Hasan, 2022	1	1	1	1
Total	30	21	15	25

Table 1. *Overview of benefits from the literature analysis*

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RESULTS ON CHALLENGES OF ADOPTING AI IN ACCOUNTING

In addition to considerable potential, the integration of AI into accounting also harbours a wide range of challenges, which will now be examined in more detail. After analysing the MLR, these challenges include ethical and regulatory issues (36/83), data quality and transparency (34/83), data security (34/83) and organisational changes (33/83). In addition, technology dependency, negative effects on employees and a lack of standards were also cited as risks.

Ethical and regulatory issues

The ethical challenges are manifold (Pierotti *et al.*, 2024). These include issues such as data protection, transparency and dealing with process changes (Dong *et al.*, 2024; Zhang *et al.*, 2023; Hasan, 2022). The many uncertainties here represent a particular hurdle for the use of AI (Vărzaru, 2022; Babatunde Adeyeri, 2024).

The bias and fairness of data are further ethical and regulatory problems, some of which still need to be clarified, as the results of AI can sometimes show discriminatory or erroneous tendencies (Yi *et al.*, 2023; Zhang *et al.*, 2023; Pierotti *et al.*, 2024). In accounting, where decisions often have far-reaching financial and legal consequences, distortions in particular can have serious consequences. Careful review and optimisation is therefore required to ensure that AI systems deliver objective and fair results (Lehner *et al.*, 2022).

Regulatory authorities are also called upon to create uniform standards in this regard. Their task is to set the appropriate framework conditions in order to adapt existing and new laws and regulations to the technological circumstances (Zhang *et al.*, 2023; Pierotti *et al.*, 2024). The current lack of specific regulations for the use of AI in accounting creates uncertainty in companies. This results in a lack of planning certainty, which inhibits the use of AI (Bose *et al.*, 2022).

Data quality and transparency

The key challenges in dealing with AI include the issues of data quality and transparency (Lehner *et al.*, 2022). The two are closely linked. AI systems, especially those based on machine learning, often make decisions based on algorithms whose decision-making logic is difficult for outsiders to understand (Pierotti *et al.*, 2024; Schweitzer, 2024). This so-called "black box" problem poses a problem in accounting, where accuracy and traceability are essential (Lehner *et al.*, 2022; Mihai and Duţescu, 2022). The accuracy of AI solutions also depends to a large extent on the accessibility and quality of the data (Zhao and Wang, 2024). AI tools generate their knowledge from training data and other

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accessible information. This means that a system is only as good as the training data provided (Pierotti *et al.*, 2024).

Data security

AI systems in accounting process large amounts of sensitive data, be it business balance sheets, tax information or personal information. Ensuring data security is therefore essential (Yi *et al.*, 2023; Pierotti *et al.*, 2024). Companies must carefully consider which data is actually necessary for the operation of AI and take appropriate measures to restrict access and train employees (Leitner-Hanetseder *et al.*, 2021; Onyshchenko *et al.*, 2022; Zhang *et al.*, 2023; Lilac Bar, 2024). Moreover, ensuring data security internally is also an organisational challenge. This is because AI solutions require many different parameters to achieve optimum results. At the same time, not every user should be able to access all data (Leitner-Hanetseder *et al.*, 2021; Zhang *et al.*, 2023).

Organisational changes

The use of AI in accounting has far-reaching effects on existing business processes and organisational structures (Babatunde Adeyeri, 2024). AI not only changes the way in which tasks are performed, but also the role of specialists and the demands placed on their skills (Vărzaru, 2022). These process changes affect operational activities as well as strategic and analytical functions, which influences the entire accounting system (Leitner-Hanetseder *et al.*, 2021; Vărzaru, 2022; Marques *et al.*, 2023; Takyar, 2023). One of the most significant changes can be seen in the automation of repetitive tasks, where up to 40% of tasks are already automated according to Emetaram and Uchime (2021). Activities such as posting business transactions, processing invoices or reconciling accounts, which were traditionally carried out manually or by rule-based systems, can be largely automated by AI (Kokina and Blanchette, 2019; Kommunuri, 2022; Al Wael *et al.*, 2024). By using algorithms for data processing and pattern recognition, AI systems can analyse large amounts of data faster and more precisely, which reduces the error rate and increases efficiency (Stancu and Duţescu, 2021; Kommunuri, 2022; Takyar, 2023). As a result, skilled workers can increasingly focus on more complex tasks that require strategic thinking and human judgement (Leitner-Hanetseder *et al.*, 2021; Stancu and Duţescu, 2021). The automation of repetitive tasks means that traditional accounting skills alone are no longer sufficient. Instead, skills in the areas of data analysis, technological understanding and strategic thinking are becoming increasingly important (Stancu and Duţescu, 2021; Vărzaru, 2022). Further training and retraining of employees are therefore essential to ensure that they are able to meet the requirements of the new technological environment (Pierotti *et al.*, 2024).

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The integration of AI also leads to changes in collaboration between different departments (Kokina and Blanchette, 2019). This leads to greater integration between accounting, IT and other areas of the company. This favours better decisions (Leitner-Hanetseder *et al.*, 2021). In addition to the advantages mentioned above, the use of AI also brings with it new requirements for accounting processes. For example, companies must adapt their data infrastructure to enable the connection and processing of data (Al Wael *et al.*, 2024; Smith and Lamprecht, 2024). The following table shows the SLR mentions for the analysed topics.

	Ethical and regulatory challenges	Data quality and transparency	Data security	Process changes
Dong et al., 2024	1	1	1	0
Yi et al., 2023	1	1	1	0
Mihai and Duţescu, 2022	1	1	1	1
Zhao and Wang, 2024	1	1	1	0
Kommunuri, 2022	0	1	0	0
Lehner et al., 2022	1	1	1	0
Cao et al., 2024	1	1	0	0
Kureljusic and Karger, 2024	0	1	0	1
Zhang et al., 2023	1	1	1	1
Losbichler and Lehner, 2021	1	1	0	1
Ширба et al., 2024	0	1	0	0
Al Wael et al., 2024	1	0	1	0
Lee and Tajudeen, 2020	0	0	1	0
Vărzaru, 2022	1	1	1	0
Leitner-Hanetseder et al., 2021	1	1	0	1
Li and Vasarhelyi, 2024	0	1	0	0
Kokina and Blanchette, 2019	0	0	0	1
Stancu and Duţescu, 2021	1	0	0	1
Marques et al., 2023	1	1	0	1
Smith and Lamprecht, 2024	0	1	1	0
Indrayani et al., 2024	0	1	1	1
Fisher et al., 2016	0	0	0	0
Onyshchenko et al., 2022	1	0	1	0
Хомяк et al., 2022	1	1	1	0
Boritz and Stratopoulos, 2023	1	1	1	1
Shi	1	1	1	1
Bakarich and O'Brien, 2021	0	0	0	1
Ling et al., 2020	0	0	0	0
Chen et al., 2023	0	0	0	1
Bose et al., 2022	0	1	1	0
Hasan, 2022	1	1	1	1
Total	18	22	17	14

Table 2. *Overview of challenges from the literature analysis*

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CONCLUSION AND DISCUSSION

Summary and Contribution to Knowledge

Overall, the use of AI in accounting offers considerable opportunities to optimise processes and create strategic advantages. At the same time, however, integration requires a well thought-out approach and consideration of technical, legal and ethical aspects. It is therefore necessary to examine on a case-by-case basis whether AI solutions are currently more beneficial or detrimental.

Compared to prior studies, this paper contributes to knowledge by synthesizing AI's potential and limitations in a single comprehensive analysis. While existing research often focuses on specific AI applications or risks, this study provides an overarching perspective.

Implications

The findings have important implications for firms. Organizations planning to integrate AI into accounting processes should take a strategic approach, ensuring that they have the necessary technological infrastructure and data management systems in place. Furthermore, employee training and change management initiatives are essential to help professionals adapt to AI-driven workflows and maximize value creation.

Effective AI governance is crucial for organizations to manage risks and optimize AI's benefits. Firms should establish clear internal guidelines for AI deployment, ensuring accountability, transparency, and ethical AI use. Governance frameworks should define decision-making responsibilities, oversight mechanisms, and continuous monitoring of AI systems to prevent unintended consequences. Additionally, integrating AI governance into broader corporate governance structures will help organizations align AI initiatives with strategic objectives and risk management practices. By proactively addressing governance challenges, firms can ensure AI adoption enhances both operational efficiency and long-term sustainability.

Limitations

Despite the systematic approach of this study, several limitations should be acknowledged. First, the selection of literature – particularly the inclusion of grey literature – introduces an element of subjectivity, as some non-peer-reviewed sources may contain biases. Second, due to AI's rapid evolution, the findings represent a snapshot in time, and new developments may quickly reshape the landscape. Third, while this paper identifies key benefits and challenges, empirical validation, e.g.

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through case studies or interviews, is needed to better understand AI's impact in real-world accounting settings.

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SUSTAINABLE REPORTING IN HEALTHCARE: A SYSTEMATIC REVIEW OF FRAMEWORKS, INDICATORS, AND STRATEGIC IMPERATIVES

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ABSTRACT

The escalating costs, environmental repercussions, and social disparities within the healthcare sector have rendered sustainability reporting a strategic necessity. This systematic literature review examines current practices in measuring and reporting sustainability in healthcare, synthesizing insights from a collection of 57 documents. The study utilizes a multi-stage methodology to identify, screen, and thematically analyze the literature, categorizing it into six essential areas: Economic and Operational Efficiency, Environmental Impact, Frameworks and Indicators, Policy, Governance, and Strategic Implementation, Social Responsibility, and Technology and Digital Transformation. Our findings indicate that sustainability reporting serves as a critical mechanism for enhancing efficiency, facilitating effective governance, and promoting social accountability in healthcare institutions and hospitals. It translates abstract goals into quantifiable metrics, linking operational performance to strategic objectives. The review underscores a significant transition away from fragmented, compliance-centered reporting towards integrated, data-driven models that leverage advanced analytics, artificial intelligence, and multi-criteria decision-making frameworks. This research establishes a cohesive foundation for future scholarly pursuits and provides practical, evidence-based recommendations for policymakers and managers. Ultimately, it presents a forward-looking agenda that advocates for the well-informed institutionalization of sustainability reporting at all levels, aiming to create a more resilient and equitable healthcare system for the future.

Keywords: healthcare; hospital; healthcare systems; sustainability reporting; ESG; CSR; indicators; evaluation; compliance; disclosures

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1. INTRODUCTION

The global healthcare sector faces a critical juncture, confronting rising operational costs (Wu & Liang, 2025), persistent inequities in access (Andrades et al., 2024), and significant environmental impacts (Gökler & Boran, 2025). These converging pressures, intensified by the post-pandemic context, threaten the long-term sustainability of health systems and have elevated sustainability from a peripheral concern to a central strategic priority. The demand for clear, comprehensive, and standardized reporting mechanisms has therefore grown, with Messmann et al. (2024) noting that such tools are now viewed not only as compliance instruments but as essential for informed decision-making and genuine accountability to diverse stakeholders.

Against this backdrop, this review systematically examines literature on sustainable reporting in healthcare, emphasizing the need for robust frameworks and measurable indicators. While sustainability reporting is established in other industries, its application in healthcare remains fragmented. Existing studies often isolate economic, environmental, or social dimensions rather than integrating them into a unified framework (Huang et al., 2024; Regragui et al., 2024; Soares et al., 2023). This review addresses that gap by synthesizing findings from 57 documents identified through a multi-stage screening process, highlighting trends, research gaps, and opportunities for more strategic, system-wide approaches. The paper proceeds as follows: Section 2 describes the methodology for literature identification and selection; Section 3 details the quality assessment and thematic analysis; Section 4 discusses findings from six thematic categories; and Section 5 concludes with a synthesis and research agenda.

2. RESEARCH SCOPE AND JUSTIFICATION

The primary aim of this study is to systematically review the global literature on sustainability reporting in healthcare, addressing the need to understand how hospitals and health systems measure, evaluate, and disclose their sustainability performance. Using a multi-stage methodology, from literature sampling to thematic synthesis, this work integrates fragmented findings into a unified body of knowledge, identifying trends and research gaps. The study pursues three objectives:

- *Categorize literature on healthcare sustainability reporting into thematic areas covering economic, environmental, social, and technological dimensions.*

- *Analyze methodologies, frameworks, and indicators used for measurement and reporting, assessing their effectiveness across diverse settings.*

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- *Synthesize key findings, highlighting the critical role of sustainability reporting and outlining a research agenda focused on methodological, technological, and theoretical advancements.*

In terms of theoretical and academic contribution, this research strengthens academic discourse in a rapidly evolving field by systematically identifying, screening, and synthesizing a substantial corpus of studies. It proposes a thematic categorization that serves as an organizing principle for future scholarship and aims to develop theoretical models explaining the drivers of sustainability and critical success factors in healthcare. Beyond summarizing current knowledge, it identifies underexplored areas such as the economic benefits of green initiatives and the effects of regulatory frameworks, moving from descriptive analysis toward actionable research frameworks.

Regarding practical contribution, for policymakers, managers, and practitioners, the current thematic analysis offers a clear roadmap for enhancing sustainability reporting. By showcasing effective methodologies and key performance indicators, it provides evidence-based guidance for initiatives in waste reduction, energy optimization, and supply chain efficiency. This equips hospital administrators with tools for strategic decision-making, resource allocation, and investment in green technologies, while also improving organizational knowledge management.

3. MATERIALS AND METHODS REVIEW

To achieve the goals of the study we deploy the (Kitchenham, 2004) methodology which is a four-step process for conducting systematic reviews. It starts by a) identifying relevant studies, then b) selecting the most appropriate ones. Next, c) assessing the quality of those selected studies, and finally, d) extracting and synthesize the data from them.

3.1 Literature Review Sample - Identification of Studies & Initial Cleaning

The process of identifying relevant literature commenced with a thorough search across two key academic databases, the Scopus Citation Index and Google Scholar. This search utilized a combination of carefully selected keywords aimed at encompassing the extensive research on sustainable reporting within the healthcare sector. The specific keywords and search strings used are outlined in Table 1. This initial information retrieval process resulted in a compilation of **214** documents for review, which constituted the preliminary literature corpus.

Table 1. *Combinations of search terms/ keywords and Boolean operators used in Scopus & Google Scholar to search documents in the sustainability reporting in healthcare topic*

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- TITLE-ABS-KEY("sustainability reporting") AND ("healthcare" OR "hospitals" OR "healthcare systems")
- TITLE-ABS-KEY("ESG reporting") AND ("healthcare" OR "hospitals" OR "healthcare systems")
- TITLE-ABS-KEY("hospital sustainability" OR "healthcare sustainability" OR "healthcare systems") AND ("reporting" OR "indicators" OR "CSR" OR "evaluation" OR "compliance" OR "disclosures")

Following the initial retrieval, a preliminary analysis was conducted to refine the corpus and ensure its relevance and uniqueness. This phase involved a thorough screening process aimed at identifying and eliminating duplicate entries and documents considered false positives. Consequently, a total of 103 documents were removed from the corpus; of these, 79 were identified as duplicates, having been retrieved from both the Scopus and Google Scholar searches. Additionally, 24 documents were excluded as false positives, as their titles and abstracts suggested they were not directly relevant to the core research topic. After this initial screening, a final, refined corpus of **111** documents remained for the next layer of studies selection criteria.

3.2 *Studies selection criteria*

Following the initial analysis, a second, more detailed layer of screening was applied to the refined corpus of 111 documents. This stage was essential to ensure that each document in the final sample was not only pertinent to the topic but also appropriate for in-depth analysis. The selection criteria focused on three specific aspects: the language of the document, its accessibility, and the nature of its content. Documents that did not meet these criteria were systematically excluded to create a high-quality, targeted research sample. The application of these criteria led to the removal of 29 additional documents from the literature review corpus. Specifically, 6 documents were excluded because they were published in a language other than English. Additionally, 14 documents were removed because they were inaccessible, that is, we were unable to obtain the full text to conduct a thorough assessment of their content. Finally, 9 documents were identified as announcements, editorial notes, or calls for papers that lacked a unique research contribution and were therefore unsuitable for inclusion. After these exclusions, the final literature review corpus was composed of **82** documents, which serve as the foundation for the subsequent analysis.

3.3 Studies quality assessment

A prevalent critique of literature reviews, which often results in their perception as subjective and of lower quality, arises from the methodologies employed in source selection (Smith, 2018). Notably, the third step (quality assessment) presents significant challenges, as differing evaluation methods can produce varied outcomes. To reduce bias and delineate the documents to be excluded, we adopted a combine approach for assessing the quality of the selected sources. This approach integrates the

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methodologies proposed by (Batini et al., 2009) and (Bano & Zowghi, 2015). Batini et al. (2009) identify four essential quality criteria: timeliness, completeness, accuracy, and consistency, while Bano and Zowghi (2015) offer further elaboration on each of these criteria. To demonstrate how these two frameworks were integrated, we have provided the following table (Table 2).

Table 2. *Integrated Quality Assessment Criteria for Literature Review Documents, based on the frameworks of Batini et al. (2009) and Bano & Zowghi (2015).*

Qualitative Criteria based on Batini et al. (2009)	Explanation based on Bano and Zowghi (2015)
Timeliness: as a quality criterion, means that a study should cite and incorporate recent relevant research and published works.	Address the criterion: The study included within the sample was published in the past 10 years, from 2015 to 2025
Completeness: To be considered complete, a study must provide a detailed description of its methodological research approach.	Address the criterion: *For survey development studies:* the authors clearly define the sample size, justify the reason behind each assessment variable and present the results straightforwardly *For experiments:* the variables that are involved have been measured for their adequacy and information about prior related experiments takes place *For case studies:* the case study context is clearly described and defined from the initial stages of observations until the conclusions and suggestions to practitioners
Accuracy: For a study to be considered accurate, its aims and objectives must be clearly stated, and the materials and methods used should be described with clarity.	Address the criterion: The included study clearly states its aims/objectives, thoroughly describes data collection methods, and supports key statements with citations from prior research.

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Consistency: as a quality criterion, means the proposed research design effectively addresses the defined research questions.	Address the criterion: A study within the current sample demonstrates consistency when it employs a suitable research design that clearly addresses its research questions.

Subsequently, following the initial two layers of screening, a thorough quality assessment was conducted on the remaining 82 documents to reduce bias and ensure the robustness of the final literature corpus. This process involved a comprehensive manual in-depth analysis of each paper by at least two members of the research team, aimed at minimizing subjectivity in the evaluation. The quality assessment was guided by a combined framework that incorporated the criteria of timeliness, completeness, accuracy, and consistency, as defined by Batini et al. (2009) and further elaborated upon by Bano and Zowghi (2015). This detailed examination led to the exclusion of 25 more articles that failed to meet the established quality standards. In the next figure (Figure 1), the sequential steps of literature review corpus is articulated through the PRISMA approach. Consequently, the final selection comprised **57** documents, which were retained for the subsequent stages of data extraction and synthesis.

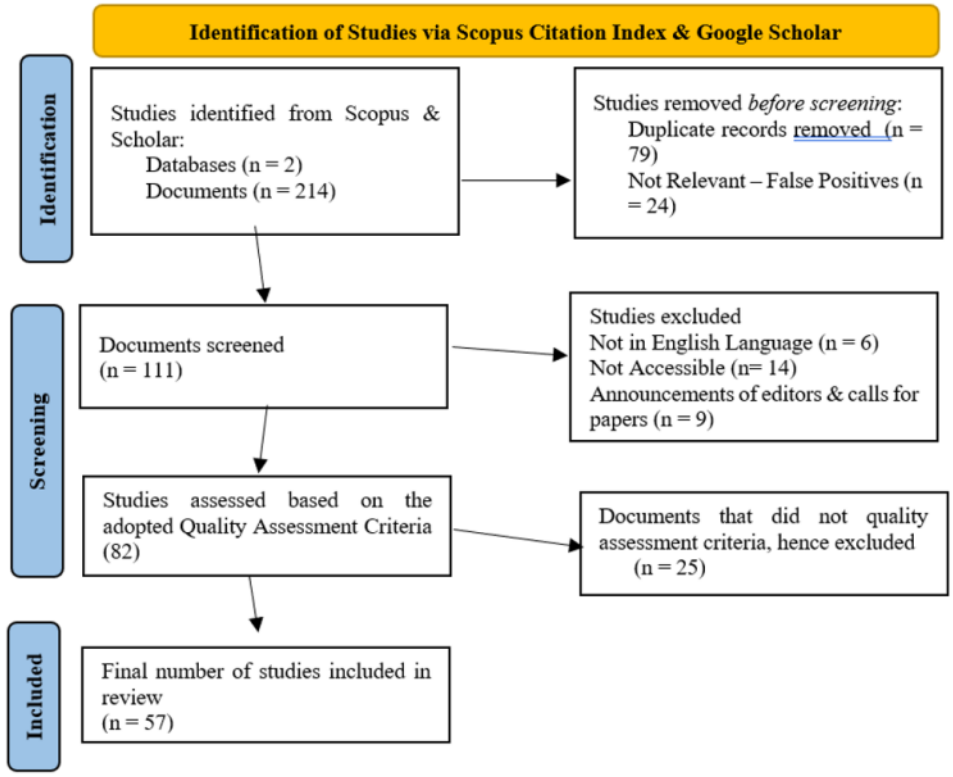


Figure 1. *PRISMA flow diagram illustrating the systematic process of identifying, screening, and selecting studies for the literature review.*

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3.3 *Data Extraction and Synthesis*

The final phase of the methodology involved a detailed extraction and synthesis of data from the 57 documents selected for review. To systematically analyze this body of work and identify key thematic patterns, we employed a thematic analysis approach. This flexible and widely used qualitative method allows for the identification, analysis, and reporting of patterns (themes) within data, making it particularly effective for summarizing diverse bodies of literature (Clarke & Braun, 2017; Morin et al., 2021). This approach enabled us to go beyond a straightforward descriptive summary and develop a more nuanced understanding of the major topics addressed in the literature regarding the necessity and importance of sustainability reporting in healthcare.

Through this process, six distinct themes emerged, representing the primary research topics in the selected literature. Each document was assigned to one of these themes based on its central focus. The resulting categories and their respective document counts were as follows:

- Economic and Operational Efficiency in Sustainability: 5 documents
- Environmental Impact and Resource Management: 18 documents
- Frameworks and Indicators for Sustainability Reporting: 19 documents
- Policy, Governance, and Strategic Implementation: 3 documents
- Social Responsibility and Patient-Centered Sustainability: 5 documents
- Technology and Digital Transformation for Sustainability: 7 documents

A crucial consideration during the thematic analysis was the potential for subjectivity in the categorization of documents in each one of the topics. To address this issue and enhance the rigor of the findings, a collaborative approach was adopted. More specifically, each paper was assigned to a specific category by at least two members of the research team to validate the categorization. Any discrepancies were resolved through discussion and consensus, a method that is widely acknowledged for enhancing the reliability of qualitative data coding (Cole, 2024; Van IJzendoorn & Miedema, 2025). This team-based process ensured that the final categorization of the 57 documents was robust, while also minimizing as much as possible the subjectivity. The subsequent sections of this study will offer a detailed examination of each of these six categories, providing a comprehensive overview of the current state of research on sustainable reporting in healthcare.

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4. RESULTS AND DISCUSSION

The forthcoming sections will offer a detailed exploration of each category, highlighting key findings and the documents that contributed to them. For each paper discussed, we emphasize its specific role in elucidating the necessity and significance of sustainability reporting in healthcare. Additionally, we explore and suggest novel research avenues and innovative methodological approaches presenting a forward-looking perspective on the field.

4.1 Economic and Operational Efficiency in Sustainability

This category covers studies emphasizing the economic and operational aspects of healthcare sustainability, focusing on cost efficiency, resource optimization, and effective management. (Almoajel, 2025) empirically examines how Evidence-Based Management (EBM) enhances cost efficiency, equity, and accessibility in Saudi healthcare, using advanced mixed methods and analytics. The study finds that while EBM supports these goals, improvements in equity and accessibility may sometimes compromise sustainability, offering a scalable framework for managing such trade-offs. From a financial perspective, (Palozzi et al., 2020) systematically review telemedicine costs, distinguishing "implementation" from "delivery" expenses, and providing a tool for feasibility analysis that underscores the need for structured financial reporting. (Cavicchi, 2017) highlights the role of intellectual capital, leadership, culture, and performance measurement, in Italian healthcare sustainability, noting a gap between policy and operational implementation, with cost accounting outweighing broader metrics. (Erjaee et al., 2022) introduce a fuzzy multi-criteria decision-making model aligned with the Triple Bottom Line to evaluate sustainability and pinpoint priority interventions. (Khosravi & Izbirak, 2019) propose a stochastic model to measure the probability that healthcare capacity exceeds challenges, revealing higher social sustainability than environmental or economic performance in an Iranian hospital. Overall, these works show that sustainable healthcare relies on robust, data-driven frameworks combining financial, operational, and social dimensions, thereby guiding targeted improvements and opening new research on sustainability reporting methods. In the next table a summary of the findings and the potential research avenues are taking place (Table 3).

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Table 3. *Summary of research avenues, key contributions and potential approaches – Topic: Economic and Operational Efficiency*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Integration of Advanced Analytics and AI	Almoajel (2025), Khosravi et al. (2019)	Move reporting from a retrospective to a predictive function, enabling proactive decision-making.	AI-driven predictive models (e.g., XGBoost) to forecast the impact of sustainability interventions.
Development of Comprehensive, Multi-Contextual Frameworks	Palozzi et al. (2020), Cavicchi (2017) (Castro et al., 2015)	Create standardized, generalizable reporting frameworks that integrate financial, social, and environmental metrics.	New reporting frameworks that can be adapted across different countries and healthcare contexts, moving beyond fragmented models.
Application of Advanced Mathematical Models	Erjaee et al. (2022), Khosravi et al. (2019)	Handle uncertainty and complex data, offering a more robust way to measure sustainability and provide a foundation for evidence-based reporting.	Advanced mathematical and statistical models (e.g., Fuzzy MCDM, stochastic models) and multivariate regression techniques.
Qualitative Approaches for Stakeholder-Inclusive Reporting	Cavicchi (2017), Almoajel (2025)	Co-create reporting systems with frontline staff, managers, and patients to ensure metrics are relevant and integrated into daily operations.	Innovative qualitative methodologies like ethnographic or participatory action research to address subjectivity and lack of engagement.

4.2 *Environmental Impact and Resource Management*

This category examines the environmental footprint of healthcare operations, including energy and water use, waste generation, and carbon emissions. For the sake of coherence and readability, we have included only ten papers from this category, rather than all eighteen, to maintain an appropriate length for this literature review. (Vacharathit et al., 2022) describe a Cleveland Clinic fellowship promoting sustainable surgical practices, achieving a 20% water reduction, diverting one million pounds of plastics, and cutting 717 metric tons of CO_2 annually. (Kjelle et al., 2024) show that reducing low-value imaging can save billions in costs and thousands of metric tons of CO_2, requiring coordinated policy and clinical action. (Knagg et al., 2024) highlight public support for sustainable care when quality, safety, and access are maintained, stressing transparent patient engagement.

From a systems perspective, (Blom et al., 2025) outline Kenya's net-zero healthcare pathway, prioritizing local data generation amid funding and infrastructure barriers. (Dolcini et al., 2025) find high sustainability awareness in Italy but limited resources, pointing to tools like BEMS and CMMS and calling for standardized metrics. (Khalid et al., 2024) adapt the Sustainability Balanced Scorecard in an Australian hospital to assess both internal and external environmental risks.Focusing on waste, (Nematollahi et al., 2024) apply Life Cycle Assessment in an Iranian hospital, recommending composting and material recovery for minimal emissions. (Abu-Shaikha, 2025) use Analytical

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Hierarchy Process to rank sustainable hospital design priorities in Jordan, emphasizing site planning and energy efficiency. (Rotaru et al., 2024) review Romanian elderly care policies, noting progress in assistive technologies but insufficient environmental integration. Together, these studies show that environmental sustainability in healthcare demands standardized reporting, robust measurement tools, and targeted interventions, ranging from LCAs (Nematollahi, Kjelle) to decision-support frameworks (Khalid, Abu-Shaikha), and systemic gap analyses (Dolcini, Blom), to bridge the divide between awareness and implementation.

Table 4. *Summary of research avenues, key contributions and potential approaches – Topic: Environmental Impact and Resource Management*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Standardized Global/Local Reporting Frameworks	Blom et al. (2025), Dolcini et al. (2025), Kjelle et al. (2024) (Zhu et al., 2018)	Develop a universal reporting system that can be customized to local contexts and resource constraints.	Blending top-down international standards (e.g. SDGs) with bottom-up, localized data collection to create actionable and comparable metrics.
Integrated Performance Measurement	Almoajel (2025), Khosravi et al. (2019), (Cimprich et al., 2019; Pederneiras et al., 2023)	Create holistic reporting models that simultaneously track environmental, social, and economic metrics to manage the trade-offs between them.	Developing integrated scorecards (e.g., SBSC) or multi-criteria decision models (e.g., AHP, Fuzzy MCDM) that assign weighted values to environmental and social factors alongside traditional financial metrics.
Action-Oriented Reporting for Clinical Micro-Systems	Vacharathit et al. (2022), Kjelle et al. (2024), Knagg et al. (2024), (De Ridder et al., 2022)	Design reporting systems that directly link specific clinical practices and micro-level operations to environmental outcomes.	Developing and embedding carbon auditing tools and waste management metrics within electronic health records (EHRs) and clinical decision support systems.
Predictive Modeling for Risk Management	Khalid et al. (2025), Blom et al. (2025)	Use reporting data to build predictive models that anticipate the impact of exogenous environmental events (for example, climate change) on hospital operations.	Applying methodologies like Dynamic Network Analysis (DNA), advanced text analytics, or stochastic models to forecast resource needs, infrastructure vulnerabilities, and operational disruptions based on environmental data.

4.3 *Frameworks and Indicators for Sustainability Reporting*

This category of articles covers scholarly works investigating frameworks and indicators for sustainability reporting, emphasizing the importance of measuring and managing environmental and social impacts to achieve sustainability in healthcare. Ten selected articles uniquely contribute to the topic. Sherman et al. (2020) provide a comprehensive narrative review outlining healthcare sustainability science and introducing a framework for standardized metrics. Using a consensus-based

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approach via the "Working Group for Environmental Sustainability in Clinical Care," they call for a comprehensive life cycle inventory database for medical devices and drugs, and for integrating environmental performance metrics into quality and safety reporting systems.

Khalid et al. (2024) explore the Sustainability Balanced Scorecard (SBSC) for public hospitals, incorporating both internal and external environmental risks. A case study in an Australian hospital shows the SBSC is superior to traditional scorecards in distinguishing between waste disposal and climate change-related events. They propose adding a "fifth perspective" for uncontrollable environmental events, expanding SBSC's scope. AlJaberi et al. (2020) develop a hierarchical framework to measure and prioritize sustainability factors using the Analytical Hierarchical Process (AHP) in five Abu Dhabi hospitals, producing a ranked list of 31 sub-factors and offering managers a structured implementation tool. Erjaee et al. (2022) introduce a fuzzy-based evaluation model combining linguistic terms and trapezoidal fuzzy sets to integrate the Triple Bottom Line (TBL), applying a Fuzzy Performance Importance Index (FPII) to rank obstacles to sustainability.

Khosravi & Izbirak (2019) present a stochastic exponential distribution model, based on stakeholder theory, to quantify social sustainability in a healthcare supply chain. Applied to the Iranian system, it generates a sustainability index for multiple stakeholders. Tushar et al. (2023) identify key factors for sustainable service management in Bangladeshi hospitals using a Delphi study and Grey-based DEMATEL, revealing "Implementation of public health policies" as the most influential causal factor.

Collectively, these studies stress that without precise reporting mechanisms, sustainability initiatives remain fragmented. They offer practical tools (Khalid et al., 2024; AlJaberi et al., 2020), quantitative models (Erjaee et al., 2022; Khosravi & Izbirak, 2019), and conceptual frameworks (Sherman et al., 2020; Tushar et al., 2023), aligning with findings that reporting tools and certifications correlate with higher sustainability maturity (Nascimento et al., 2017). The literature suggests a shift from merely recognizing environmental problems to implementing integrated, actionable reporting systems that promote transparency, accountability, and systemic change.

Table 5. *Summary of research avenues, key contributions and potential approaches – Topic: Frameworks and Indicators for Sustainability Reporting*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Standardization of Metrics and Frameworks	Messmann et al. (2024), AlJaberi et al. (2020), Bottero et al. (2015), Sherman et al.	Develop a universal reporting system that can be customized to local contexts and	Blending top-down international standards (such as SDGs) with bottom-up, localized data collection to create actionable and comparable metrics.

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	(2020)	resource constraints.	
Integrated Performance Measurement	Erjaee et al. (2022), Tushar et al. (2023), Khosravi & Izbirak (2019)(AlJaberi et al., 2020; Carnero, 2015; Senay & Landrigan, 2018)	Create holistic reporting models that simultaneously track environmental, social, and economic metrics to manage the trade-offs between them.	Developing integrated scorecards (e.g. SBSC) or multi-criteria decision models (e.g. AHP, Fuzzy MCDM) that assign weighted values to environmental and social factors alongside traditional financial metrics.
Action-Oriented Reporting for Strategic Implementation	Tushar et al. (2023), Bottero et al. (2015)(Merry et al., 2023; Russo et al., 2019) (Capolongo et al., 2015)	Design reporting systems that directly link data to strategic decisions and operational improvements.	Using models like Grey-based DEMATEL to identify cause-and-effect relationships among sustainability factors, helping managers prioritize interventions on "causal" drivers.
Qualitative and Quantitative Disclosure Analysis	(Batool et al., 2019; Garzoni et al., 2024; Huang et al., 2024; Previtali & Cerchiello, 2018)	Systematically analyze the content and determinants of sustainability disclosure across different media (e.g., websites, reports) to understand organizational motivations.	Applying both manual and automated web-content analysis and econometric models to test how organizational characteristics (e.g. size, status) influence the level and quality of sustainability information disclosed.

4.4 *Policy, Governance, and Strategic Implementation*

This category examines works at the intersection of policy, governance, and strategic implementation in healthcare sustainability, focusing on top-down mechanisms that translate environmental awareness into measurable outcomes. Three key articles provide distinct perspectives. Saleem et al. (2025) demonstrate that leaders prioritizing sustainability can markedly improve ecological outcomes by fostering positive employee attitudes, empowering staff, and instilling confidence in adopting green practices. Using Dynamic Capabilities Theory, they show that leadership impact is maximized when it builds a culture of individual and collective accountability, motivating engagement with environmental initiatives. Robinson et al. (2024) emphasize that strong governance is essential for effective leadership in climate-resilient healthcare. Without adaptive governance, hospitals struggle to prepare for climate change due to policy gaps, fiscal limits, and weak leadership commitment. Their frameworks integrate adaptation and mitigation into long-term healthcare planning. Dion & Evans (2024) present case studies from the Middle East and North Africa showing that aligning sustainability goals with strategic objectives, through integrated governance, energy-efficient technologies, and cultural change, yields environmental and economic benefits. However, fragmented decision-making and low staff awareness hinder implementation, highlighting the need for cohesive leadership.

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Overall, these studies move the conversation from identifying sustainability goals to clarifying strategies for execution and monitoring. Sustainability reporting emerges as a crucial tool, enabling leaders to track whether initiatives influence behavior and deliver environmental gains (Saleem et al., 2025). Transparency measures, such as publishing departmental energy performance, can shift organizational culture (Dion & Evans, 2024), while weak reporting undermines governance and trust (Robinson et al., 2024). These works point to future research on integrating governance, leadership, and reporting for systemic change in hospitals.

Table 6. *Summary of research avenues, key contributions and potential approaches – Topic: Policy, Governance, and Strategic Implementation*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Role of Leadership and Employee Psychology	Saleem et al. (2025)	Investigate the human element in sustainability by studying how leadership behaviors and employee psychological states (attitude, empowerment, self-efficacy) are linked to environmental performance.	Applying psychological theories and quantitative methodologies like PLS-SEM to model cause-and-effect relationships between leadership, employee behavior, and organizational outcomes.
Governance Mechanisms for Systemic Resilience	Robinson et al. (2024)	Explore how governance and policy structures enable proactive climate adaptation and resilience in healthcare systems, particularly in the face of uncertainty.	Using theoretical frameworks from Earth Systems Governance and Adaptive/Anticipatory Governance to design transdisciplinary studies that can provide new guidance for policymakers.
Integrated Strategic Frameworks and Planning	Dion et al. (2024)	Develop holistic models that connect operational changes (e.g., energy efficiency) with high-level governance and financial reporting to ensure initiatives are strategically embedded.	Employing qualitative, grounded theory approaches to build integrated conceptual frameworks that explicitly link operational technology and reporting metrics to corporate governance and strategic goals.
Cross-Cultural and Multi-Regional Studies	All three papers, explicitly or implicitly	Compare how sustainability initiatives and reporting are implemented in different geopolitical and economic contexts (e.g., LMICs vs. high-income countries).	Conducting comparative case studies and large-scale surveys to test the transferability of leadership styles, policy frameworks, and reporting mechanisms across diverse healthcare systems.

4.5 *Social Responsibility and Patient-Centered Sustainability*

This body of scholarship emphasizes the social dimension of sustainability, moving beyond environmental and economic factors to address how healthcare systems respond to patients, employees, and communities. A stakeholder-centric approach, grounded in ethical responsibility, patient empowerment, and social awareness, is presented as fundamental to long-term sustainability.

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Valera (2025) proposes a paradigm shift linking individual health to ecosystem health, integrating environmental impacts into ethical assessments of clinical practice. Drawing on Potter's "global bioethics" and Næss's "ecosophy," this perspective offers decision-making guidelines that prioritize patient well-being, shared responsibility, and ecological integrity. Empirical studies explore ways to operationalize these principles. Vergunst et al. (2020) demonstrate the feasibility of using the Triple Bottom Line (TBL) to evaluate healthcare interventions across financial, environmental, and social dimensions. Although their case revealed high costs and poor social outcomes, the approach enables a balanced assessment of an intervention's overall value. Smale et al. (2023) examine provider engagement in reducing medication waste, finding strong professional commitment hindered by resource constraints and insufficient organizational backing, issues mitigated by strong leadership and collaboration.

At the systems level, Hussain et al. (2019) use stakeholder surveys and Analytical Hierarchy Process to identify "Organizational Culture" and "Poor Coordination" as primary barriers to social sustainability in healthcare supply chains, with "lack of management support" and "lack of commitment" as key sub-barriers. Rodriguez et al. (2020), in a longitudinal study of Spanish public hospitals, show that social sustainability progress is uneven and heavily influenced by governmental guidance. From an overall point of view, these works establish social responsibility as central to genuine sustainability. TBL reporting (Vergunst et al., 2020) and barrier mapping (Hussain et al., 2019) enhance accountability, while tracking long-term trajectories (Rodriguez et al., 2020) ensures efforts remain coherent and impactful. Without such structured reporting, initiatives risk fragmentation, loss of momentum, and eventual failure.

Table 7. *Summary of research avenues, key contributions and potential approaches – Topic: Social Responsibility and Patient-Centered Sustainability*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Holistic TBL Reporting	Vergunst et al. (2020)	Develop and refine methodologies for prospectively incorporating social and environmental metrics into the evaluation of healthcare interventions.	Applying a TBL framework to rigorously evaluate interventions, moving beyond simple cost-effectiveness analysis to a more comprehensive assessment of an intervention's true impact.
Quantifying Human-Centric Barriers	Hussain et al. (2019)	Create quantitative models to identify and prioritize the social and organizational barriers to sustainability implementation.	Using multi-criteria decision-making models like AHP or fuzzy logic to transform qualitative stakeholder perceptions into quantifiable data for strategic planning and resource allocation.
Ethical Frameworks	Valera (2025)	Develop new theoretical paradigms that integrate	Synthesizing philosophical concepts like "eco-ethics" and "planetary health" to create

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for Decision-Making		social, ecological, and ethical considerations into healthcare decision-making, providing a foundation for new reporting metrics.	a theoretical basis for a new set of values that inform and justify sustainability-focused organizational policies and reporting standards.
Behavioral Change and Stakeholder Engagement	Smale et al. (2023), Rodriguez et al. (2020)	Investigate the behavioral and psychological factors that influence healthcare professionals' and patients' engagement with sustainability initiatives.	Employing qualitative methods like thematic analysis and case studies to uncover the drivers and barriers to sustainable behaviors, informing the design of reporting systems that promote culture change and stakeholder buy-in.

4.6 *Technology and Digital Transformation for Sustainability*

The final category examines the role of technology and digitalization in advancing sustainable healthcare, showing that digital tools are not just supportive mechanisms but drivers of systemic change. In Saudi Arabia, Almoajel (2025) demonstrates that combining evidence-based management (EBM) with advanced analytics such as Structural Equation Modeling (SEM) and XGBoost improves cost efficiency, equity, and accessibility, though trade-offs with sustainability may occur. Governance emerges as a critical enabler of technological change, with Robinson et al. (2024) framing adaptive leadership and anticipatory planning as essential "technologies" for building climate-resilient healthcare information systems. Case studies from the Middle East and North Africa link governance, green hospital management, and energy efficiency, showing that real-time monitoring can deliver environmental and financial gains when paired with unified decision-making (Dion & Evans, 2024).

Hensher (2024) adds a Health Technology Assessment (HTA) framework that prioritizes "intrinsic" environmental impacts of specific technologies over "generic" impacts requiring broader policy solutions. Complementing this, Health Technology Performance Assessment (HTpA) emphasizes real-world evaluation; findings from Brazil reveal the need for ongoing reassessment and disinvestment when technologies underperform (Guerra-Júnior et al., 2017).

At the infrastructure level, Abbas et al. (2022) find that strong cybersecurity and e-government development enhance sustainability by preventing malpractice and safeguarding reporting systems. Buffoli et al. (2015) critique current sustainability evaluation tools (LEED, BREEAM, ITACA) as overly focused on the built environment, calling for multidisciplinary frameworks that include social and economic dimensions. In summary, these studies show that advanced analytics (Almoajel, 2025), governance-integrated monitoring (Dion & Evans, 2024), and secure digital infrastructures (Abbas et al., 2022) are central to sustainability reporting and strategy. Without such integrated frameworks, innovations risk being unmeasurable and unsustainable over time.

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Table 8. *Summary of research avenues, key contributions and potential approaches – Topic: Technology and Digital Transformation for Sustainability*

Research Avenue	Related efforts	Key Contribution	Innovative Methodological/Theoretical Approaches
Integrated Digital Reporting Platforms	Almoajel (2025), Buffoli et al. (2015), Abbas et al. (2022)	Develop integrated digital platforms that consolidate data from various sources (e.g., BEMS, EMRs) to create holistic sustainability reports.	Using AI and machine learning to automate the collection, analysis, and visualization of environmental, social, and economic data, thereby reducing the burden of manual reporting.
HTA for Sustainability and Disinvestment	Hensher (2024), Guerra-Júnior et al. (2017)(Mohiuddin, 2023)	Establish systematic processes and guidelines for incorporating environmental and social metrics into health technology assessments.	Creating frameworks that distinguish between intrinsic and generic environmental impacts to prioritize HTA efforts, and institutionalizing HTpA to continuously monitor and report on the real-world performance of technologies.
Governance and Digital Policy	Robinson et al. (2024), Abbas et al. (2022)(Brown et al., 2023)	Investigate how governance structures can be adapted to manage the complexities and risks of digital transformation for sustainability.	Applying concepts from adaptive and anticipatory governance to design policies that account for the uncertainties of technological change and the need for robust cybersecurity measures to protect digital infrastructure.
Multi-Criteria Decision-Making Tools	Hensher (2024)	Create and validate new tools for multi-criteria decision-making that enable healthcare leaders to balance competing sustainability goals.	Using methodologies like AHP and fuzzy models to help decision-makers manage trade-offs (e.g., between equity and cost-efficiency) and justify investment in sustainable technologies.

5. DISCUSSION AND CONCLUSION

The present investigation synthesizes a comprehensive body of literature, establishing that sustainability reporting has evolved beyond the realm of a peripheral or aspirational activity within the healthcare sector. Instead, it has emerged as a critical and multifaceted practice that significantly influences the economic, environmental, and social viability of hospitals and health systems around the globe. The reviewed research indicates a profound transformation in the perception of sustainability, transitioning from a simplistic view characterized as a "green" initiative to its recognition as an integral strategic function that demands rigorous, integrated, and continuous measurement and assessment. Through this review we identify three primary rationales underscoring the necessity of sustainability reporting:

- **Driving Operational and Economic Efficiency:** Reporting functions as a vital mechanism for identifying and rectifying waste and inefficiency within healthcare organizations. Research

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categorized under *Economic and Operational Efficiency* and *Environmental Impact* illustrates that frameworks and quantitative models, such as the Fuzzy Multi-Criteria Decision-Making model (Erjaee et al., 2022) and Life Cycle Assessments (Nematollahi et al., 2024), effectively transform subjective intentions into quantifiable outcomes. By systematically tracking metrics including CO_2 emissions, water consumption, and operational delays, organizations can transition from conjecture to a data-driven methodologies, thereby significantly impacting both their financial performance and resource management.

- **Enabling Effective Governance and Strategic Implementation:** Sustainability reporting offers the transparency and accountability essential for translating high-level commitments into actionable practices. The frameworks discussed in this review demonstrate that without robust reporting and monitoring systems, governance initiatives lack efficacy. Tools such as the Sustainability Balanced Scorecard (Khalid et al., 2025) and Health Technology Performance Assessment (Guerra-Júnior et al., 2017) play a pivotal role in tracking progress, managing competing priorities, and justifying investments to diverse stakeholders. This assertion is bolstered by findings within the *Technology and Digital Transformation* category, where research indicates that the integrity of reporting systems -secured through stringent cybersecurity measures (Abbas et al., 2022)-is fundamental in fostering public trust and ensuring that technological innovations deliver on sustainability commitments.

- **Fostering Social Responsibility and Patient-Centered Sustainability:** Reporting acts as a conduit between an organization's ethical values and its public-facing initiatives. Valera (2025) articulates the theoretical foundations for this paradigm, positing that an "eco-ethical" approach necessitates a reporting system that equally prioritizes patient well-being and environmental health. This is exemplified in studies such as Vergunst et al. (2020), which illustrate how the Triple Bottom Line framework can effectively capture the social outcomes of interventions, thereby serving as a robust tool for ethical accountability. Additionally, research conducted by Smale et al. (2023) and Hussain et al. (2019) highlights the importance of reporting on human-centric factors, ranging from employee attitudes to managerial support, essential for identifying cultural and organizational barriers that obstruct sustainable practices. Collectively, these findings underscore that by embracing comprehensive reporting mechanisms, healthcare organizations can cultivate a culture of shared responsibility that resonates with patients, staff, and the broader community (Bosco et al., 2024).

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In summary, the healthcare sector stands at a crucial inflection point, confronted with unprecedented challenges stemming from climate change, resource constraints, and long-standing evolving of societal expectations. The literature demonstrates that sustainability reporting is the pivotal mechanism for effectively navigating this complex landscape. Here in this study, we provided related efforts as the framework through which economic prudence, environmental stewardship, and social equity can be measured, managed, and harmonized. The salient conclusion derived from this review is that the failure to establish and implement robust, integrated, and ongoing reporting frameworks will not only jeopardize sustainability initiatives but might also undermine the core mission of healthcare systems worldwide. That is, to enhance the well-being of both individuals and the planet as well. To this respect, future research endeavors should not only strive to refine these reporting methodologies but also explore avenues for their institutionalization at all levels, from the micro-level of clinical practice to the macro-level of national governance, to ensure a genuinely sustainable future for healthcare.

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EMBRACING IMBALANCE: STRATEGIC CALIBRATION AS A RECURSIVE APPROACH TO DECISION-MAKING UNDER COMPLEXITY

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ABSTRACT

This paper introduces Strategic Calibration (SC), a conceptual framework for sustaining strategic direction under conditions of volatility, uncertainty, complexity, and ambiguity (VUCA). Grounded in Complex Adaptive Systems (CAS) theory and sociotechnical cognition, SC reconceptualizes strategy as a recursive process of directional calibration, structured by feedback loops and shaped through interaction between human actors and AI-enabled systems. Rather than seeking equilibrium, SC fosters responsiveness to ongoing flux—framing strategy as a rhythmic, interpretive practice across time, stakeholders, and resources. The framework articulates three interdependent domains of calibration: stakeholder interaction, sociotechnical cognition, and capability deployment across shifting temporal and resource contexts. In contrast to planning models or episodic adaptation, SC positions strategic direction as continuously (re)shaped through iterative recalibration and productive tension. Rather than emphasizing control, balance, or resolution, the framework builds on established perspectives by focusing on non-equilibrium dynamics and recursive adjustment within complex systems. The paper develops four propositions to guide future research and concludes with implications for both scholars and practitioners—especially those managing uncertainty, multi-stakeholder complexity, and digital augmentation in strategic work. SC offers a generative lens and vocabulary for understanding how organizations sustain direction not by restoring balance, but by engaging adaptive imbalance, feedback, and recalibration. The framework provides a structured basis for empirical studies of dynamic decision-making, real-time adaptation, and AI-enabled cognition in complex and sustainability-oriented environments.

Keywords: strategic decision-making, complexity, sociotechnical cognition, artificial intelligence, strategic adaptation, feedback loops, sustainability

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INTRODUCTION

Across industries and geographies, organizations are increasingly shaped by environments that defy linear planning or predictive control, especially in the context of crisis entanglement and systemic nonlinearity (Weiser and Laamanen, 2022; Lawrence et al., 2024). Strategic decision-making now unfolds within VUCA conditions – volatility, uncertainty, complexity, and ambiguity, where feedback loops are rapid, stakeholder expectations shift unevenly, and digital systems mediate interpretation and action (Bennett and Lemoine, 2014; Kravchenko et al., 2024; Ritala, 2024). These dynamics render static strategy tools, such as long-range planning, integrated reporting, or equilibrium-based frameworks, ill-equipped to support ongoing adaptation (Eccles and Krzus, 2010; Omazić, 2023; Denis, 2024).

In response to these challenges, this paper introduces the Strategic Calibration (SC), a conceptual framework for sustaining strategic direction under persistent complexity. SC reconceptualizes strategy as a recursive process of directional adjustment, guided by feedback, shaped through sociotechnical cognition, and responsive to multi-stakeholder tension. Rather than minimizing uncertainty, SC treats it as a generative condition that enables reframing and calibration over time (Farjoun, 2010; Bailey and Barley, 2020). SC integrates insights from Complex Adaptive Systems (CAS) theory, sociotechnical systems, and AI-supported judgment to address three interdependent domains of calibration: stakeholder interaction, sociotechnical cognition, and capability deployment across temporal and resource constraints. The framework contributes to emerging strategy conversations by shifting attention from episodic transformation to continuous interpretive responsiveness.

Two questions guide this inquiry:

1. How can organizations use SC to maintain strategic direction without relying on predictive control or episodic shifts?
2. What role can AI-enabled mechanisms play in supporting calibration under VUCA conditions?

This paper adopts a conceptual approach to advance theory where empirical studies remain fragmented or insufficient to address emerging strategic dynamics. Conceptual research is essential when integrating ideas across domains or clarifying relationships not yet tested (MacInnis, 2011; Jaakkola, 2020). Rather than proposing new theory, this paper extends established constructs, particularly from Complex Adaptive Systems and sociotechnical cognition, into a structured framework for recursive strategic calibration. The framework develops clear constructs, articulates relational mechanisms, and formulates propositions to support future empirical validation.

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CONTEXT

Organizations today confront a paradox: unprecedented access to data, tools, and forecasting capabilities coincides with a growing sense of strategic disorientation. Despite this abundance, insight often fails to translate into coherent direction, and responsiveness lags behind the accelerating pace of change (Mikalef and Gupta, 2021; Biloslavo et al., 2024). This is not a problem of too little information, but of intersecting pressures: contradictory stakeholder demands, compressed planning cycles, algorithmic volatility, and intensifying social, environmental, and geopolitical disruption (Lazarus, 2009; Levin et al., 2012; Biloslavo et al., 2024).

At the organizational level, strategy teams must reconcile misaligned time horizons, conflicting performance demands, and evolving stakeholder coalitions (Schaltegger, Hörisch and Freeman, 2022). Market signals are not only noisy but interdependent. Short-term gains can erode long-term resilience. ESG actions may alienate investors even as social legitimacy becomes more critical (Eccles, Serafeim and Krzus, 2011; Janicka, Sajnóg and Sosnowski, 2021). Managers are increasingly left to navigate incompatible priorities without a structured process for recursive adjustment.

At the same time, artificial intelligence (AI) introduces both acceleration and friction into the strategic process. Tools like predictive analytics (Faheem, Aslam and Kakolu, 2021) and generative systems expand the volume and variety of available insights. Yet these high-speed outputs often collide with slower human decision cycles, creating interpretive friction (Faraj, Pachidi and Sayegh, 2018; Sjödin et al., 2021). When algorithmic suggestions exceed organizational capacity or frameworks for interpretation, leaders face an overload of plausible but competing recommendations (Mikalef and Gupta, 2021). These demands on interpretive labor can reinforce reactive rather than adaptive strategy (Biloslavo et al., 2024).

This creates a structural gap between the conditions of strategy and the tools commonly used. Many organizations continue to rely on linear forecasts, equilibrium-based models, or fixed scorecards despite operating in nonlinear, feedback-rich environments (Ford, 2008; Strogatz, 2018). These environments increasingly involve distributed cognition across humans and AI systems (Hollan, Hutchins and Kirsh, 2000; Faraj, Pachidi and Sayegh, 2018). In such contexts, the central challenge is not planning but continuous calibration across evolving tensions, technological mediation, and temporal asymmetry. This paper addresses that challenge by drawing on foundational theories, including Complex Adaptive Systems (Holland, 1992; Dooley, 1997), sociotechnical cognition (Xiao et al., 2018; Biswas et al., 2024) , and critiques of equilibrium models (Kaplan & Norton, 1996; Teece, 2007). We introduce the Strategic Calibration framework as a structured response to persistent strategic tension.

Our aim is to develop a theoretically grounded framework to support strategic adaptation under conditions of complexity. Conceptual research is particularly valuable when existing models fall short

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or when integrative synthesis is needed across domains (MacInnis, 2011; Jaakkola, 2020). Rather than proposing new theory, this paper extends existing constructs, especially from CAS and sociotechnical cognition, into a coherent framework that can inform future empirical research.

THEORETICAL FOUNDATIONS

Complex Adaptive Systems and the Logic of Strategic Responsiveness

The Strategic Calibration (SC) framework is grounded in Complex Adaptive Systems (CAS) theory, which helps explain how organizations operate in fast-changing, unpredictable environments (Holland, 1992; Dooley, 1997) including recent applications in sustainability transition dynamics (Weiser and Laamanen, 2022). In CAS, strategy develops through feedback, interaction, and adaptation, rather than through rigid planning. This perspective emphasizes why traditional methods focused on control often fail in intricate situations (Stacey, 1996; Ford, 2008) (Stacey, 1995; Ford, 2008).

To address gaps in how CAS accounts for interpretive and technological complexity, we integrate sociotechnical systems theory, which examines how people and technologies shape decision environments (Trist, 1981; Appelbaum, 1997). In particular, the growing role of artificial intelligence (AI) in strategy raises questions about how insights are generated, interpreted, and acted upon (Brynjolfsson and McAfee, 2017). Sociotechnical thinking informs our conceptualization of AI as a real-time decision support mechanism.

This perspective emphasizes that change does not arise from top-down control, but through continuous interaction among people, technologies, and environmental feedback (Holland, 1992; Dooley, 1997). In such systems, strategic outcomes are emergent and shaped by dynamic interdependencies rather than linear causality. As a result, traditional strategy tools often prove inadequate in unstable or nonlinear environments (Ford, 2008; Strogatz, 2018). CAS suggests that strategy must remain responsive, not rigid. It also reframes tension and imbalance. In CAS, misalignment and uncertainty are not failures to fix but signals for adaptation (Stacey, 1995; Farjoun, 2010). Further, CAS highlights that non-equilibrium states are not exceptions but conditions of emergence (Holland, 1992; Stacey, 1995). Recent work on strategic adaptation logic reinforces that organizations must continuously recalibrate in response to complex shifts, in particular, Cozzolino and Verona (2024) develop a decision-tree that integrates dynamic capabilities, ambidexterity, and alliances to guide adaptation after radical change. They offer cues for shifting course rather than symptoms of dysfunction.

Sociotechnical Cognition and AI as a Calibration Partner

CAS, however, does not directly account for the changing role of technology in shaping strategy. Its early formulations predate digital cognition and AI-mediated interpretation (Anderson, 1999). As AI

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tools increasingly influence how strategic questions are framed and explored, a new challenge emerges: managing interpretive complexity in sociotechnical systems and recent calls to investigate AI's role in distributed sensemaking and cognitive friction (Bailey and Barley, 2020; Biswas *et al.*, 2024).

AI systems can surface patterns, simulate scenarios, and identify tensions. However, they also introduce ambiguity. An AI-powered risk engine, for example, might generate many plausible scenario paths, each internally valid, but without guidance for prioritization (Mikalef and Gupta, 2021). This can overwhelm strategic processes with choices rather than clarity. Outputs may generate insight but require human judgment to determine what matters and when. Without straightforward integration, AI can create friction or delay decisions(Brynjolfsson and McAfee, 2017; Van de Wetering, 2022; Biloslavo *et al.*, 2024). SC responds to this challenge by framing AI as a calibration partner. It does not replace human decision-making but enables faster sensing, targeted reframing, and cross-domain feedback in real time.

Limits of Traditional Strategy Models

Many widely used strategy frameworks, such as the Balanced Scorecard or Integrated Reporting, were developed to support alignment with goals, performance tracking, and organizational accountability (Kaplan and Norton, 2004; Eccles and Krzus, 2010). These tools help structure decision-making through measurable outcomes and internal reporting, though recent work highlights their limitations in digitally-mediated environments (Biloslavo et al., 2024; Makkar and Rani, 2024), particularly when strategic objectives are relatively stable and causal relationships are known. However, in volatile or ambiguous environments, such models often struggle to keep pace with the speed, interdependence, and ambiguity of strategic conditions. They risk reinforcing outdated goals or oversimplifying directional tradeoffs. Even dynamic approaches, such as ambidexterity or capabilities-based models typically conceptualize adaptation as a series of punctuated responses, episodes in which organizations shift direction and then re-stabilize (March, 1991; Eisenhardt and Martin, 2000; Teece, 2007). Yet in complex environments, pressures evolve continuously. As Brown and Eisenhardt (1998) describe, strategy becomes a practice of ongoing adjustment, not episodic change. This view aligns with research highlighting the need for continuous reframing and multi-dimensional responsiveness (Kuwada, 1998; Sabherwal, Hirschheim and Goles, 2001; Sjödin et al., 2021).

These limitations reveal a theoretical gap in how strategy frameworks accommodate continuous imbalance. SC treats balance as a moving condition, not a stable outcome. Instead of emphasizing control or prediction, it centers on iterative adjustment across stakeholder expectations, time pressures, and shifting constraints (Peteraf, Verona and Bettis, 2013). CAS theory features align closely with sustainability transitions' demands, where goals are long-term, values are contested, and feedback

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must be integrated continuously (Holland, 1992; Dooley, 1997; Lichtenstein et al., 2006). In these contexts, calibration replaces equilibrium as the logic of strategic direction.

SC also draws from sociotechnical systems thinking to position AI as a support for judgment rather than a replacement (Bailey and Barley, 2020). Finally, it acknowledges that many strategy models continue to assume predictability or linearity in how goals are set and pursued (Kaplan and Norton, 2004; Teece, 2007). SC instead proposes that organizations maintain direction by calibrating across three core dimensions: stakeholder tension, time horizons, and resource constraints. These elements rarely align neatly and often shift in conflicting ways. SC offers a structure for staying adaptive when conditions remain in motion.

While the SC framework is conceptual, it draws on empirical studies that have surfaced important aspects of the domains it integrates. For example, recent research has examined AI-supported decision friction, such as Natali's (2024) study of "frictional AI," which highlights how intentional inefficiencies in AI systems can improve human–machine collaboration and reduce overreliance on automation. Studies of stakeholder conflict under complexity, including Weiser et al. (2022) and Atanassova et al. (2025), have illuminated the tensions that arise when competing value logics intersect in sustainability and governance contexts. Work on strategic responsiveness in VUCA environments, such as Atanassova et al.'s (2025) longitudinal study of learning-based agility across 28 UK firms, and Makkar and Rani's (2024) exploration of adaptation strategies, provides additional grounding. Yet these studies often treat such elements in isolation (e.g. feedback loops, interpretive tension, or stakeholder complexity) without integrating them into a coherent, recursive framework. SC addresses this gap by offering a structured synthesis that connects these dynamics for future theoretical and empirical development.

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CONCEPTUAL FRAMEWORK

The Strategic Calibration (SC) framework integrates three interdependent domains of strategic adjustment. Each domain reflects a distinct theoretical foundation and addresses a key dimension of strategic tension under conditions of complexity. Figure 1 illustrates the Strategic Calibration Framework, which conceptualizes strategy as a dynamic, recursive process operating in a VUCA environment (Bennett and Lemoine, 2014).

The framework centers on continuous interaction among three components: Stakeholder Interaction (Freeman, 1994), Sociotechnical Cognition (Xiao et al., 2018; Biswas et al., 2024) , and Capability Calibration (Farjoun, 2010). Two feedback loops link these elements and support four propositions: Stakeholder Tension (P1), Interpretive Agility (P2), Multi-Dimensional Calibration (P3), and Feedback Balance (P4) (Van de Wetering, 2022; Makkar and Rani, 2024). The model presents strategy as an emergent, nonlinear, recursive process. The three domains shown in Figure 1 are elaborated below, with reference to their theoretical grounding and the strategic tensions they address.

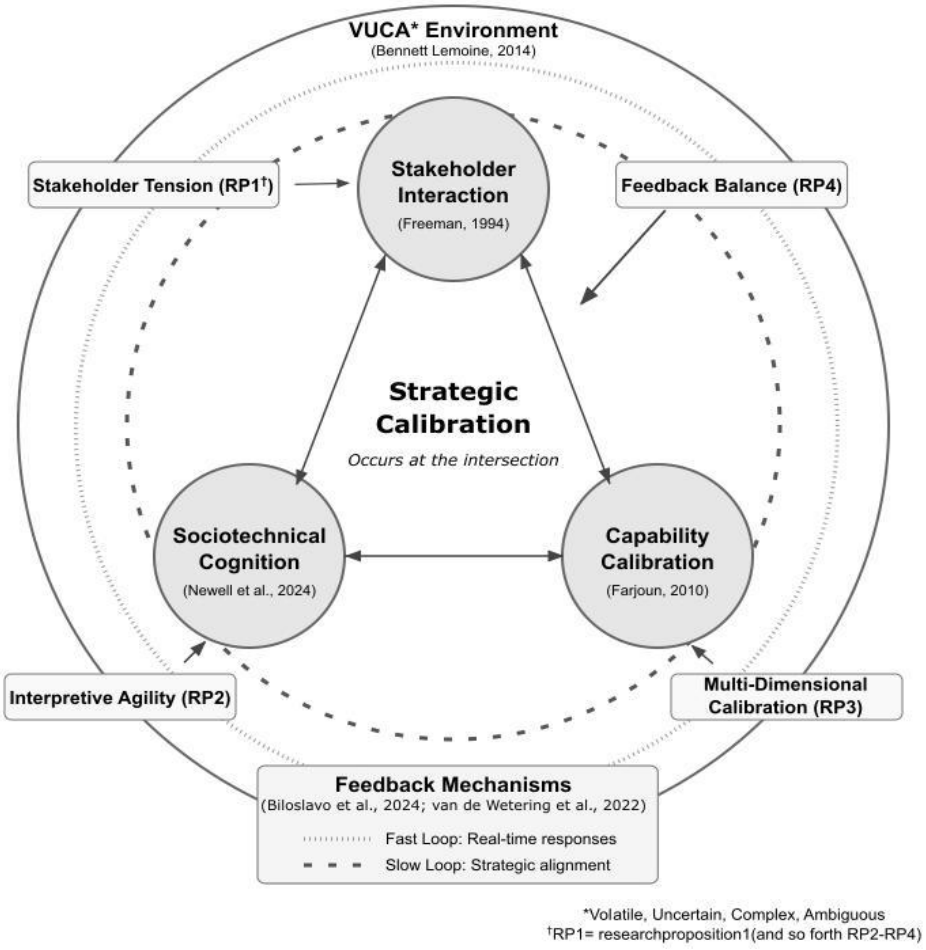


Figure 1: Strategic Calibration Conceptual Framework

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Overview of the Strategic Calibration Framework

The Strategic Calibration (SC) framework integrates three interdependent domains of strategic adjustment. Each domain reflects a distinct theoretical foundation and addresses a key source of tension in complex strategic environments. These domains work recursively to support adaptive direction-setting under conditions of uncertainty and imbalance. A brief overview is provided below, followed by detailed discussion of each domain and the propositions they inform.

Stakeholder Interaction: Organizations interpret and respond to dynamic, and often conflicting, stakeholder demands as ongoing sources of strategic tension and reframing. Theoretical base: Stakeholder Theory (Freeman, 1994); Complex Adaptive Systems (Stacey, 1995; Farjoun, 2010). Recent extensions Stakeholder multiplicity in sustainability contexts (Schaltegger, Hörisch and Freeman, 2022).

Sociotechnical Cognition: Strategic sensemaking is shaped through human–AI collaboration, where feedback loops and pattern recognition support interpretive agility. Theoretical base: Sociotechnical Systems Theory (Trist, 1981; Appelbaum, 1997); Distributed Cognition (Hollan, Hutchins and Kirsh, 2000). Recent extensions: AI-enabled sensemaking and decision friction (Bailey and Barley, 2020; Biswas *et al.*, 2024)

Capability Calibration: Organizations continuously recalibrate direction across time, resource constraints, and operational feedback, not by returning to equilibrium, but by iterating amid imbalance. Theoretical base: Dynamic Capabilities (Teece, 2007); Non-equilibrium strategic logic (Eisenhardt and Brown, 1998). Recent extensions: Strategic responsiveness and feedback architecture in VUCA environments (Biloslavo *et al.*, 2024; Makkar and Rani, 2024).

These domains interact continuously, forming a feedback-driven system within a dynamic environment. SC highlights that these processes are interdependent and recursive, not sequential or isolated. The next subsections develop each domain and its role in SC.

Stakeholder Interaction as Strategic Tension

Organizations increasingly face overlapping and conflicting stakeholder demands (Dentoni, Bitzer and Schouten, 2018; Freeman, 2023), particularly in sustainability-oriented firms where investor, regulator, customer, and societal expectations often diverge.

In CAS terms, imbalance is not a deviation but a trigger for adaptation (Stacey, 1995; Farjoun, 2010). SC reframes stakeholder engagement as an ongoing calibration process: interpreting diverging signals and adjusting direction iteratively. This dynamic leads to the first research proposition (RP), which formalizes the relationship between stakeholder divergence and the frequency of calibration:

> RP1: In complex environments, increased divergence in stakeholder expectations prompts more frequent cycles of SC, primarily when supported by timely feedback mechanisms.

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> Potential Empirical Inquiry: Frequency of strategy reviews or revisions, stakeholder sentiment mapping frequency, and tracking of stakeholder alignment indicators.

Calibration depends on an organization's interpretive capacity and access to high-quality feedback. Without adequate sensing or adaptive structures, tension may result in delay or conflict rather than learning.

Sociotechnical Cognition as Interpretive Amplifier

To complement CAS's structural emphasis on feedback and emergence, SC integrates sociotechnical cognition and effectuation theory to account for human-AI framing, judgment, and real-time responsiveness. As AI becomes more embedded in strategy processes, decision-making increasingly involves human–machine collaboration (Faraj, Pachidi and Sayegh, 2018). Sociotechnical cognition captures this hybrid framing process (Xiao *et al.*, 2018; Biswas *et al.*, 2024) where AI-supported systems surface patterns, generate options, and prompt reframing.

SC incorporates both fast and slow feedback loops to support adaptability (Sjödin *et al.*, 2021; Hagiu and Wright, 2023; Biloslavo *et al.*, 2024). Fast loops provide rapid insights; slow loops support longer-term learning This logic supports our second proposition, which emphasizes interpretive agility as a key outcome of sociotechnical integration:

> RP2: When sociotechnical cognition is integrated into strategic processes, organizations demonstrate greater interpretive agility, defined as the speed and clarity of reframing in response to new information. Potential Empirical Inquiry: Number of reframes or scenario revisions per planning cycle; time-to-decision following insight generation; variation in strategic interpretation among decision units.

Interpretive agility depends not just on tool use but also on managerial judgment, collaboration, and tolerance for ambiguity. Without governance, AI-enabled insight can overwhelm rather than clarify.

Calibration Across Strategic Dimensions and Feedback Loops

SC emphasizes continuous adjustment across interdependent tensions: stakeholder demands, time horizons, and resource constraints (March, 1991; Freeman, 1994; Teece, 2007). These tensions are not addressed in isolation and often conflict. Responding to one may destabilize another. Deliberate oscillation across domains is central to adaptation, what CAS scholars describe as dynamic, non-equilibrium processes (Dooley, 1997; Lichtenstein et al., 2006). These shifts are not episodes of realignment but constitute the continuous rhythm of strategy under complexity. Strategic direction emerges not from goal completion or equilibrium, but through responsive interaction across time, stakeholders, and resources. This multi-domain logic underpins our third proposition, which posits that strategic coherence emerges from simultaneous calibration across interacting domains:

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RP3: In complex environments, effective SC depends on simultaneously attending to stakeholder, temporal, and resource tensions, not optimizing within a single domain. Potential Empirical Inquiry: Calibration index across stakeholder engagement, temporal flexibility, and shifts in resource allocation; multi-criteria decision audit trails.

Feedback operates across multiple timeframes. Fast loops capture short-cycle signals (e.g., social sentiment, operational data). Slow loops support longer-cycle learning (e.g., board review, cultural patterns). Together, they shape strategic direction (Luo and Tang, 2020; Sjödin et al., 2021). The temporal structure of calibration, its rhythm and responsiveness, leads to our fourth proposition, which focuses on the interplay of fast and slow feedback loops:

RP4: SC is more effective when organizations balance fast feedback loops for responsiveness with slower loops for long-term perspective. Potential Empirical Inquiry: Lag between feedback recognition and decision action; cadence of short vs. long-term cycles; degree of coherence in strategic messaging.

SC is relevant for researchers and practitioners seeking to design adaptive strategy systems, particularly in sustainability-oriented, technology-intensive, or multi-stakeholder contexts.

DISCUSSION: INTERPRETING THE STRATEGIC CALIBRATION FRAMEWORK

Strategic Calibration (SC) reorients traditional strategy logic by shifting the emphasis from equilibrium, prediction, or episodic realignment toward recursive adjustment. Drawing on Complex Adaptive Systems (CAS), sociotechnical systems, and distributed cognition, SC positions strategic direction as an outcome of ongoing calibration rather than deliberate control. This approach treats imbalance not as deviation but as a generative condition for action (Stacey, 1995; Farjoun, 2010). Through structured feedback and interpretive processes, SC enables responsiveness across dynamic stakeholder, temporal, and resource tensions.

Stakeholder Interaction: Reframing Tension as Input

SC departs from models that view stakeholder misalignment as noise or conflict to be minimized. Instead, it interprets divergence in stakeholder expectations as a signal for calibration, a mechanism that surfaces latent priorities and clarifies directional choices (Freeman, 1994; Schaltegger, Hörisch and Freeman, 2022). In CAS terms, this reflects the adaptive value of imbalance. Rather than seeking alignment as a goal, SC supports strategic responsiveness by structuring how competing signals are interpreted and acted upon over time. SC views these tensions not as coordination failures but as strategic inputs that reveal latent priorities and prompt judgment. SC departs from models that view stakeholder misalignment as noise or conflict to be minimized. Whereas traditional frameworks may

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implicitly seek consensus, drawing on Farjoun (2010) and Stacey (1995), SC reinterprets this tension as a vital adaptive signal. It treats these competing demands not as a problem to be solved, but as the very engine of recursive calibration.

Sociotechnical Cognition: Amplifying Interpretive Agility

Sociotechnical cognition extends the CAS view by incorporating the role of AI in shaping decision environments. While CAS emphasizes feedback and emergence, it does not address how cognitive work is distributed across human and algorithmic agents. SC frames AI not as a predictive tool, but as a partner in interpretive framing, generating patterns, prompting reframes, and enabling responsiveness without replacing human judgment (Faraj, Pachidi and Sayegh, 2018; Bailey and Barley, 2020; Biswas et al., 2024)b. This supports interpretive agility, the ability to reconfigure strategic understanding in response to new information rapidly.

Capability Calibration: Beyond Episodic Change

Traditional capability models often conceptualize strategic adaptation as a series of punctuated shifts (Eisenhardt and Martin, 2000; Teece, 2007). SC instead foregrounds continuous calibration across time, stakeholder, and resource tensions. This reframing challenges linear, staged views of change and proposes that strategic coherence arises through deliberate oscillation, not alignment. Drawing from CAS principles, SC treats direction as emergent from the recursive interaction of domains, shaped by fast and slow feedback loops (Dooley, 1997; Luo and Tang, 2020). Aligning more closely with the logic of continuous change from Brown and Eisenhardt (1998) , our framework posits that strategic coherence emerges from deliberate and ongoing oscillation between stakeholder, temporal, and resource tensions, not sequential realignment.

IMPLICATIONS FOR THEORY

SC reframes strategic direction as an emergent outcome of recursive calibration across stakeholder tension, technological mediation, and shifting resource constraints—domains that rarely align and often evolve in conflicting ways (Schaltegger, Hörisch and Freeman, 2022; Biloslavo *et al.*, 2024; Atanassova *et al.*, 2025). SC extends Complex Adaptive Systems (CAS) theory by translating its core principles: emergence, distributed agency, and recursive feedback, into operational mechanisms for strategic alignment (Holland, 1992; Dooley, 1997; Lichtenstein *et al.*, 2006; Biloslavo *et al.*, 2024). Rather than treating CAS as metaphor, SC uses these dynamics as structuring elements for real-time decision-making, particularly in multi-stakeholder and sustainability-oriented contexts (Hollan, Hutchins and Kirsh, 2000; Nair and Reed-Tsochas, 2019; Schaltegger, Hörisch and Freeman, 2022).

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The framework also advances cognitive views of strategy (Mintzberg, 1978; Kaplan and Norton, 2004) by integrating sociotechnical cognition, highlighting how judgment emerges through interaction between human actors and AI systems (Appelbaum, 1997; Biswas *et al.*, 2024). In doing so, SC responds to recent calls to study AI's role in distributed sensemaking and cognitive friction (Dellermann, 2019; Bailey and Barley, 2020; Natali, 2024). SC further formalizes the role of feedback by distinguishing between fast and slow loops, enabling real-time responsiveness and long-term learning when stakeholder demands, timeframes, and constraints evolve in conflicting ways (Sjödin *et al.*, 2021; Van de Wetering, 2022). Finally, SC complements dynamic capabilities theory (Teece, Peteraf and Leih, 2016; Cozzolino and Verona, 2024) by specifying how continuous calibration, rather than episodic reconfiguration, enables strategic coherence. This reflects recent critiques that invite temporally embedded, real-time forms of adaptation (Peteraf, Verona and Bettis, 2013; Baden-Fuller and Teece, 2020; Weiser and Laamanen, 2022). SC offers a mechanism-rich perspective on how firms adapt within complexity, with AI-enabled feedback and interpretive agility (Sjödin *et al.*, 2021).

Limitations

The SC framework is conceptual and has not yet been empirically validated. Its recursive structure may be difficult to observe in organizational settings that lack decentralized cognition or adaptive planning capacity. The framework presupposes the presence of structured feedback mechanisms and interpretive flexibility, conditions that are likely to vary across industries, governance models, and stages of organizational maturity.

IMPLICATIONS FOR PRACTICE

Strategic Calibration (SC) offers a structure for practicing strategy amid sustained complexity, where feedback is uneven, direction is contested, and decision-making is distributed across systems and actors (Uhl-Bien and Arena, 2017). Rather than executing fixed plans, strategic tools must support the detection of misalignment, surfacing of tensions, and interpretive framing across time horizons. SC encourages ongoing calibration in response to shifting conditions, rather than episodic realignment. AI-enabled systems support this process not by automating decisions, but by expanding what is visible, questioned, or reframed. Tools such as scenario generation, pattern recognition, and generative prompting reveal alternate paths that may otherwise remain obscured (Bailey and Barley, 2020). These systems extend judgment by generating insight. not by enforcing rules. SC also highlights the temporal structure of strategic responsiveness. Fast and slow feedback loops must be intentionally designed and sequenced. High-frequency sensing must be balanced with slower, integrative analysis to maintain coherence over time (Brown and Eisenhardt, 1997; Luo and Tang, 2020). When feedback is fragmented

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or absent, organizations risk overreacting or stagnating. From this perspective, misalignment is not failure but information; tension is not a flaw but a persistent feature of strategy that requires framing, not resolution. SC may be most applicable in adaptive, distributed organizations with embedded systems thinking and stakeholder co-creation. In contrast, firms with rigid hierarchies, limited feedback capacity, or constrained flexibility may face adoption barriers. These boundary conditions help define where SC is most relevant, and where adaptation or hybrid models may be required (Schaltegger, Hörisch and Freeman, 2022).

FUTURE RESEARCH DIRECTIONS

The Strategic Calibration (SC) framework introduces a recursive approach to directional responsiveness under complexity. While conceptual, it opens several paths for empirical investigation. One avenue involves studying how organizations develop interpretive agility, the capacity to reframe strategy amid shifting stakeholder, temporal, or resource conditions. This could be explored through cognitive tracing, scenario simulations, or experimental designs. Metrics might include decision speed, framing shifts, or convergence across stakeholder logics, drawing on AI prompt logs, decision records, or textual artifacts. Future research could investigate how organizations calibrate across interdependent strategic domains, such as stakeholder demands, resource constraints, and temporal horizons, using comparative field studies or simulation methods like agent-based modelling (Ghorbani et al., 2015). Such studies could help refine the SC framework by identifying the organizational conditions under which effective calibration is enabled or constrained.

A complementary avenue involves examining the design and governance of feedback architectures, with particular attention to the interaction between fast and slow feedback loops. As AI systems increasingly generate layered streams of insight, they influence not only the availability of information but also how decisions are framed, sequenced, and prioritized (Davenport and Ronanki, 2018; Sjödin *et al.*, 2021). Empirical work might assess how these feedback structures shape actionability, interpretive burden, and decision latency in hybrid human–machine environments. AI-enabled systems increasingly shape not just sensing but strategic framing itself (Faraj, Pachidi and Sayegh, 2018; Bailey and Barley, 2020), enabling rapid scenario evaluation and assumption testing. Research might explore how cadence, both human and algorithmic, affects calibration in hybrid decision environments. A third avenue is to examine the organizational conditions under which SC emerges. Our framework presumes cognitive decentralization, accessible feedback, and adaptive capacity. Variations in industry, governance, or maturity may support or inhibit these features. Sustainability-oriented firms, where systems thinking and value-based complexity are present, may offer promising sites for study (Liang, Yang and Zhang, 2022).

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SC also calls for methodological innovation. In addition to case studies, researchers might apply simulation, language analysis, or longitudinal studies of human–AI interaction to capture its recursive, non-equilibrium nature. Finally, SC may offer a useful lens on "super wicked problems" such as climate change, which demand adaptive, multi-agent, and self-constraining strategies (Sachs *et al.*, 2006; Lazarus, 2009; Levin *et al.*, 2012). Such research may have implications beyond corporate strategy, offering insights for public governance or sustainability transitions where recursive adaptation is also essential.

CONCLUSION

Strategic Calibration (SC) reconceptualizes strategy as a recursive process of navigating and recalibrating across dynamic tensions, rather than executing a sequence of fixed plans or episodic realignments. It frames imbalance not as a failure of coherence but as a generative signal—an input for adaptation. In doing so, SC embeds feedback, judgment, and sociotechnical mediation as integral mechanisms of sustained responsiveness. Drawing from Complex Adaptive Systems (CAS) theory, sociotechnical systems thinking, and an expanded view of feedback, SC repositions strategy as a recursive process of adjustment, not a static plan or episodic shift. SC operates across three interdependent domains: stakeholder interaction, sociotechnical cognition, and capability calibration. These are linked through fast and slow feedback loops that support continuous alignment and responsiveness across time and context, without relying on prediction, equilibrium, or fixed consensus. By positioning artificial intelligence as an interpretive enabler rather than a decision substitute, SC addresses the changing nature of strategic judgment and distributed sensemaking.

The framework contributes conceptually by integrating sociotechnical cognition into strategic thinking and by translating CAS principles into actionable mechanisms for navigating persistent ambiguity and competing demands. It offers a foundation for empirical research in sustainability-driven, AI-augmented, and multi-stakeholder environments. As complexity intensifies, SC provides a vocabulary and structure for navigating strategic direction when stability cannot be assumed. By recasting strategy as recursive calibration rather than equilibrium seeking, SC contributes to how we understand and structure decision-making under complexity. It offers a logic for acting amid imbalance, framing amid ambiguity, and adapting amid change.

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LOGISTICS ACTIVITIES IN THE FURNITURE SECTOR FOR TDABC PROPOSES

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ABSTRACT

The Portuguese furniture industry predominantly comprises Micro, Small, and Medium Enterprises (SMEs), which operate in a highly competitive international context. Logistics plays a critical role in ensuring timely delivery and customer satisfaction in this environment, yet many companies struggle with limited access to cost information and underdeveloped management systems. This study identifies key logistics activities in the sector and assesses whether companies have the necessary data to calculate customer delivery costs using Time-Driven Activity-Based Costing (TDABC).

A questionnaire was developed based on expert input and applied to a sample of Portuguese furniture SMEs to achieve this. The study investigates the standardization of logistics processes, the types of costs most frequently incurred, and operational and cost data availability. Findings reveal that although logistics workflows are relatively standardized, most companies do not have sufficient information systems to fully support a TDABC model. However, some firms show partial readiness, and a minority are already capable of implementing this methodology.

The results support the development of a TDABC-based costing model and set the foundation for the project's third phase: creating a software tool to help companies in the sector estimate customer delivery service costs accurately and efficiently.

Keywords: Internationalization, Transport Workflow, TDABC, Furniture Industry, Logistics.

INTRODUCTION

The furniture sector in Portugal is primarily made up of micro, small, and medium-sized enterprises (SMEs) that operate in a highly competitive global environment. These companies are economically significant and are increasingly looking to expand internationally. However, they face several

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structural hurdles, such as limited technological resources, a lack of skilled labor, and outdated management systems.

In this context, logistics—especially aspects related to customer service and final delivery—has emerged as a crucial element for maintaining operational efficiency, ensuring customer satisfaction, and standing out in the marketplace. Nevertheless, even though logistics is becoming more vital, many businesses still depend on traditional costing methods that fail to reflect the complexities of logistics operations.

This reliance restricts their ability to access accurate cost information, which is essential for effective decision-making, especially when it comes to calculating delivery costs tailored to specific customers. This study aims to assess whether the logistics processes in Portuguese furniture companies are adequately standardized and if these businesses have the necessary data to determine logistics service costs.

Additionally, it explores their readiness to implement Time-Driven Activity-Based Costing (TDABC), a method that allows for a more precise and transparent allocation of costs based on actual time and resource consumption. This article marks the second phase of a larger research initiative. After identifying logistics as a strategic function in the first phase, this stage utilizes a structured questionnaire to evaluate operational practices, information systems, and cost-monitoring capabilities.

LITERATURE REVIEW

The furniture industry is a relevant and dynamic sector in Portugal, composed predominantly of micro, small, and medium-sized enterprises (SMEs) that operate in a highly competitive and increasingly globalized environment. Although progressive, the international expansion of these companies faces significant structural challenges, including limited economies of scale, a shortage of skilled labor, and reduced technological and financial resources. In this context, the effective management of logistics activities—especially those related to customer service and final delivery—has emerged as a critical factor for competitiveness.

Given the sector's reliance on punctuality, customization, and cost-efficiency, logistics has evolved from a purely operational function to a strategic pillar of business performance. However, despite this growing relevance, many companies in the sector lack robust cost accounting tools that allow them to monitor and optimize their logistics operations. Traditional costing systems often fail to reflect the

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true complexity and resource consumption of logistics processes, which compromises decision-making and pricing strategies.

This study explores whether logistics processes in the Portuguese furniture sector are sufficiently standardized and whether companies currently possess the necessary information to calculate logistics costs—particularly those incurred in customer-related services.

Logistics is all about planning, executing, and managing the movement of goods, services, and information from their starting point to the end customer (Christopher, 2022). What used to be a support function has now become a vital aspect of supply chain strategy (Rushton, Croucher, & Baker, 2022). This field encompasses everything from transportation and warehousing to inventory management, packaging, and the flow of information (Wang, 2016). Each industry has its own specific logistics needs that require customized strategies (Lagorio et al., 2022).

With the rise of globalization and e-commerce, logistics has gained even more significance in strategic planning (Maussen & Hoozée, 2020). Companies now face the challenge of striking a balance between being efficient and agile (Mazzuco, Wronski & Zonatto (2017). Logistics plays a crucial role in enhancing overall performance by cutting down lead times, managing inventory effectively, and improving customer satisfaction (Christopher, 2022).

The 7Rs of logistics—the right product, quantity, condition, place, time, customer, and price—still hold great importance (Hernández & Garcia, 2008). However, newer issues, such as sustainability and resilience, are taking center stage as well (Wang, 2016). Lean logistics focuses on eliminating waste, while agile logistics enhances flexibility (Mazzuco et al., 2017; Lagorio et al., 2022).

Digital technologies are revolutionizing the logistics landscape. Artificial Intelligence (AI) is refining forecasting methods, the Internet of Things (IoT) is improving data flow, and blockchain technology is promoting transparency in operations (Wamba & Queiroz, 2020; Hoozée & Hansen, 2021).

Logistics decisions are made at three distinct levels (Ghiani et al., 2022): Strategic level involves infrastructure and market design (Christopher, 2022); Tactical level focuses on transport modes, inventory control, and supplier policies (Everaert et al., 2008); Operational level takes care of everyday tasks like warehousing and scheduling (Rushton et al., 2022).

Some emerging trends in logistics are: Sustainability, which aims to lower emissions and incorporate circular practices (Gevaers et al., 2011); Resilience, which seeks to create supply chains that can

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withstand risks (Ivanov & Dolgui, 2021); and Autonomy, which includes the use of drones and automated systems (Zhang et al., 2025).

Today's logistics landscape requires an integrated approach that combines strategic, tactical, and operational levels (Lagorio et al., 2022). While accurate cost control is crucial, traditional models like Activity-Based Costing (ABC) often fall short in capturing the complexities of logistics (Everaert et al., 2008).

A more effective alternative is Time-Driven Activity-Based Costing (TDABC) (Kaplan & Anderson, 2007), which ties costs to time and capacity. This method improves transparency, highlights inefficiencies, and encourages better resource utilization (Hoozée & Hansen, 2021). In the context of logistics, TDABC has been employed to evaluate transportation, warehousing, and customer service expenses, making it a practical tool for managing costs and monitoring performance (Mazzuco et al., 2017).

Portuguese Furniture Sector

In Portugal, economic activities are categorized according to the Portuguese Classification of Economic Activities (CAE), which aligns with global standards and serves as a basis for economic analysis and policy formulation. The very first version of CAE came out in 1953, derived from a translation of the UN's International Standard Industrial Classification (INE, 2007).

The furniture sector is classified as CAE 31, which covers the Manufacture of Furniture and Mattresses, and it falls under Section C – Manufacturing. This category includes various types of furniture such as office, kitchen, wooden, and metal pieces, as well as mattresses (DGAE, 2020).

According to DGAE (2020), in the year 2020, there were 4,429 active furniture businesses, making up 6.5% of the manufacturing industry and 0.33% of all enterprises. This highlights the significant role the sector plays in the national economy. Geographically, the industry is concentrated primarily in the North (64.5%), followed by the Centre (20.2%), and the Lisbon Metropolitan Area (15.3%), which altogether account for 84.7% of furniture companies (DGAE, 2020). This distribution reflects the overall trends in manufacturing.

Employment in the sector has seen some ups and downs: in 2010, there were 35,452 workers, but this number fell by 18.6% during the economic crisis from 2010 to 2014, dropping to 28,873. However, between 2015 and 2020, employment increased by 14.5%, reaching 34,184 individuals (DGAE, 2020). Despite this recovery, finding qualified workers remains a hurdle. Many companies face challenges in

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hiring skilled labor, leading to delays and production setbacks (Caetano, 2021; Larguesa & Castro, 2022).

The majority of furniture businesses are small or micro enterprises, making up 96.15% of the industry, as noted by Banco de Portugal (2020). While small firms generate a higher revenue of €616 million, micro-enterprises, despite their larger numbers, contribute only €236 million. Many family-owned businesses struggle with limited technical and human resources (Barbosa, 2020), resulting in inefficiencies and compliance issues. On the upside, their adaptability can provide a competitive advantage in fast-changing markets (Vicente, Frazão & Silva, 2018).

In recent years, the sector has embraced modern technologies, incorporating new materials, digital tools, and advanced manufacturing techniques—this has spurred innovation and improved product quality. Collaborations with designers have also helped to enhance product differentiation in competitive global markets (Vicente et al., 2018).

The Gross Value Added (GVA) for the sector stood at €636 million in 2020, representing 0.32% of the country's GDP (DGAE, 2020). From 2014 to 2019, GVA surged by 76%, but fell by 39% afterward due to economic uncertainties and global supply chain interruptions (Kenton, 2022).

Since the 2010 financial crisis, the strategy of internationalization has gained traction. Many companies have expanded their reach beyond Portugal to counter domestic market saturation (Fernandes & Machado, 2016). As reported by APIMA (2020), the primary export markets include France (€500 million, 31.61%), Spain (€437 million, 27.68%), Germany and the UK (€86 million each, 5.48%), and the USA (€74 million, 4.7%). Notably, France and Spain together account for about 59% of exports, indicating a dependency on these markets (APIMA, 2020).

Established in 1984, APIMA plays a crucial role in boosting international competitiveness, facilitating joint initiatives, and promoting participation in global trade fairs. It is a member of both the European Furniture Manufacturers Federation and the World Furniture Confederation. Through trade missions and exhibitions, APIMA works to elevate Portugal's reputation as a producer of high-quality furniture (APIMA, 2019).

RESEARCH DESIGN

This research takes an exploratory and descriptive perspective in evaluating how prepared Portuguese furniture firms are for implementing the Time-Driven Activity-Based Costing (TDABC)

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system in their logistics functions. This approach was taken because of the lack of research in the context of furniture and the necessity for deeper inquiry into the existing practices, and this represent a big challenge for the furniture sector Pacheco, et al. (2024).

An industry-specific literature review was complemented by expert interviews in the field to compile the structured questionnaire dedicated to the survey. This methodology of combining different sources and methodologies is known as triangulation and serves to strengthen content validity as well as relevance to the sector. The questionnaire was designed to capture both objective data and perceptions of management regarding logistics processes, information systems, and cost-tracking capabilities.

The questionnaire design followed the SMART criteria to guarantee and reinforce that questions posed for furniture manufacturers were Specific, Measurable, Action-oriented, Relevant, and Time-bound. The sample for the research was obtained from the SABI database and was narrowed via CAE Rev. 3.1 codes to include only those companies that were actual furniture manufacturers. Considering that the study was exploratory, the sample was very small and highly selective.

This methodological structure allows for the comparison of company practices and provides diagnostic insights useful for the development of a TDABC cost model. While the number of valid responses was limited (n=9), the depth and maturity of the respondents' answers contribute valuable qualitative insights.

To accurately allocate costs to each activity within the transport process, it is essential to understand the delivery terms agreed upon for the transaction. The International Chamber of Commerce (ICC) plays a key role in promoting fair international trade and is responsible for the creation of the Incoterms – internationally recognized rules that govern the terms of delivery in global transactions. The Incoterms provide clear guidance on three critical aspects of trade – a workflow was developed to visualize the allocation of transport-related expenses (Incoterms® 2020 Rules for the Use of Domestic and International Trade Terms, 2019):

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Sequence in the Allocation Costs Between Seller and Buyer

Local	Concept
Country of Origin	1 Packing and checking
	2 Charges for loading at the seller's premises
	3 Transport in the country of origin (pre-transport)
	4 Customs expenses (export)
	5 Charges at the boarding terminal
Internacional	6 Main Transport
	7 Transport Insurance
Country of Destination	8 Charges at the Destination Terminal
	9 Customs expenses (importation)
	10 Logistics and Transport in the destination country (transport)
	11 Unloading charges at the buyer's premises

Table 1 – Sequence in The Allocation Costs Between Seller and Buyer. Source: Adapted from International Chamber of Commmerce (2019)

This preliminary diagram offers insight into how costs are distributed along the supply chain depending on the selected Incoterm. The key challenge is identifying which costs can be transferred to the buyer under the agreed delivery terms. A further limitation of the current model is its exclusive focus on international transactions, with no provision for domestic deliveries. A new diagram was developed, tailored to the selected Incoterm, to provide a clearer view of cost distribution. For instance, if a customer purchases a chair to be delivered in Switzerland under the FCA (Free Carrier) term, the seller is responsible for the costs up to the customs clearance at the origin. The shipper's responsibilities, therefore, include packaging, loading at the premises, and transportation to the customs point. The buyer bears all subsequent costs.

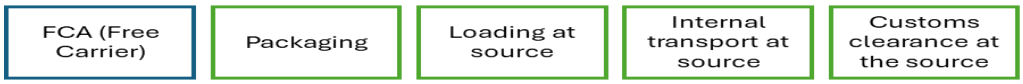


Figure 1 – FCA Incoterm Obligations Source: Adapted from International Chamber of Commerce (2019)

As previously noted, the questionnaire underwent minor revisions following feedback from the expert panel. These changes were made to better align the questions with the specific context of the furniture sector and to ensure the collection of relevant data for this study. Only opinion-based questions allowed for empty responses; all multiple-choice and quantitative questions were set as mandatory to enable submission.

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The selection of entities to receive the questionnaire (see appendix) was carried out using the SABI (Sistema de Análisis de Balances Ibéricos) database, filtering companies by CAE Rev. 3.1 codes. This yielded 8,506 eligible entities. The top 100 were selected from this pool to participate in the study.

Following the initial distribution of the questionnaire via email, only two companies responded. A second contact effort was made through email and phone calls, during which the purpose and importance of the study were explained in detail. Despite these efforts, only nine valid responses were obtained.

RESULTS FROM QUESTIONNAIRE TESTING

The 6 expert were asked their opinion about the questionnaire that would be applied to industrial companies in the logistics sector. They were informed that the questionnaire must describe the entire work process associated with the logistics area to identify the activities and tasks, times, human resources, equipment, and materials consumed. Table 2 shows the answer obtained:

Expert 1	The questionnaire is suitable for the purpose.
Expert 2	The questionnaire is complete and well-framed in the context of the sector.
Expert 3	I would include service valuation questions to understand what values per m3/delivery we are talking about for each market, both the ones you currently pay and the ones you want/should pay. I would include more sensitive questions, such as: would you have any problem loading at a nearby competitor's premises if this would mean significant savings? Ask directly if they see any problems or disadvantages in joining a local logistics network. In this network, they would have to provide their customers' details, such as addresses, so that, as a group, they could look for partners (competitors) who have goods for the same customer/destination. The sharing of information is crucial to the success of this project. Still, it is also one of the most significant psychological barriers in our sector and municipality, jeopardizing the project. It is necessary to convince them that saying that they sell to a certain client, in what volume, and with what regularity, will not harm them or cause them to lose business. On the contrary, it will boost their competitiveness and that of their partners (local competitors) in the international market. It must be us competing with the "world" and not us competing with our "next door" neighbor. This is what we have been doing and we are slowly "killing" each other's margins, becoming more and more fragile before the client.
Expert 4	The survey seems fine to me, in general. However, it is important to remember that the mentality of the companies in this sector, given all the problems that exist, do not have "time to waste". In addition, managers of these companies are mostly operational and are present in the factories, close to the production and not in the offices, nor do they participate, to a large extent, in administrative tasks. It is, therefore, essential to review the questions in perhaps not-so-technical vocabulary so that the questions are straightforward and easy to understand.
Expert 6	In this context, I would say that it is complicated for us to get companies to fill out a questionnaire. I am, in fact, always very reluctant when I must do it, since they are seen as a waste of time. So, I would suggest some changes in shortening the answer options, as is the case of one of the initial questions, where it asks the level of education. I believe that the goal here is the importance of the level of schooling and, thus, it would be more pertinent

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	to understand if they have the former 4th grade, secondary education (vocational or general) or, if beyond this, they went on to secondary education. In this case, I think that what is important to keep in mind is the issue of school interest and the education obtained, rather than in which year they stopped. As far as accounting figures are concerned, it is important to stress that those answering the questionnaire, if they are from the logistics sector, may understand little or nothing about accounting issues. It is therefore advisable to adapt the vocabulary to general and less technical terms. Finally, it would be easier to create scales of values to make it easier to answer the questionnaire. Otherwise, the respondent may pass the questions to accounting or give up.

Table 2 - Expert comments on questionnaire. Source: Self-Elaboration

Based on experts' answers, it becomes clear that many managers in furniture companies are mostly operational; they are used to working on the factory floor, close to production, and not in the offices, nor do they participate to a large extent in administrative tasks. Therefore, it was essential to review the questions in perhaps not-so-technical vocabulary so they are straightforward to understand. All the Incoterms were revised to mitigate this effect, and figures were added to the questionnaire. Another interesting suggestion was that it would be easier to create scales of values regarding revenue and other indicators. Otherwise, the respondent may pass the questions to accounting or give up. After these adjustments, the questionnaires were applied. Following, we present the descriptive statistics of the pilot test of the questionnaire.

The participants were between 35 and 59 years old. The person at a more advanced age has the lowest level of studies. Regarding qualifications, 77% of participants have a superior degree, and most have more than 10 years of experience in the sector. The average professional experience in the sector is approximately 19.6 years, which demonstrates a solid level of industry expertise among participants.

Companies range in establishment years from 1947 to 2088 (the 2088 entry is likely a data error). This suggests most firms are well-established, though the presence of incorrect values should be addressed in the dataset. Regarding annual turnover (2020), 7 companies report turnover > 1,000,000 EUR, indicating they are medium-to-large. The remaining 2 fall between 100,001 EUR and 1,000,000 EUR. These figures reflect financial robustness and potential capacity to invest in costing systems. The average number of employees per company is approximately 55, again supporting the idea that these firms are medium-sized and structurally capable of implementing structured costing systems.

When asked about if the available data is sufficient to calculate logistics process costs reliably (in the furniture sector) 56% responded "Yes" and 44% responded "No". This perception shows a divided view among companies. While the majority believe their systems can support cost calculation, a significant portion (nearly half) acknowledges gaps in their data structure.

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Regarding the management accounting tools that companies used to support the strategic decisions, the answers were the following:

Type	Percentage of positive answers
Management accounting	33%
Standard cost model	33%
Annual Budget	67%
Budget per department	33%
Tableau de Board	44%
Balanced Scorecard	11%

Table 3- Management Tools. Source: Self-Elaboration.

Annual budgeting stands out as the most popular management tool used by companies, closely followed by Tableau de Board, management accounting, standard cost models, and departmental budgets, each utilized by around one-third of respondents. There was a strong consensus among participants regarding the standard logistics framework provided, suggesting a significant level of process uniformity and a general sense of satisfaction with existing workflows.

Weekly shipment volumes showed considerable variation, ranging from 10 to 450 units, highlighting the operational diversity across firms. Many companies engage in both individual and grouped deliveries, with individual shipments typically falling between 6 and over 100 units, while grouped shipments can go up to 150 units. This indicates that while consolidated logistics are prevalent, they are not the norm for all.

Business-to-business (B2B) transactions are predominant, with resellers and distributors being the main clients. Interestingly, only one company primarily serves end customers directly. Some businesses ship as many as 400 units weekly to resellers, further emphasizing the sector's dependence on B2B relationships.

All firms are based in Portugal and frequently export to Spain and France, often sending out more than 200 units each week. Other destinations, both within the EU and beyond, such as the U.S., UAE, and Switzerland, also engage in trade, showcasing the intricate nature and significance of export logistics.

Firms that export larger volumes typically have more sophisticated cost-tracking systems in place. Those utilizing tools like Tableau de Board are more inclined to collect order-level data, which indicates a correlation between operational complexity and preparedness for Time-Driven Activity-Based Costing (TDABC).

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Most businesses rely on traditional logistics providers and methods. When asked about the adequacy of their data for calculating logistics costs, responses were mixed. A mere handful of firms possess the detailed, order-level data necessary for a comprehensive TDABC implementation, revealing a disconnect between what companies perceive and their actual system capabilities.

We present a descriptive analysis of these results, summarizing the frequency of "Yes" responses (information available) for each category. This reveals patterns in what data companies commonly have or lack, and thus how prepared they are to perform TDABC-based cost calculations for customer-related logistics activities.

Question 4.8 asked companies to indicate ("Yes" or "No") if their current information system (especially accounting) can reliably provide certain information for each major logistics activity/process. The activities considered were: (1) Packaging, (2) Loading goods onto transport, (3) Transport at origin (e.g. internal movement before main transport), (4) Unloading at destination, (5) Administrative process/export dispatch, and (6) Other logistics activities. For each activity, six types of data were queried: available work time devoted annually, normal utilization rate of that time, annual labor cost for that activity, annual external services cost for that activity, annual equipment depreciation for that activity, and related taxes/fees.

Table 4 below summarizes how many companies answered "Yes" regarding the availability of information for each activity:

Logistics Activity	Available Time (hours/year	Utilization Rate (%	Annual Labor Cost	External Services Cost	Depreciation Cost	Taxes/Fees Cost
Packaging	66%	33%	44%	44%	33%	44%
Loading	44%	22%	44%	44%	3/9 (33%	44%
Transport (Origin	44%	33%	56%	44%	44%	44%
Unloading (Dest.	22%	22%	33%	33%	44%	33%
Admin/Dispatch	44%	33%	33%	33%	33%	33%
Other	33%	22%	22%	22%	22%	33%

Table 4 - Availability of Information Data by Activity. Source: Self-Elaboration.

Most companies have only partial cost data by activity. Roughly half (33%–56% of firms, depending on category) can obtain annual labor cost, external services cost, depreciation, or tax figures for the main activities. For example, 5 of 9 companies can get the annual labor cost associated with the "Transport at origin" activity, and 4 of 9 can get that for Packaging, Loading, etc. However, the other

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half of companies do not break out these costs by activity in their systems. Notably, very few companies track costs for the catch-all "Other" category (only 2/9 have those figures), indicating that miscellaneous or less-defined activities often go unmeasured in detail.

A moderate number of firms track available work hours per activity – e.g., 6/9 (66%) have data on annual hours available for Packaging, and about 4/9 (44%) do for most other activities. This suggests some companies have capacity planning data (perhaps through workforce planning or standard hours for each process). However, it is not universal – e.g., only 2/9 have defined available hours for Unloading, possibly because some firms might not isolate unloading as a separate resource pool.

One clear gap is in utilization rates of available time. Very few companies (only 2 or 3 out of 9 for each activity) record the normal utilization percentage of their logistical activities' capacity. In most cases, companies answered "No" to having utilization rate information. This implies that even if they know how many hours are available, they might not track how intensively that capacity is used versus idle. For TDABC, utilization can be used to adjust cost calculations (e.g. cost per practical capacity hour), so this is a notable missing piece for most firms.

Companies seem more likely to have detailed data for Packaging and core transport-related activities than for peripheral ones. Packaging stands out with the highest data availability across several fields (e.g. two-thirds have packaging time data, and ~44% have various cost components for packaging). In contrast, Unloading and "Other" processes have consistently lower data availability (often only ~20–33% of firms have those figures). This likely reflects that some companies focus measurement on primary operational steps (packing, loading, main transport leg), and either assume unloading and other minor processes' costs or consider them less significant/ harder to isolate.

Overall, the majority of companies do not have a fully detailed breakdown of costs and capacity for each logistic activity. Only a few firms appear to have nearly all the requested information. In fact, in the data we observed, only 2 out of 9 companies responded "Yes" to almost every item in this section (indicating a highly developed costing system that differentiates all activities). Others have a mix: for example, some firms track available hours and costs for specific activities like packaging or transport, but not for others, or they capture cost data but not time utilization, etc. This patchy availability means that many companies would need to estimate or collect additional data to perform TDABC, since ideally, one needs both the capacity (time) and cost for each activity to determine cost rates.

Table 5 shows how many companies have each type of per-order information available (broken down by activity):

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Logistics Activity	Time per Order	Direct Materials per Order	Insurance/Subcontract Fees per Order	Fuel/Communications per Order	Taxes/Fees per Order
Packaging	44%	56%	44%	22%	22%
Loading	22%	33%	22%	33%	22%
Transport (Origin	22%	22%	22%	33%	22%
Unloading (Dest.	22%	22%	22%	33%	22%
Admin/Dispatch	33%	33%	33%	44%	44%
Other	22%	22%	22%	22%	33%

Table 5 - Availability of Per-Customer/Order Data by Activity. Source: Self-Elaboration.

Only a handful of companies keep track of the time spent on each customer order, and even fewer connect direct material costs or other external expenses to specific deliveries. It's more common for companies to monitor administrative tasks than to focus on logistics operations. Currently, just 22% of businesses are fully equipped for detailed Time-Driven Activity-Based Costing (TDABC). Many others lack crucial data on time and utilization, often overestimating how ready they are for this method.

Implementing TDABC in its entirety requires integrated systems that collect data on activities at the order level. Beyond understanding total expenses and capacity for each activity, TDABC necessitates detailed information about resource usage linked to each customer or order.

In Question 4.9, we asked whether systems provided critical data such as time spent, materials used (like packaging), insurance costs, subcontracting fees, fuel expenses, tolls, and taxes—all essential for accurately attributing logistics costs to customers. Unfortunately, only 2 to 4 out of 9 companies track the time spent per order for most activities. Packaging is the area with the most tracking, as 4 firms keep tabs on the time, yet only 2 track the hours for loading, transport, or unloading. Most companies rely on averages instead of real-time data logs.

When it comes to tracking packaging material per order, it is the most commonly monitored data point (5 firms). A few companies also keep track of insurance or costs related to outsourced delivery, but this is not common. Only 2 to 3 companies gather data on fuel, tolls, or communication costs per order.

Administrative processes generally show better tracking, with 4 firms recording external services or taxes (like customs) for each order. Costs that are clearly linked or billed are more likely to be tracked

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than indirect costs. In contrast to activity-level data (Question 4.8), data on a per-customer basis (Question 4.9) is much less common.

Most companies only have incomplete information, such as packaging materials or administrative fees, but lack comprehensive records at the order level. Only two firms consistently report having full data availability, confirming that they possess robust systems. Tracking for administrative or documentation activities shows a slightly higher percentage (33–44%), probably due to automated records generated by systems (like timestamps and invoices).

On the other hand, physical logistics activities such as loading and unloading are seldom logged at the order level. This indicates a gap in system integration: companies may track financial figures per order, but often do not have operational logs, such as time spent on tasks. Although most firms are mid-sized and experienced, only a few possess the necessary systems for detailed TDABC. There is a clear need to align how ready companies think they are with their actual data capabilities and to encourage system upgrades to achieve accurate logistics costing.

This study sheds light on some important theoretical and practical aspects.

Theoretical Implications: by applying the TDABC model in a traditional sector with low digitization, this research adds valuable insights to existing literature. It showcases the difficulties encountered when putting theoretical concepts into real-world applications. While the relevance of the TDABC model is supported, it also underscores the necessity for adjustments when used in environments that lack sufficient information maturity.

Practical Implications: for managers operating within the furniture industry, the findings act as a gauge of their data preparedness. Companies that do not possess thorough data will face challenges in determining precise customer-level margins, which can hinder their ability to make informed strategic choices. Embracing integrated tracking and costing systems could yield significant financial and operational advantages, especially in today's fiercely competitive global marketplace.

CONCLUSIONS

This exploratory study focused on whether logistics processes in Portuguese furniture companies are standardized, which logistics costs are most prevalent, and if these firms possess the necessary data to calculate activity-based costs, particularly in customer service. It also evaluated their readiness to

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implement Time-Driven Activity-Based Costing (TDABC) to enhance cost clarity and efficiency in management.

The findings reveal that logistics processes across these companies tend to be quite similar, especially within B2B operations, indicating a degree of standardization and the potential for shared costing models. Most firms maintain structured workflows when it comes to preparation, packaging, and delivery.

Although companies generally feel prepared to adopt TDABC, only a few have the detailed time and cost data needed for its successful implementation. This gap highlights a disconnect between what management expects and the actual capabilities of their systems.

To bridge this gap, several practical steps can be taken: providing managerial accounting training focused on logistics, employing simple digital tools to track time by activity, and fostering collaborative logistics networks to share benchmarks and best practices.

While companies identify significant cost components like labor, packaging, and services, they seldom record costs or time associated with specific customer tasks. Many believe they can estimate these costs, yet most lack data on practical capacity and time spent on each order—crucial inputs for TDABC.

A few firms do stand out, utilizing integrated systems that meticulously track both time and costs. These examples demonstrate that TDABC can work effectively with the right data alignment. However, the majority still depend on broad cost estimates and miss out on TDABC's insights into customer profitability or process inefficiencies.

In summary, furniture firms display a level of operational maturity and appreciate the importance of cost management, yet most are not fully prepared for TDABC. Achieving readiness involves investing in system integration, time tracking, and transitioning towards data-driven decision-making.

The potential benefits—especially in the face of global competition and complex logistics—make this investment worthwhile. This study highlights essential logistics activities to include in cost models and confirms that most firms follow standard processes, setting the stage for the next phase of research: creating a tool to estimate customer delivery costs using TDABC.

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Companies that align with the established standards will be equipped to calculate service costs based on basic operational inputs, leading to improved cost transparency, better decision-making, and enhanced competitiveness.

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APPENDIX

Dear. Mr. Company Administrator …

As a master's student, I am developing a work on the management of logistics activities in the furniture sector. This work has two phases:

- the first phase aims to situate the logistics process within the furniture industry value chain;
- the second phase aims to develop a costing model that provides companies with a useful tool for decision-making in the management of the logistics activity.

In this context, we would like to hear from a panel of Experts who, due to their experience and knowledge, are profoundly knowledgeable about the sector and its operational reality, both in strategic terms and in terms of the management of the logistics process.

Based on the responses to the attached survey, we will try to cross the different views and contributions of the Experts on two major issues:

What is the role of logistics in the value chain?

What parameters define furniture logistics?

Having you been identified as an expert, we request collaboration in this study, through the response to the attached survey.

Thanks for the collaboration.

QUESTIONS:

1. On the following pages, or on the link below, to view the web version, there is a questionnaire (Portuguese Language) that will be applied to industrial companies in the furniture sector based in Paços de Ferreira.

   The purpose of the questionnaire is to collect information that serves as a basis for describing the entire work process associated with the logistics area, to identify activities and tasks, times, human resources, equipment and materials consumed.

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Please leave a comment on the questionnaire here, including suggested questions to include and response options to consider. Thanks.

_____

_____

_____

_____

_____

Access Link: https://zfrmz.eu/cUP9Fty16wtOraligu31 (Only in Portuguese)

QUESTIONNAIRE FOR FURNITURE COMPANIES

1. General Data

1.1 Birth of date

dd-MMM-yyyy

1.2 Academic education*

- ○ 2nd cycle of Basic Education
- ○ 3rd cycle of Basic Education obtained in general education or through dual certification pathways.
- ○ Secondary education aimed at pursuing higher level studies.
- ○ Vocational secondary vocational education to pursue higher level studies plus professional internship - minimum of 6 months.
- ○ Non-tertiary post-secondary level qualification with credits for pursuing higher level studies.
- ○ Degree Non-tertiary post-secondary
- ○ Master´s Degree
- ○ Doctorate
- ○ Other

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1.3 Working Position*

1.4 Years of working experience*

2. General company data

2.1 Year of constitution*

2.2 Turnover (For the year 2020)*

2.3 Number of workers (on December 31, 2020) *

2.4 Export volume (For the year 2020) *

3. General data of the internal information system

3.1 Do you have cost accounting? *

○ Yes

○ No

3.2 Do you use the standard cost model? *

○ Yes

○ No

3.3 Do you prepare an annual budget for the company? (Sales, production, purchases, external supplies and services, depreciation, financial charges, human resources, among other items) *

○ Yes

○ No

3.4 Do you have "tableau de bord" or "balanced scorecard"? *

○ Yes

○ No

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3.5 Do you identify with one of the diagrams below regarding the process of shipping goods?





○ No

3.6 What did you modify in the scheme described above?

3.7 What is the average number of weekly shipments that the company makes? *

3.8 In relation to customers at the destination of the goods, identify the average number of weekly shipments, according to the options below: *

Average number of weekly submissions

Sent to a single customer.

Grouped for multiple clients (grouping)

3.9 Regarding the weekly shipments made, define the average number of weekly shipments, according to the type of customer: *

Average number of weekly submissions

Final customer

Reseller

Distributor

Other

3.10 What are the main shipping destinations for cargo? *

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Average number of weekly submissions

Portugal

Spain

France

UK

Other Community Countries

Third Countries (Outside the European Union)

3.11 Considering your company's current information system, especially Accounting, define with "Yes" and "No" the information you can reliably obtain, keeping in mind each of the activities/processes and their annual expenses**:** *

	working time available affection to activity (measured in hours - annual man)	Normal utilization rate of available time	Annual cost of work available activity affection (Measured in hours - men)	Supplies and annual external services related directly with the activity. Fixed or semi-fixed costs	Amortizations of equipment affection directly to the activity. Fixed or semi-fixed costs	Fees, taxes, and other expenses related directly with the activity
1.Packaging						
2. Merchandise loading						
3. Transport at Origin						
4.Discharge in the origin + stock movement						

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5. Administrative process / Export Dispatch						
6.Other						

3.12 If you selected the option "Other", define the name of the activity/process:

3.13 Considering your company's current information system, especially Accounting, define with "Yes" and "No" the information you can reliably obtain, bearing in mind each of the logistics/delivery services: *

	Time, in man-hours, spent specifically, with the delivery/order	Direct materials applied due to delivery/and order	Insurance, fees, subcontracting, commissions and other related services directly to delivery/order	Communications, fuels, tolls, energy, and other ESS related directly with delivery/order	Fees, taxes, and other expenses directly related to the activity
1.Packaging					
2. Merchandise loading					
3. Transport at Origin					
4.Discharge in the origin + stock movement					
5. Administrative process / Export Dispatch					
6.Other					

3.14 If you selected the "Other" option, specify the name of the logistics/delivery service:

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3.15 In your opinion, are the data contained in the matrices in the previous points sufficient to reliably calculate the cost of the logistics processes associated with delivery in the furniture sector? *

YES or NO

3.16 Leave your suggestion/recommendation here for the design and development of a model for calculating the costs of logistics processes associated with delivery, in the furniture sector: *

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THE ROLE OF SOCIAL MEDIA INFLUENCERS IN HEALTHY EATING AFTER OBESITY

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ABSTRACT

This study examines the role of social media influencers (SMI) in shaping healthy eating habits among formerly obese individuals. The study was guided by the combination of relevant theoretical underpinnings, which led to the development of nine research hypotheses. A quantitative approach was adopted, with data collected through an online survey of 321 participants who had undergone bariatric surgery at least six months prior and followed at least one SMI focused on healthy eating. Structural equation modeling using SmartPLS4 was employed to test the proposed hypotheses.

The results confirm that source credibility has a positive impact on attitude toward healthy eating but does not directly impact healthy eating intentions. Attitude has a positive impact on intention, which in turn influences healthy eating behavior. Additionally, healthy eating behavior has a positive impact on healthy eating habit. The findings also show that openness is a determinant in explaining healthy behavior among former obese individuals, having a positive impact on attitude, intention, behavior, and habit, and therefore reinforcing the adoption and maintenance of healthy eating.

This study fills a gap in the literature, by extending SMI literature to a relevant segment of consumers (i.e., former obese) that has been so far disregarded by research. It also provides relevant insights to diverse stakeholders, including SMI and public health organizations.

Keywords: Obesity, Former Obese, Post-Bariatric, Social Media Influencers, Healthy Eating, Habit, Consumer Behavior, Openness to Change.

INTRODUCTION

Excess weight and obesity are among the leading causes of mortality in Europe (World Health Organization, 2022). Obesity is a complex condition influenced by multiple factors, including genetic

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predisposition, dietary patterns, physical inactivity, and psychological aspects such as anxiety and depression (Garvey and Mechanick, 2020, World Health Organization, 2022). While weight management strategies include dietary interventions, physical activity, and, in extreme cases, surgery, long-term success depends on sustained lifestyle changes, particularly in adopting and maintaining healthy eating habits (Taxtsoglou and Iliadis, 2015).

Given the challenges of maintaining weight loss, individuals turn to multiple sources, including healthcare professionals and online platforms, for support. Social media has become a key space for this guidance, particularly through SMI who share experiences and promote healthy eating.

With nearly 5 billion users globally (We are Social and Meltwater, 2024), social media platforms are central sources for users seeking guidance on health and nutrition. Studies have demonstrated that exposure to healthy eating behavior on social media can positively impact individuals' dietary choices (Kinard, 2016, Wilson et al., 2019, Zepeda and Deal, 2008). The rise of social media has led to the emergence of social media influencers (SMI), individuals who shape public opinions and behaviors through their content (Vrontis et al., 2021). Research shows that exposure to SMI who promote healthy eating can influence healthy eating behavior (Kinard, 2016, Wilson et al., 2019, Zepeda and Deal, 2008). However, their role in long-term healthy eating habit formation remains underexplored. Given the complexity of post-obesity adjustments, including cases where individuals have undergone surgical interventions, this study examines how SMI can impact healthy eating habits and behavior among former obese individuals.

This research adopted a quantitative approach, aiming to validate a conceptual model based on a literature review. Data collection was conducted through an online survey, utilizing pre-established scales from previous studies. The sample consists of individuals aged 18 and older who underwent bariatric surgery more than six months prior and follow at least one social media influencer specializing in healthy eating. The data was analyzed using SMART-PLS, a structural equation modeling tool used for assessing relationships between variables. The following section presents the main theoretical foundations that guided the hypothesis development.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

Before presenting the research model and hypothesis development, this section defines the key variables examined in this study, highlighting their relevance in the context of healthy eating and SMI.

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Source credibility is a fundamental determinant of SMI influence on consumer behavior, as it shapes audience perceptions of trustworthiness and expertise. It determines the extent to which an audience perceives an SMI as a reliable and knowledgeable source, influencing both attitudes and intentions (Casalo et al., 2020, Ohanian, 1991, Vrontis et al., 2021). However, as this study seeks to explain not only attitudes and intentions but also behavior and habit, additional theoretical foundations were required.

The Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980) is one of the most widely applied models in consumer behavior research, providing a robust framework for predicting how attitudes influence intentions and, ultimately, behavior. This framework is essential for examining how exposure to SMI content translates into actual dietary behavior changes. However, TRA primarily explains conscious decision-making processes and does not account for how behaviors are sustained over time.

To address this limitation, this study incorporates the Habit Formation Theory (Duhigg, 2012, Rothman, 2000), which explains how repeated behaviors transition from intentional actions to automatic, ingrained habits. Understanding habit formation is crucial in the context of formerly obese individuals, as long-term adherence to healthy eating patterns determines the sustainability of weight loss and health improvements.

However, in the case of formerly obese individuals, behavioral change is not limited to habit formation alone but also involves a fundamental shift in personal values. Human Values Theory (Schwartz, 1994, Schwartz, 2012) provides insights into how openness to change influences behavior modification. Individuals who are more open to change are more likely to adopt and sustain new health-related behaviors, making this a relevant construct for understanding post-obesity dietary transformations.

Building on these theoretical perspectives, this study identifies six key variables that collectively explain how SMI influence healthy eating attitudes, intentions, behaviors, and habits. Table 1 presents an overview of these concepts.

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Variable	Definition	Key References
Source Credibility	Perceived trustworthiness and expertise of SMI, influencing audience perception and decision-making.	Ohanian (1991)
Attitude	Psychological evaluation (positive or negative) of healthy eating, shaped by exposure to persuasive content.	Ajzen and Fishbein (1980)
Intention	Commitment and motivation to adopt or maintain healthy eating behaviors, influenced by external factors like SMI.	Ajzen (1991)
Healthy Eating Behavior	Specific dietary actions that align with nutritional guidelines, such as increased vegetable intake and reduced processed food consumption.	Mamun et al. (2020), Wilson et al. (2019), Zepeda and Deal (2008),
Healthy Eating Habit	Repeated and automatic patterns of dietary choices, requiring less cognitive effort over time.	Duhigg (2012), Ouellette and Wood (1998), Rothman (2000)
Openness to Change	Willingness to adopt new behaviors and adjust established routines, affecting attitude, intention, behavior, and habit formation.	(Schwartz, 1994, Schwartz, 2012)

Table 1. *Key concepts for this study*

Hypothesis Development

The hypotheses proposed in this study stem from the theoretical foundations previously discussed. Source credibility is a central concept in understanding the impact of SMI on consumer behavior, influencing both attitudes and intentions (Ohanian, 1991, Casalo et al., 2020, Vrontis et al., 2021). Credible SMI, perceived as knowledgeable and trustworthy, play a significant role in shaping individuals' attitudes toward healthy eating, as well as their intention to adopt such behaviors. Studies in food marketing have shown that consumers rely on credible sources for dietary decisions, particularly when evaluating health-related claims (Choi and Rifon, 2002, Cuesta-Valiño et al., 2020, Voorveld et al., 2018). Accordingly, we propose the following hypotheses:

H1 – Source credibility has a positive impact on attitude toward healthy eating.

H2 – Source credibility has a positive impact on the intention to adopt healthy eating.

Attitudes are well-established predictors of behavioral intentions, as outlined in the Theory of Reasoned Action (Ajzen & Fishbein, 1980). Research demonstrates that positive attitudes toward health behaviors strengthen individuals' intentions to engage in them (Mamun et al., 2020). In the context of dietary choices, previous studies confirm that favorable attitudes toward healthy eating significantly increase the likelihood of adopting such behaviors (Yadav & Pathak, 2016; Hoque et al., 2018; Menozzi et al., 2015). Building on this, we propose:

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H3 – Attitude toward healthy eating has a positive impact on the intention to adopt healthy eating.

H4 – The intention to adopt healthy eating has a positive impact on healthy eating behavior.

Behavioral change is not only driven by conscious decisions but also by deeper personal values. Human Values Theory (Schwartz, 1994, 2012) identifies openness to change as a crucial factor influencing individuals' willingness to adopt new behaviors. In dietary behavior, openness to change has been linked to greater willingness to explore new food choices and adhere to sustainable nutrition plans (Leite et al., 2021; Lee et al., 2019; Quinones et al., 2022). This study considers openness to change as an essential factor in the adoption of healthy eating habits. Therefore, the following hypotheses are proposed:

H5 – Openness to change has a positive impact on attitude toward healthy eating.

H6 – Openness to change has a positive impact on the intention to adopt healthy eating.

H7 – Openness to change has a positive impact on healthy eating behavior.

H8 – Openness to change has a positive impact on healthy eating habit.

Finally, research on habit formation suggests that sustained behaviors eventually develop into automatic habits when reinforced over time (Duhigg, 2013; Rothman, 2000). Studies on dietary habits indicate that repeated engagement in healthy eating behaviors strengthens habitual food choices and long-term adherence to balanced diets (Lally et al., 2010; Gardner & Tang, 2014; Neal et al., 2013). This study examines how healthy eating behavior influences habit formation, leading to the final hypothesis:

H9 – Healthy eating behavior has a positive impact on healthy eating habit.

Figure 1 presents the conceptual model developed for this study, illustrating the hypothesized relationships.

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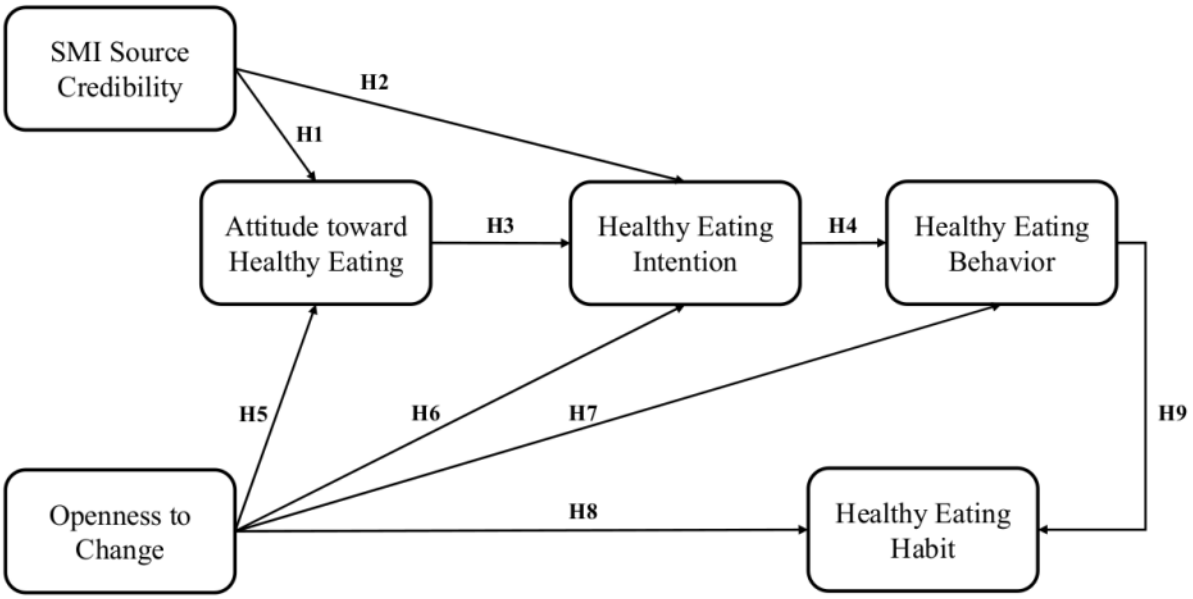


Figure 1. *Conceptual model*

METHOD

Materials

Data was collected through a structured questionnaire consisting of four sections. The first section screened participants based on eligibility criteria: being over 18, having undergone bariatric surgery more than six months prior, using social media, and following at least one SMI focused on healthy eating, which they were required to identify. Only those who identified such an SMI proceeded to the second section, which assessed source credibility. The third section measured attitudes, intentions, behaviors, habits, and openness to change regarding healthy eating. The final section collected demographic data for sample characterization.

Measures

The measurement scales used in this study were adapted from previous research. Source credibility was measured using the scale from Ohanian (1991), attitude from Spears and Singh (2004), habit from Gardner and Tang (2014), intention from Wijayaratne et al. (2018), and openness to change from Sandy et al. (2017). Healthy eating behavior was developed by the authors for this study.

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Participants

The target population for this study consists of individuals aged 18 or older who had undergone bariatric surgery more than six months prior, actively use social media, and follow at least one SMI focused on healthy eating. A non-probabilistic sampling method was employed.

The final sample consisted of 321 participants, predominantly female (81.62%). In terms of age distribution, most participants were aged 41–50 years (38.63%), followed by those aged 31–40 years (29.28%). Regarding education, 45.48% had completed secondary education, while 23.36% held a bachelor's degree. Regarding occupation, 71.96% were employed full-time. Concerning exposure to SMI promoting healthy eating, 35.51% of participants reported consuming such content multiple times a day, while 22.74% did so once per day, highlighting high engagement with this type of digital content.

Data Analysis Techniques

SmartPLS 4 was selected for this analysis due to its flexibility and ability to handle complex models and non-normal data (Hair et al., 2018). SmartPLS is widely used in marketing and social sciences research, particularly for ensuring the robustness of results and conducting validation through appropriate structural equation modeling techniques. This data analysis process follows established theoretical guidelines, focusing on construct validity and the explanatory power of the model, ensuring that the results are interpreted rigorously and coherently with the literature.

RESULTS SUMMARY

Validity and Reliability

The first stage of the analysis involved assessing the validity and reliability of the constructs in the model. This was conducted through an evaluation of item outer loadings, composite reliability (CR), Cronbach's alpha (CA), and average variance extracted (AVE). The results indicate that all constructs have outer loadings above 0.7, confirming a strong individual reliability of the indicators (Hair et al., 2014). Cronbach's alpha and CR values for all constructs exceed 0.8, demonstrating high internal consistency, which is essential for ensuring model validity (Nunnally, 1994). Additionally, AVE values are all above the 0.5 threshold, confirming adequate convergent validity, meaning that the constructs explain the majority of the variance in their indicators (Fornell and Larcker, 1981).

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Discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) ratio, a more rigorous measure than the Fornell-Larcker criterion (Henseler et al., 2015). All HTMT values were below the 0.85 threshold, indicating that the constructs are sufficiently distinct from one another, thereby ensuring robust discriminant validity.

Hypothesis Testing

After confirming the validity and reliability of the constructs, the structural model analysis was conducted to test the proposed hypotheses and examine the relationships between the model's constructs. This analysis provides insights into the significance and strength of these relationships. The results are summarized in Table 2.

Direct Paths	Path Coefficients	P Values
H1 Source Credibility ⊚Attitude	0.508	0.000
H2 Source Credibility ⊚ Intention	-0.096	0.133
H3 Attitude ⊚ Intention	0.245	0.001
H4 Intention ⊚ Behavior	0.354	0.000
H5 Openness To Change ⊚ Attitude	0.174	0.004
H6 Openness To Change ⊚ Intention	0.175	0.007
H7 Openness To Change ⊚ Behavior	0.231	0.000
H8 Openness To Change ⊚ Habit	0.182	0.000
H9 Behavior ⊚ Habit	0.607	0.000

Table 2. *Hypothesis testing*

The results of the structural model analysis indicate that all hypotheses were supported, except for H2. While source credibility had a positive impact on attitude toward healthy eating (H1), its effect on the intention to adopt healthy eating (H2) was not statistically significant. These findings suggest that while credibility influences attitudes, additional factors may mediate the relationship between credibility and behavioral intention. The remaining hypotheses were confirmed, reinforcing the theoretical framework underlying the model.

CONCLUSION

This study aimed to contribute to the understanding of the role of social media influencers (SMI) in shaping healthy eating habits among formerly obese individuals. The conclusion is structured into three key areas: theoretical contributions, practical implications, and limitations with suggestions for future research.

Theoretical Contributions

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This study provides several theoretical contributions. First, it reinforces the importance of source credibility in shaping positive attitudes toward healthy eating, aligning with prior research (Ohanian, 1991, Pradhan et al., 2023, Vrontis et al., 2021). However, contrary to expectations, the results indicate that source credibility does not directly influence the intention to adopt healthy eating behaviors among post-bariatric individuals. Instead, the influence is performed through the mediation of attitudes. Future studies should explore these potential mediators to clarify the mechanisms at play.

Second, this study contributes to the discussion on the influence of SMI among former obese, particularly post-bariatric individuals—a highly specific and understudied segment. Unlike the general population, these individuals have undergone extensive medical supervision, including guidance from surgeons, nutritionists, endocrinologists, and psychologists. The results indicate that even in a segment with prior medical support, SMI play a relevant role in reinforcing and sustaining healthy eating behaviors.

Additionally, the findings confirm that openness to change significantly impacts attitude, intention, and behavior related to healthy eating, providing new evidence related to the human values literature (Schwartz, 1992) in a particularly relevant topic, such as healthy eating among former obese individuals. This suggests that individuals who are more open to change are better prepared to adjust their eating habits, namely to meet post-surgery dietary requirements, as is the case of post-bariatric patients.

Finally, the study highlights the strong link between repeated behavior and habit formation, reinforcing the role of repetition in consolidating long-term healthy behaviors (Verplanken and Orbell, 2003). This finding is particularly relevant in a post-surgical context, where maintaining healthy eating habits is crucial for long-term medical success.

Practical Implications

The results of this study offer valuable insights for health campaign managers, digital marketing professionals, and policymakers focused on promoting healthy eating behaviors among individuals who have undergone bariatric surgery. For healthcare professionals, particularly multidisciplinary hospital teams working with post-bariatric patients, these findings highlight the potential benefits of forming partnerships with specialized influencers. By engaging trusted SMI as campaign ambassadors, healthcare professionals can extend their reach and reinforce behavioral recommendations among patients.

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For SMI and the food and pharmaceutical industries, this study confirms that influencer credibility is positively associated with attitudes related to healthy eating, which indirectly can influence healthy eating intentions, behaviors, and habits. This suggests that SMI should focus on promoting brands and products aligned with the principles of healthy nutrition, which can have a positive impact on the lives of ex-obese, including post-bariatric patients.

Limitations and Suggestions for Future Research

Despite its contributions, this study has several limitations. The use of a non-probabilistic sampling method limits the generalizability of findings, as it does not ensure full population representation. Although the sample size was sufficient, future research should employ probabilistic sampling to enhance external validity.

A gender imbalance was observed, with a predominance of female participants. Due to the lack of national statistics on post-bariatric individuals, it is unclear whether this gender distribution is representative of the broader population.

An important result is the lack of a significant relationship between source credibility and intention. This finding raises questions about the real drivers of behavioral intention in this context. Future research could examine whether different message types, communication styles, or situational factors influence this relationship.

Further studies should also explore the inclusion of mediating or moderating variables—such as adherence to post-surgical dietary recommendations or engagement with digital health platforms—to clarify the relationships between SMI credibility, intention, and behavior.

Finally, as digital platforms continue to evolve, future studies should investigate how emerging content formats (e.g., short-form videos, interactive health applications, AI-driven recommendations) influence the formation and maintenance of healthy eating habits among former obese individuals.

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EXPLORING NEW HORIZONS IN CORPORATE MANAGEMENT: REMOTE MEETINGS AS A TOOL FOR ENHANCING BUSINESS EFFICIENCY

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ABSTRACT

The paper analyses both EU and Italian legislation concerning remote participation in shareholders' meetings of *public limited companies*. The principal European measure in this field is the Shareholders' Rights Directive (2007/36/EC), which, under Article 8, provides for electronic voting and remote participation in the shareholders' meeting. However, the Directive applies exclusively to *listed companies*. The relevant provision under Italian law is Article 2370, paragraph 4, of the Civil Code, which has been amended also in light of the transposition of the aforementioned Directive. Italian law requires that such electronic means may be used only if expressly permitted by the *articles of association*, whereas the Directive leaves Member States free to avoid imposing such a condition. It should be noted that Italian legislation still includes provisions adopted during the Covid-19 pandemic, aimed at facilitating the use of technological tools in shareholders' meetings. This paper therefore compares such emergency legislation with the corresponding provisions of the Civil Code, with a view to identifying potential efficiency gains in corporation's life.

Keywords: corporate governance, shareholders' meetings, remote participation, electronic voting, digitalization, efficiency

INTRODUCTION

The increasingly frequent use of new technologies in the formation of shareholders' will within the *public limited company* (hereinafter "PLC") has led to a growing legislative recognition of the phenomenon. The purpose of this paper is to examine the general framework established by European legislation and then to analyse its implementation under Italian law, which may serve as a testing ground for assessing the potential efficiency gains permitted by the European directive.

As for the (limited) European provisions, reference must first be made to the Shareholders' Rights Directive I (Directive 2007/36/EC, SHRD I), concerning the exercise of certain rights of shareholders in *listed companies*. Article 8 of the Directive introduces the possibility of applying electronic means to

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remote participation in shareholders' meetings of PLCs. Moreover, Article 5(3) of the same Directive requires that the notice of the meeting contain a clear and precise description of the procedures to be followed by shareholders in order to participate in and/or vote at the meeting, including the procedures for electronic voting.

The subsequent Shareholders' Rights Directive II (Directive (EU) 2017/828, SHRD II) does not introduce significant innovations regarding participation in shareholders' meetings by electronic means. Nevertheless, it presumes the applicability of such means, both in Recital 10 and in Article 1(3); the latter inserts Article 3c into SHRD I, concerning – in its second paragraph – the confirmation of receipt of electronic votes.

All these rules refer to *listed companies*, as they are typically characterised by a more dispersed shareholder base and a greater need to exercise rights across borders—thus remotely.

In this context, it is worth noting that the codification Directive (EU) 2017/1132 on company law—which applies to all *public limited companies*, including non-listed ones, and in certain cases also to *private limited companies*—does not currently contain any provisions on the remote exercise of rights by electronic means in shareholders' meetings. This remains true even following the adoption of Directive (EU) 2019/1151, concerning the use of digital tools and processes in company law, as well as of Directive (EU) 2025/25, which aims to further expand and improve the use of digital tools and processes in company law.

As regards Italy, several provisions govern the subject under examination. The principal rule of reference is Article 2370(4) of the Civil Code, introduced as early as the 2003-company-law reform, which envisaged two possibilities: the possibility of participating in shareholders' meetings by means of telecommunication *(Assonime, 2022; Busani, 2021; Coletta, 2020; Comitato Interregionale del Triveneto, n.d.; Consiglio Notarile di Firenze, 2022; Consiglio Notarile di Milano, n.d.; Ferri and Sodi, 2023; Consob, 2022; Gallo and Vannucci, 2011; Guidotti, 2001; La Sala, 2021; Magliulo, 2020; Sandei, 2016; Schiuma, 2020; Stanzione, 2021)* and the possibility of voting by correspondence.

Upon transposing SHRD I pursuant to Article 31 of Law No. 88/2009 (which delegated legislative authority to the Government) Italy:

a) expressly introduced in Article 2370(4) of the Civil Code the possibility of electronic voting;

b) amended Article 127 of the Consolidated Law on Finance (Legislative Decree No. 58/1998, "CLF"), concerning voting by correspondence or by electronic means (pursuant to Article 3(9) of Legislative Decree No. 27/2010). The amended Article 127 now entrusts Consob (the independent Authority for securities and Stock Exchange regulation) with the power to establish the procedures for voting by correspondence or electronically. These procedures are currently set out in Articles 143-bis and 143-ter

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of the Consob Issuers' Regulation (referred to as the "IR"), adopted by Resolution No. 11971 of 14 May 1999 and most recently amended by Resolution No. 22551 of 22 December 2022.

It is worth noting that SHRD I applies exclusively to *listed companies*, whereas Legislative Decree No. 27/2010, in the absence of limitations within Law No. 88/2009, amended also Article 2370(4) of the Civil Code, which applies to all *public limited companies*, whether listed or not (if listed, it applies only outside of the scope of the above-mentioned IR).

Italy, like many other Member States, also intervened during the Covid-19 pandemic to promote the use of remote communication technologies, through Article 106(2) of Law Decree No. 18/2020 (hereinafter "LD 18"). These rules were intended to cease to apply upon the end of the pandemic; however, their effectiveness has been repeatedly extended. As of today, the relevant deadline has been postponed to 31 December 2025 (although a further extension appears possible).

Accordingly, the analysis of Italian law will be structured in two temporal phases:

a) during the transitional period, it continues to be governed by LD 18;

b) as of 1 January 2026, it will again be governed by the ordinary provisions of the Civil Code and of the CLF and Consob IR.

The logical framework of this paper is as follows: an analysis of electronic voting; followed by the examination of shareholders' meetings held by videoconference in a fully collegial manner; then of meetings held in a reduced collegiality format; then of the possibility of mandating meetings to be held exclusively online; and, finally, a conclusion on how these new tools of corporate organisation can foster efficiency and promote cross-border voting.

ELECTRONIC VOTING

The use of electronic voting was first introduced by SHRD I (Article 8(1)) for public limited companies listed on a regulated market only; it was later implemented in Italy for *all* PLCs, whether listed or not, through its incorporation into Article 2370(4) of the Civil Code (and in Article 127 of the CLF). As clearly outlined in Article 8 of SHRD I, electronic voting may take two forms, depending on the timing of its exercise: it may occur prior to the shareholders' meeting, or during the meeting itself.

In the *first* case, it essentially amounts to the technological evolution of voting by correspondence (which in Article 12 of the SHRD I is regulated only for listed companies and in Italy, instead, had already been extended as early as 2003 to all PLCs, including unlisted ones). The similarity is such that, even before the explicit introduction of electronic voting in 2010, it was widely accepted that electronic voting was admissible under Italian law. Its exercise requires that shareholders be presented with proposed resolutions in advance of the holding of the meeting.

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In the *second* hypothesis (real-time voting), electronic voting is simply one of several modalities through which votes may be cast. However, it is a method that may be used either at the same physical location where the shareholders' meeting is held, or from a different location; see, on the use of "Televoter" or "Radiovoter" *(Magliulo, 2019)*; for the different forms of electronic voting, including those arising from the application of the SHRD I, see *(Turelli, 2011)* in particular §§ 1 and 5.

Where electronic voting is exercised both simultaneously with the meeting's proceedings (unity of time) and at the very place of its occurrence (unity of place), such voting becomes fully integrated within a *fully collegial* shareholders' meeting and does not derogate from its nature. Accordingly, the Italian provision which allows recourse to electronic voting only if expressly permitted by the *articles of association* does not appear applicable in this case, as the operation of the meeting is not being altered in any way.

PARTICIPATION IN SHAREHOLDERS' MEETINGS BY ELECTRONIC MEANS IN THE PRESENCE, ABSENCE OR CONTRADICTION OF A STATUTORY CLAUSE

As regards both the use of videoconferencing during shareholders' meetings and the possibility of electronic voting, Article 8 of SHRD I does not make their use conditional upon any specific provision in the articles of association. Under EU law, therefore, Member States may provide either that companies have the right to hold shareholders' meetings by electronic means, or, as Italy already did in 2003, that such remote meetings are permitted only if expressly provided for in the articles of association.

Under Italian law *(Turelli, 2004)*, the question therefore arises as to the relationship between participation by electronic means and the corresponding provision in the articles of association—both up to 31 December 2025 and beyond that date (absent any further extensions).

LD 18, for the purposes relevant here, provides that: "in the notice convening the ordinary or extraordinary shareholders' meeting, PLCs may provide for voting to be conducted electronically or by correspondence and for participation in the meeting by means of telecommunication, notwithstanding any contrary provisions in the articles of association". This special provision thus permits recourse to voting by correspondence or electronically, and to remote shareholders' meetings, in *all* circumstances; that is: a) where a statutory clause expressly *permits* it; b) in the *absence* of such a clause; and even c) in *contradiction* of such a clause (i.e. when the articles explicitly prohibit remote shareholders' meetings or electronic voting).

After 31 December 2025, with the return to the ordinary discipline of the Civil Code, the legal framework reveals certain areas of uncertainty. The relevant provision is Article 2370(4) of the Civil

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Code, which states: ″the articles of association may allow participation in the shareholders' meeting by means of telecommunication, or the casting of votes by correspondence or electronically. Shareholders voting by correspondence or by electronic means shall be deemed to have participated in the shareholders' meeting″. In light of this provision:

A) there is no doubt that the *articles of association* may lawfully introduce such a provision;

B) likewise, given the wording of Article 2370(4) of the Civil Code, there is no doubt that the articles may also exclude the use of videoconferencing;

C) what remains uncertain is the situation in case of silence.

On this last point, a minority opinion has been advanced *(Comitato Interregionale dei Consigli Notarili delle Tre Venezie, 2006; Guidotti, 2001)*, according to which participation by telecommunication is in any case admissible. Indeed, even if the meeting is held remotely, such a meeting would still ensure *full collegiality*, as it would guarantee so-called "two-way" communication, whereby each participant is able both to speak and to hear the interventions of others. From this perspective, the requirement in Article 2370(4) for an express statutory provision would apply only where the technological means employed result in a *departure from full collegiality*—for instance, in the case of a meeting broadcast by streaming (where interventions are not permitted, only listening). In the absence of such derogation, no statutory provision would be necessary, as the ordinary rules governing shareholders' meetings would remain unaffected.

However, it must be acknowledged that this thesis presents both a strength and a weakness: on the one hand, it accurately recognises that remote participation is now functionally equivalent to physical attendance; on the other hand, it disregards the clear literal wording of Article 2370(4), which requires that participation by telecommunication be expressly authorised by the articles of association. The prevailing opinion *(Consiglio Notarile di Milano, 2020)* therefore holds, based on the text of the Civil Code, that the use of videoconferencing is not permitted in the absence of an express statutory clause. Moreover, scholars more receptive to innovation have noted that, given the widespread availability and reliability of telecommunication tools, the Italian provision is now excessively restrictive: the time has come, *de iure condendo*, to provide that the use of telematic means should be permitted *by default*, unless expressly excluded by the articles —thus reversing the current approach. Interestingly, the Italian legislator has recently embraced this solution, but not for public limited companies. Instead, it did so for non-profit entities: Article 24(4) of the Code of the Third Sector (Legislative Decree No. 117/2017), as recently amended by Law No. 104 of 4 July 2024, provides for the first time that: ″unless the memorandum of association or the articles of association expressly provide otherwise, members may participate in the shareholders' meeting by means of telecommunication and may cast their votes

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electronically [...]". In the view of the present author, the time is now ripe to extend this principle to public limited companies as well.

THE USE OF "ATTENUATED COLLEGIALITY"

Teleconferencing, by ensuring *two-way participation*—meaning that any participant may both hear and speak—via audio and video, appears to be the technological tool best suited to enabling a participation both *active* and *passive*, which truly places remote participation on an equal footing with in-person attendance. For companies with a small shareholder base, a two-way audio-only connection may also be assimilated to this model (as in the case of shareholders holding a meeting by telephone).

It is therefore natural to ask whether only full collegiality is admissible (i.e. all participate simultaneously, with the possibility of both active and passive participation), or whether it is instead possible to organise collegial decision-making in a different manner. With a twofold clarification: first, that the issue addressed here concerns *optional* use of remote communication, i.e. *in addition* to the possibility of in-person participation (which remains guaranteed); and second, that recognising the validity of attenuated collegiality, even when optional, means acknowledging that shareholders making use of such means shall be deemed to be present at the meeting and entitled to vote.

In the context of PLCs, it is the legislator —both at EU and national level—that has itself introduced exceptions to the principle of collegiality: indeed, there is a generalised allowance for voting by correspondence or by electronic means (Article 8(1)(c) of SHRD I; Article 2370(4) of the Italian Civil Code). Both voting by correspondence, and electronic voting exercised prior to the meeting, represent, for those who opt for them, a *complete* departure from collegiality (thereby renouncing the right to follow and to intervene) and thus reduce shareholders-company interaction to the mere casting of a vote. It should further be noted that EU law (applicable only to listed PLCs) and Italian law (applicable to all PLCs) impose no restrictions on the use of voting by correspondence or electronic voting. In particular:

A) there are no *objective* restrictions, in that these modalities may be used for the adoption of *any* resolution, whether by the ordinary or the extraordinary shareholders' meeting;

B) there are no *subjective* restrictions, since there is *no* minimum or maximum *number* of shareholders who may make use of them.

Accordingly, both EU law (only for listed PLCs) and Italian law (for all PLCs) permit a total waiver of collegiality: a valid meeting could be held, in which no shareholder is present and in which, consequently, the principle of collegiality is *entirely* waived.

In light of the foregoing, the following conclusions may be reached.

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1) It is possible to resort to *attenuate collegiality*: in fact, a shareholders' meeting held with attenuated collegiality would constitute a lesser departure from the norm than a meeting without any collegial interaction at all. If the latter is permitted without limitation, the former must, *a fortiori*, be permitted under the same conditions.

2) Concerning the forms in which attenuated collegiality may manifest itself, the discussion concerns the possibility (without prejudice to the shareholder's right to participate either in person or remotely, in an active form) of a form of remote participation that is *passive* only or *limitedly active*. A paradigmatic example is that of a shareholders' meeting broadcast via audio-video, thereby allowing the shareholder to hear and view all proceedings, but:

a) *without* being granted the right to actively participate by taking the floor (passive only);

b) or with the right to participate actively, but *in a limited manner*, for instance without being allowed to speak, but only to interact in writing via chat (limitedly active).

3) Attenuated collegiality modalities, *if used in a stand-alone way*, have no real legal value: in fact, although they enable shareholders to be informed about the discussion taking place at the shareholders' meeting, they do not allow them to participate in it and consequently do not allow them to be regarded as present at the meeting.

However, where such modalities are *accompanied by* the possibility of exercising the *vote* remotely, they acquire relevance for the valid holding of the shareholders' meeting. In fact, the *minimum condition* for the shareholder to be regarded as present is the right to *vote* — whether such vote is exercised in a context of full collegiality, attenuated collegiality or in the complete absence of collegiality.

Accordingly, *a fortiori*, by combining the mere real-time transmission of the shareholders' meeting with the simultaneous casting of an electronic vote from a remote location, the shareholder can express their vote in a better-informed manner than by casting an electronic vote prior to the meeting or by voting by correspondence (both of which are already fully valid forms of voting). It should be noted that the e-vote, in this case, would normally be expressed simultaneously, but would validly be cast even if expressed prior to the meeting: in which case, the passive-only participation to the meeting would be of lesser importance, as it would serve to inform a shareholder that has already voted.

4) It is *not*, however, permissible for the articles of association to *impose* forms of attenuated collegiality or, even more so, to impose electronic voting (or voting by correspondence) as the sole form of participation.

Indeed, art 8(1) of SHRD I states that national laws must permit companies to "*offer*" to their shareholders forms of electronic participation: so the EU Directive, whose purpose is not to amend corporate governance rules (but merely to introduce the use of electronic means as a way to increase efficiency and facilitate cross-border voting), is *neutral* to any form of constraint.

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The same considerations are true under Italian law. In fact, given the use of the verb "may permit" in Art. 2370(4) of the Italian Civil Code, it is already doubtful whether the articles may impose a fully virtual, yet fully collegial, shareholders' meeting (see next paragraph): the positive opinion (which as of today is still controversial) is based on the fact that a mandatory virtual meeting would anyway still comply with the requirement of full collegiality (i.e. the ability to hear and intervene, including the right to vote) (Magliulo, 2019). By contrast, if electronic voting (or voting by correspondence) were to be made mandatory, such an imposition would derogate from the principle of full collegiality: and this is something Italian law does not allow (Turelli, 2011), outside of the very limited scope of Article 135-undecies.1 of the CLF.

TELECOMMUNICATION AS THE SOLE MANDATORY MODALITY AND THE NON-NECESSITY OF INDICATING THE PLACE OF CONVOCATION

The SHRD I does not face the issue of a *mandatory*, virtual only meeting: its wording is clearly focused on "allowing", rather than on "forcing". Nor does the provision laid down in Article 8(2), § 2, which states that the Directive operates "without prejudice to any legal rules which Member States have adopted or may adopt concerning the decision-making process within the company for the introduction or implementation of *any form* of participation by electronic means", address the introduction by Member States of an obligation to hold fully virtual general meetings. In fact, this provision concerns merely the possibility of regulating the *company*'s internal decision-making process (i.e. possible clauses to be introduced in the articles of association) for the use of electronic tools, within the legal limits of the system; and not, instead, the possibility of expanding those *legal* limits. In the silence of EU law, the decision on the topics is therefore in the hands of the Member States.

Under Italian law a number of provisions, including that which allows until 31 December 2025 for shareholders' meetings to be held exclusively online on a mandatory basis, cast doubt on whether such a possibility will remain admissible as of 1 January 2026. Anticipating the conclusions I shall reach, I take the view that it is permissible for the articles of association to mandate exclusively virtual participation in the general meeting; however, the issue remains highly debated as of today.

It must be stated that the argument *a contrario* does not appear convincing — namely, the argument according to which, since Article 106 of LD 18 permits mandatory, virtual only meetings only until a certain date, then beyond that date such possibility would be precluded. This line of reasoning fails to take into account the fact that LD 18 is an "*emergency*" measure, which by its very nature aimed to provide a prompt and reliable response to the Country's sudden needs during lockdown. Its purpose was therefore not to express a definitive stance on the systematic classification of such rules, but rather to *immediately* ensure *operational certainty*. It follows that not every provision of LD 18 should be

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regarded as "exceptional" law: alongside provisions that are truly derogatory, there are others that are essentially interpretative in nature. From this perspective, the provision permitting shareholders' meetings to be held exclusively online may be construed as having a twofold significance: in general, a merely confirmatory one; and, in a specific respect only, a derogatory one.

As to the *former*: it serves merely to confirm the full equivalence, for legal purposes, of remote meetings (held in accordance with the principle of full collegiality) and in-person meetings. Indeed:

A) if properly managed, technological tools allow for the replication of conditions equivalent to those of an in-person meeting;

B) the use of telecommunication may, at times, even overcome the practical issues relating to the accessibility of certain shareholders' meeting venues;

C) the deliberate avoidance of technological tools is no longer a value protected by the legal system. This is evidenced by: a) the widespread availability of such tools (in the EU, the number of SIM cards exceeds the number of inhabitants); and b) the now routine reliance on digital means by the legislator in its dealings with the general public.

As to the *second* aspect: Article 106 of LD 18 introduces a derogation on a single point only — namely, the requirement for the relevant clause to be included in the articles of association (which, therefore, may be absent or even contradicted until 31 December 2025). After that date, the sole consequence will, therefore, be that the applicable rule reverts to Article 2370(4) of the Italian Civil Code, which requires that such provision be expressly included in the articles.

In light of the above technical and value-based considerations, in my view, it must be held that both a clause explicitly mandating online shareholders' meetings and a clause delegating to the convening body the power to choose between calling the meeting exclusively in person, in hybrid form or entirely online, are to be regarded as lawful.

If this is so, it becomes clear that the text — still referring to the place of convocation — of Articles 2363(1) and 2366(1) of the Italian Civil Code, although unquestionably drafted in a context where only physical meetings were envisaged, does not constitute an obstacle to the developments described above. The mention of the place of convocation must be understood, quite naturally, as referring to the scenario of an in-person meeting, the purpose of which was "to ensure that the meeting could be held".

In the case of a fully virtual meeting, it will therefore be the aforementioned requirement—an expression of the broader principle of good faith—that must be observed and adapted to the new context. This implies both the adoption of a system enabling real-time, two-way communication and the need to indicate to the participants the virtual "place", to which they must "go" in order to attend the meeting remotely.

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The reconstruction set out above correctly reflects, in my view, the values underpinning the relevant legal provisions. However, it remains true that Article 2370(4) of the Italian Civil Code states that the articles of association "may permit" the use of telecommunication tools: this wording may present an obstacle to the full endorsement of the view that virtual-only shareholders' meetings may be imposed as mandatory. The counter-argument, as stated above, is that the literal interpretation is not decisive, since two-way communication ensures *full* collegiality and is therefore equivalent to physical presence. Accordingly, the legal provision would apply only to the inclusion in the articles of association of the (optional, never mandatory) use of electronic means departing from *full* collegiality.

Against the possibility to convene a virtual-only meeting: (La Sala, 2016); (Lener, 2012); (Stanzione, 2021); in support: (Turelli, 2011); (Sandei, 2016); (Consiglio Notarile di Milano, 2021).

A FINAL CONSIDERATION

This paper has sought to demonstrate how the evolution of corporate law provisions on remote shareholders' meetings—both at the EU and national level—offers a valuable lens through which to explore new horizons in business and management. By comparing the Italian Civil Code with the Shareholders' Rights Directive and with the exceptional provisions enacted during the Covid-19 pandemic, it has been possible to highlight the tension, but also the synergies, between tradition and innovation in corporate governance.

The relevance of this topic to corporate governance is twofold. First, it shows how legal frameworks can foster or hinder efficiency, participation and inclusiveness in decision-making processes. Second, it illustrates that corporate governance is not merely a *set* of structural rules, but also a *dynamic* system of tools through which companies interact with their shareholders and adapt to social and technological change. The adoption of remote participation and electronic voting can significantly reduce transaction costs, facilitate cross-border participation and ensure broader shareholder engagement.

From the perspective of the theme "exploring new horizons in business and management", the legal treatment of remote shareholders' meetings exemplifies how "new horizons" in business are often reached by embedding digital instruments into traditional structures. Far from eroding collegiality, real-time two-way communication technologies can reinforce it, ensuring transparency and fairness, while at the same time overcoming the limitations of physical presence.

Ultimately, the findings of this paper suggest that the consolidation of electronic tools within the framework of shareholders' rights in PLCs is both inevitable and desirable. Digital participation is unquestionably beneficial where conceived as an *additional* option alongside physical attendance, as envisaged by Article 8 of the Shareholders' Rights Directive; it is more controversial—though, in my view, still to be welcomed—where it is imposed as the *sole* form of participation; and in every

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scenario—whether collegiality is ensured fully, only partially or not at all—the essential condition for acceptability remains that shareholders must at least be able to exercise their right to vote, either in advance or during the meeting; otherwise, their participation cannot be regarded as valid.

In this way, the alignment between law and technology remains faithful to the foundational values of good faith, equality and efficiency in corporate life, while also opening up genuine new horizons for the governance of companies.

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MOTIVATION AND SCIENTIFIC PRODUCTIVITY UNDER PRESSURE

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ABSTRACT

Scientific productivity is crucial in driving innovation and fostering social and economic growth. The research addresses three core questions: (1) what are the key motivators and demotivators influencing scientific productivity, (2) how do these factors vary across disciplines and career stages, and (3) what performance-oriented practices can support academic motivation and productivity in higher education institutions. The theoretical framework combines motivation theories—Self-Determination Theory (SDT) and the Ability-Motivation-Opportunity (AMO) model—with New Public Management (NPM) context, providing a strong foundation for understanding performance strategies in higher education. Applying qualitative methods, the study used the stay interview technique—structured dialogues exploring factors that retain academic staff—and conducted thematic analysis folowwing the Braun & Clarke framework to examine experiences at a leading Polish technical university. Data were coded using NVivo and organized into four main thematic domains: financial, organizational, social, and mental. The findings reveal that researchers report more demotivators than motivators, with financial constraints and organizational inefficiencies being particularly highlighted. Disciplinary differences in STEM fields are also significant: for example, computer scientists prioritize conference support, while civil engineers emphasize industry partnerships. The study further emphasizes a systemic shift in academia where performance is increasingly evaluated through publication practices (e.g., accountability metrics), often at the expense of original research inquiry. Our results suggest that enhancing productivity in higher education requires tailored strategies that reflect the diversity of academic fields. Embedding these strategies within the SDT–AMO–NPM framework can help institutions better balance performance expectations with academic well-being. This study contributes to the understanding of how motivation and institutional conditions interact to influence scientific productivity and provides actionable recommendations for research management in higher education.

Keywords: scientific productivity, motivations, Higher Education, SDT, AMO

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INTRODUCTION

Scientific productivity has become a central goal for higher education institutions (HEIs), influencing academic careers, institutional rankings, and funding strategies. In recent decades, researchers have experienced growing pressure to publish frequently, secure external grants, and contribute to international visibility. This pressure is often shaped by performance-based evaluation systems, which link research output to institutional support and career paths, as observed worldwide (Feenstra and Delgado López-Cózar, 2023; Kulczycki, 2023; Kwiek, 2018). At the same time, academic staff must balance these demands with their own psychological well-being and professional development.

Scientific productivity is an element of strategic plans for academic institutions and career development, driving competition and pressure. To encourage scholars to increase their productivity in publishing and overcome negative constraints, academia must seek a balanced progression that prioritizes organizational goal fulfillment and employees' psychological needs and well-being (Lim et al., 2025). This objective necessitates the implementation of management strategy where motivation tools play a crucial role. They are not just a core mechanism for engaging employees and ensuring their satisfaction, but they are also a powerful tool for inspiring and motivating scholars to contribute to academic productivity.

For this reason, understanding what motivates or demotivates researchers has become increasingly important for university authorities aiming to support long-term research productivity. This paper examines how individual academics across various STEM (science, technology, engineering, mathematics) disciplines and career stages experience and respond to these expectations. By focusing on one of Poland's leading research and technical universities that emphasizes recognition, reputation, and productivity, the study examines key challenges to scientific productivity from the researchers' perspective. Moreover, drawing on Self-Determination Theory (SDT) and the Ability-Motivation-Opportunity (AMO) framework, the study explores how institutional and individual-level factors interact to shape academic performance in respect to discipline differences. Through qualitative analysis of stay interviews, it identifies both shared and discipline-specific motivators and demotivators that influence research productivity in STEM fields.

COMPREHENSIVE LITERATURE REVIEW

Scientific productivity has been widely studied, often using quantitative indicators such as the number of publications, citations, and research grants (Teodorescu, 2000; Christensen et al., 2020; Kwiek & Roszka, 2025). While these measures are helpful, they do not fully reflect the personal, organizational, and motivational factors that shape academic work. Bland et al. (2005) emphasize that

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research productivity depends not only on individual skills but also on supportive environments and strong leadership. Moreover, Al Sada, Al Asmael, and Faisal (2017) demonstrate that supportive organizational culture and participative leadership significantly enhance job satisfaction and motivation among scholars, and are shaping academic engagement. Similarly, Kwiek (2018, 2021) demonstrates that institutional structures and academic hierarchies significantly influence research performance. This approach integrates both quantitative (bibliometric) and qualitative perspectives on scientific productivity. It is also aligned with Performance Management principles, emphasizing goal-oriented research activities, such as improving an institution's position in international university rankings (Camillieri, 2021). Performance Management is also seen in the effective management practices, such as structured recruitment, development, and retention strategies that support academic staff and enhancing institutional performance (Taamneh et al., 2022). As highlighted by Lewis (2024) PM as an important element of the NPM not only supports control and accountability, but also reflects broader organizational power dynamics and political agendas (such as evaluation system) in managing academic work.

Scientific productivity also varies significantly across academic disciplines, reflecting differences in research methods, publication practices, funding availability, and the nature of collaboration (Chang and Yeh, 2025). For example, STEM fields often emphasize publishing in high-impact journals and securing external grants, while the humanities may prioritize monographs or national-level dissemination. A study conducted by Piro et al. (2013) suggests that standard bibliometric indicators may not fully capture the contributions of researchers across all fields, highlighting the need for discipline-specific approaches. This finding aligns with the study by Light et al. (2025), which highlights substantial within-discipline differences, such as patterns of individual authorship and gender disparities, that cause challenges to using H-metrics to assess research productivity and impact of a author's published work.

In recent years, there has been increased attention to motivation. Stupnisky et al. (2023) found that self-determined motivation is a key factor influencing research output, especially in STEM fields. According to Deci and Ryan's Self-Determination Theory (2020), researchers are more productive when they feel competent, autonomous, and connected to their academic community. The Ability-Motivations-Opportunities model (Appelbaum et al., 2000) complements this view by showing that performance depends on the ability, motivation, and opportunities supported by the institution. Recent empirical work by Benítez-Núñez et al. (2024) confirms that all three AMO dimensions—ability, intrinsic motivation, and opportunity—are positively associated with academic research performance, while extrinsic motivation shows a more complex, nonlinear relationship. This

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highlights the importance of designing institutional environments that foster both internal drive and structural support for researchers.

However, many previous studies rely on large-scale, quantitative data and do not show how these factors differ across disciplines or career stages. There is a lack of qualitative research exploring the diverse experiences and needs of scholarly communication and practices among academic staff in STEM fields, which are often investigated only quantitatively (Kwiek, 2015; Barker & Manning, 2024).

THEORETICAL FRAMEWORK

This study's theoretical framework is rooted in three pivotal theories: Deci and Ryan's (2020) Self-Determination Theory and the AMO model (Naqushband et al., 2024; Appelbaum et al., 2000), and New Public Management (NPM), which emphasizes the importance of effectiveness in the Higher Education sector. These frameworks, particularly the AMO model, serve as a comprehensive lens for understanding the factors influencing academic staff performance, motivation, and overall engagement in scientific work, providing our audience with a deep understanding of the subject matter. Universities can support the development of abilities by providing training and resources, encouraging motivation through recognition and rewards, and creating opportunities for academic contributions through collaborative projects and research grants (Barker and Manning, 2024; Kwiek, 2021; Bland et al., 2005).

SDT indicates that three fundamental psychological needs must be satisfied for academic staff to be optimally motivated: competence, relatedness, and autonomy. Competence refers to the need for individuals to feel efficient in their professional roles. In the academic environment, competence is closely linked to research proficiency, teaching effectiveness, or successful grants. Relatedness represents relationships, seen in collaborative academic work, fostering and establishing scientific teams and networks. It represents the strong relationships with the institution - academics are proud to be affiliated with the home institution. Autonomy, another crucial component of SDT, is a powerful tool that empowers academic staff, referring to their degree of independence in their work. This includes the freedom to choose research topics, methodologies, and journals for publishing and set their own academic goals (Daumiller et al., 2022).

Furthermore, this study's findings are analyzed within the broader context of NPM approach. NPM highlights the importance of performance management and employee accountability as essential drivers of institutional success (Lane, 2005). In HE and academic research, this might be seen in the scientific evaluation systems, measurable performance indicators (publication records, Impact Factor), and fostering efficiency with a sense of responsibility for personal and professional development (Armstrong and Baron, 2005). The increasing emphasis on research and teaching quality output,

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publication metrics, and grants receiving aligns with NPM principles as institutions strive to enhance scientific productivity and institutional reputation. By integrating SDT, the AMO model, and NPM approach, this study gives an overview and a better understanding of academic motivation and performance.

PURPOSE OF THE STUDY

Using the SDT and the AMO model, we investigate individual-level scientific productivity at a leading Polish technical university during a period of significant changes in the national assessment system, which is intensely focused on performance evaluation. Within the framework of NPM , we examine how academic staff perceive their psychological needs and the institutional support they receive, with a focus on the impact of performance-based assessment on academic work.

First, we identify the key motivators and demotivators influencing scientific productivity in STEM fields. Second, we examine how these factors vary across academic disciplines and career stages, providing a more nuanced understanding of individual experiences. Third, we offer practical and theory-driven recommendations for academic institutions by integrating SDT and AMO approaches with performance-based evaluation systems, which enables a deeper understanding of staff needs and support mechanisms.

Our findings reveal discipline-specific differences in scholarly communication and highlight the crucial role of academic leadership in shaping HR practices that foster both research productivity and the self-development of researchers. While the single-institution scope and qualitative design may limit the generalizability of the results, the study offers valuable insights for balancing institutional performance goals with the personal needs of academic staff and complements existing quantitative research. It also lays a foundation for future studies on academic productivity.

METHOD

Using qualitative methods, this study employed the stay interview approach to collect data (National Institutes of Health, 2024) and applied thematic analysis to interpret the results (Sun, Hsieh, and Gao, 2025). Stay interviews are structured conversations designed to analyze why individuals remain in their roles and what factors influence their continued engagement. The stay interviews enabled us to engage directly with respondents and understand their motivations, needs, and concerns, allowing for an in-depth exploration of researchers' experiences, institutional challenges, and disciplinary differences. This qualitative approach was chosen to capture the complexity and depth of academic motivation, which cannot be fully understood through a quantitative study. Qualitative methods are

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particularly suited for exploring individual perspectives and contextual factors across diverse disciplines.

The qualitative component of our study was enriched by the perspectives of 19 semi-structured interviews conducted with academic staff representing STEM fields at the one of the oldest and biggest university in Poland. The participants' diverse backgrounds enabled us to capture a wide range of experiences and discipline-specific challenges while reflecting on different academic career stages, including PhD students, early-career researchers, and full professors. The interviews generated rich, contextualized data concerning intrinsic and extrinsic motivators and the role of organizational resources and institutional support. The analysis was shaped by SDT theory, with particular emphasis on its three basic psychological needs: competence (feeling effective in one's academic work), relatedness (a sense of connection and belonging within the academic environment), and autonomy (the freedom to make meaningful choices regarding conducting research and scientific goals).

The interview data were examined inductively using Braun and Clarke's six-step thematic analysis framework (2006) to ensure a thematic analysis. The data from the interviews were coded to indicate similar patterns with support of NVivo software. It let us develop the major themes and codes regarding motivators and demotivators of scientific productivity. The interviews were recorded in Polish, and translated into English after the coding process. This methodological approach ensures that our findings are empirically grounded and theoretically informed, contributing to revealing different factors influencing scientific productivity in STEM disciplines.

RESULTS

This study has identified four main themes regarding motivators and demotivators. These factors are analyzed regarding their causes, resolutions, and management, focusing on barriers and facilitators to increasing scientific productivity in four main areas: financial, organizational (such as institutional policies, resource allocation, and administrative support), social (including research infrastructure, collaboration opportunities, and academic culture), and mental. The themes represent organizational tools and resources that either facilitate or hinder academic staff in achieving scientific success. Within the AMO model, motivators and demotivators are understood not as purely individual factors but as elements that influence both motivation and the opportunities provided by the institution to engage in productive academic work.

Financial motivators and demotivators

Financial and monetary motivators are crucial in providing opportunities for researchers to accelerate their scientific careers. Funding for research, location support, and awards facilitate researchers' access to necessary resources, allowing them to pursue high-impact work. Monetary esteem is one of the

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most important incentives, including funding for scientific publications, which helps cover the costs of publishing in high-quality journals in an open-access model. Additionally, funding for proofreading services can ease the burden of preparing manuscripts for submission. Post-diploma funding and scholarships offer financial support for early-career researchers, enabling them to pursue further academic development. Financial awards also serve as recognition for outstanding research achievements, providing additional motivation for academic excellence.

Financial factors can serve as significant demotivators for researchers in achieving scientific productivity. The lack of funding for high APCs in open-access publishing is one of the demotivators, limiting the opportunity to disseminate research and connect with broader audiences, especially in STEM fields. In the context of higher education in Poland, academic salaries often fall short of those offered in the private sector. In addition, high conference fees and substantial research costs further hinder scientific engagement. These financial constraints may limit researchers' ability to participate in international academic events, access necessary research resources, and fully engage in high-quality scientific work.

Organizational motivators and demotivators

Organizational factors, such as flexibility in the organizational structure, align with the opportunity component of the AMO model, as they provide a conducive environment for research and innovation. Organizational factors can have both motivating and demotivating effects on researchers' scientific productivity. On the positive side, strong administrative support, project offices assisting in grant writing and financial reporting, and access to advanced research equipment significantly facilitate academic work. Participation in English language courses, specialized training programs, and computer courses enhances researchers' competencies, enabling them to publish in international journals, collaborate globally, and efficiently utilize advanced research tools. These factors reduce bureaucratic burdens and allow researchers to focus on conducting high-quality research. On the other hand, specific organizational challenges can act as demotivators. Leadership and team management issues, including conflicts within research teams, poor work organization, and excessive bureaucracy, can hinder productivity. Ineffective institutional structures and procedural inefficiencies may divert researchers' time and energy from their core scientific activities, reducing their motivation and engagement. Teaching overload, which is also identified as a significant organizational demotivator, reduces researchers' ability to focus on scholarly activities, thus limiting their productivity.

Social motivators and demotivators

On the positive side, organizational openness to interdisciplinary research, strong HR practices, focus on work-life balance, professional development, and recognition of scientific achievements can be

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powerful motivators. Collaborative research opportunities also foster an environment of shared knowledge and resources, further encouraging scientific productivity and innovation. Collegiality was also identified as an opportunity for researchers to engage in workshops and national and international conferences, which play a crucial role in facilitating networking and interdisciplinary cooperation. These interactions enhance research quality and contribute to greater academic recognition and visibility within the global scientific community. Social demotivators can impact researchers' ability to achieve scientific success. A lack of collaboration between business and industry can limit access to practical applications, funding opportunities, and real-world problem-solving, essential for advancing research. Additionally, a low scientific culture and excessive pressure to publish research findings can detract from the intrinsic motivation to produce high-quality, innovative work, leading to stress and burnout among researchers. However, a lack of know-how regarding scholarly communication practices, which was noted as a barrier, can detract from researchers' ability to share their work and engage with their academic communities effectively.

Mental motivators and demotivators

The last factor in our analysis is mental factors. Motivators related to competency development contribute directly to the motivation component of the AMO model by fostering intrinsic drives for improvement and mastery. Mental motivators are crucial in shaping researchers' attitudes and drive toward achieving scientific excellence. Scientific competition can motivate researchers to push the boundaries of their work, though it can also act as a demotivator when it becomes overly stressful. Curiosity about conducting research and the intrinsic "spark of god" often drive researchers to seek answers to complex questions and innovate. Furthermore, adequate earnings can contribute to a sense of security and well-being, which fuels motivation. Openness to exchanging views and ideas fosters a stimulating intellectual environment that encourages collaboration and personal growth. However, certain mental demotivators can hinder scientific productivity. Sometimes insufficient technical skills to conduct research can make it difficult for researchers to succeed. A disrupted work-life balance often results in burnout, negatively affecting professional performance and personal well-being. Lastly, lacking scientific recognition can undermine researchers' confidence and hinder their drive to contribute to the scientific community. Various forms of recognition, such as excellence awards, Rector's awards, the attainment of scientific degrees, H-index scores, and performance rankings, acknowledge researchers' contributions and encourage sustained engagement. These incentives not only enhance individual motivation but also contribute to the overall prestige of academic institutions.

Differences between scientific disciplines

The respondents indicated several significant differences between scientific disciplines in terms of motivators and demotivators influencing academic productivity. Moreover, the differences between

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disciplines noted in the study provide further insights when viewed through the lens of SDT and the AMO model. For example, chemistry and physics emphasize publishing in highly ranked journals, where financial support for covering APCs is an extrinsic motivator, supporting controlled motivation. In contrast, engineering disciplines, which are more industry-focused, highlight the lack of collaboration within the industry as a barrier. This reflects a potential misalignment between external opportunities (as per the AMO model) and researchers' intrinsic motivation to engage in collaborative, practical research.

Chemistry

In chemistry, researchers require a range of competencies to publish internationally in high-impact journals and conduct high-quality research. These include the ability to work in scientific teams, communication skills, mental toughness, and stress resistance. Handling failure, such as publication rejections, is also essential because chemistry researchers publish more articles than in other disciplines. Additionally, interdisciplinary collaboration, scientific maturity, and knowledge of economics and law are important for implementing scientific results on an industrial scale, so chemical researchers often collaborate with pharmaceutical or medical companies, for instance. However, challenges arise due to insufficient competencies, such as team cooperation, limited organizational skills, and management experience. Financial awards offered by the faculty and university for publishing achievements also serve as strong motivators. Researchers are encouraged to publish and apply for grants by both the head of the department and university authorities, fostering a competitive environment.

Physics and mathematics

In physics, researchers are identified by mathematical and programming skills, which are crucial for analyzing complex studies. Organizational skills, particularly in managing working time effectively, are also essential and mentioned by respondents. Assistance with the formalities related to grant applications is one of the most important motivators for researchers. However, a lack of support from university authorities in establishing research teams can influence collaboration in more significant and impactful projects. Despite these challenges, scientific curiosity and the desire to understand natural phenomena are big motivators for physics researchers. The satisfaction of discovering something new and the joy of engaging in research are key driving forces that attract intrinsic motivations and commitment to the field.

Civil engineering

In civil engineering, researchers need a range of essential competencies to succeed in their scientific work. This field is more practical than others, so researchers also require practical and technical

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competencies. Positive motivators for researchers in this field include recognition in the scientific community, the ability to cooperate with industry, and the opportunity for personal satisfaction and scientific self-development. Financial bonuses for publishing beyond a certain point scale also serve as a motivational tool. Significant facilitators are supported in applying for and managing research grants, funding APCs, and translation fees to support the publication process. However, several demotivators negatively impact researchers' scientific output. The high pressure to publish, driven by the faculty and university's emphasis on publication metrics, can detract from the quality of research as the focus is shifted to increasing publication counts. Researchers also face challenges such as insufficient resources for conducting extensive research (e.g., lacking specialized software or technical staff), the burden of too many teaching hours, and poor working conditions that make it difficult to focus on research. Moreover, family considerations are often ignored in the organization of teaching schedules, which can affect the work-life balance for researchers.

Architecture and Urban Planning

Researchers in architecture and urban planning require several key competencies to succeed in their scientific productivity, such as creativity, openness to learning new tools, and openness to interdisciplinarity research. Language competencies are also vital. Support from the authorities plays an essential role in motivating researchers. This includes assistance with formalities related to writing grants, as well as financial support for conference fees and other architectural events. Regarding intrinsic motivators, curiosity, personal development, and the desire to improve the scientific workshop are potent drivers for researchers. Ambition to impact the field and contribute innovative ideas further motivates researchers. Interestingly, in this field, there are few significant demotivating factors. Most mentioned were publication pressure and lack of APC funding.

Marine Technology

Marine technology researchers need a specific set of competencies often obtained during industry training. Scientific publications are an important indicator, and financial support for APC and conference attendance to disseminate their findings and engage with the global research community are positive motivators. Also, autonomy in choosing research topics that are usually connected to the marine industry and are more applicable is a factor. So, this field instead realizes more practical than research grants. However, monetary rewards for high-quality publications are a motivator for gaining personal academic recognition. A common demotivator is the lack of skills in using modern programs or technical tools essential for conducting cutting-edge research and staying competitive. Also, the lack of special equipment, which is usually very expensive, is a big demotivator and the reason for decreasing scientific productivity.

Computer Science

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In computer science, researchers require a range of technical and soft skills, such as strong language competencies, programming knowledge, and measurement methods. Moreover, the ability to cooperate with specialists from other fields, organizational skills for team collaboration, and the ability to search for new study areas in very quickly changing environments are crucial for progress in this discipline. Computer scientists benefit from financial support for conferences where conference proceedings are sometimes more important than research articles. However, there are challenges, such as focus on commercialization, which may detract from pure scientific exploration, and organizational issues that can distract from the core research activities. Additionally, a lack of professional stability makes researchers see another job in IT companies, so composing a stable scientific team is a challenge because young researchers often change scientific careers to commercial ones. The table below summarizes the differences, along with examples, across scientific disciplines, highlighting how researchers in various STEM fields indicate motivators and demotivators that influence their scientific productivity.

Table 1. Motivators and demotivators in the STEM disciplines.

Discipline	Key Competencies	Motivators	Demotivators
Chemistry	Teamwork, communication, mental resilience, interdisciplinary collaboration, economic/legal knowledge, scientific maturity	Financial awards for publishing, encouragement from leadership, industry collaboration	Lack of team/organizational skills, management experience, high pressure, handling failure (e.g., publication rejection)
Physics & Mathematics	Mathematical & programming skills, organizational skills, time management	Intrinsic motivation, curiosity, satisfaction from discovery, support with grant formalities	Lack of institutional support for team-building, challenges in large collaborative projects
Civil Engineering	Practical/technical skills, industry cooperation, grant and project management	Recognition, industry collaboration, self-development, financial bonuses, support with APCs and translations	Pressure to publish, limited resources (staff/software), excessive teaching, poor conditions, ignored family/work-life balance

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Architecture & Urban Planning	Creativity, interdisciplinarity, tool fluency, language skills	Personal development, curiosity, innovation, financial support for conferences, support with grant formalities	Publication pressure, lack of APC funding
Marine Technology	Industry-specific knowledge, autonomy in topic selection	APC/conference funding, autonomy, practical relevance, financial rewards	Lack of modern tool skills, absence of special/expensive equipment
Computer Science	Programming, measurement methods, soft skills, interdisciplinarity, adaptability	Financial support for conferences, opportunity for interdisciplinary collaboration	Commercialization pressure, lack of organizational stability, loss of young researchers to IT industry

DISCUSSION AND CONCLUSIONS

Our study aimed to explore how individual academic motivation in STEM fields is shaped by both psychological needs (SDT) and institutional conditions (AMO), particularly in the context of a performance and recognition-oriented university system. Our findings contribute to this goal by highlighting three key insights. First, across all career stages and disciplines, researchers report encountering more barriers than enablers to scientific productivity. Respondents consistently highlighted that financial constraints represent a significant and common challenge affecting them across all academic disciplines and career stages, limiting their ability to fully engage in research activities, pursue collaboration opportunities, and access necessary resources. Second, disciplinary specificity plays a dominant role in shaping motivation due to differing publication and scholarly communication practices, funding mechanisms, and collaboration models. Third, we found that researchers' motivation is strongly linked to how well institutional structures respond to their psychological needs and resources.

These findings deepen our understanding of how motivation functions within diverse academic environments. The barriers identified—mental, organizational, financial, and social—limit not only research productivity but also long-term engagement and well-being. Given the disciplinary diversity, a one-size-fits-all approach to motivation is ineffective. Instead, institutional strategies must be

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tailored to field-specific contexts, recognizing that computer scientists, for instance, prioritize conference support, while civil engineers emphasize industry collaboration, which was also highlighted in earlier studies (Piro et al., 2013; Light et al., 2025).

Importantly, our third aim emphasizes that integrating SDT and AMO frameworks can guide the development of organizational and HRM practices that are both performance-oriented and sensitive to researchers' well-being. This includes practical tools such as tailored recognition systems, targeted professional development, adequate funding schemes, and supportive leadership structures. When implemented thoughtfully, such strategies can balance institutional objectives with the psychological and professional needs of academic staff, creating a more sustainable model of scientific performance developing institutional recognition by increasing scientific productivity remains a key objective for universities worldwide (Kwiek, 2018; Camilleri, 2021). According to previous studies, these challenges have multiple dimensions—mental, organizational, financial, and social—which directly affect both research efficiency and academic motivation (Bland et al., 2005; Al Sada, Al Asmael, & Faisal, 2017). Our findings highlighted how the frameworks that use a multi-approach could be interpreted and explored. Autonomous motivation is strongly associated with intrinsic motivation, which is fostered by the mental motivators identified in the study. Controlled motivation is related to extrinsic motivators, such as financial incentives and scientific recognition. The study also found that many researchers in investigated disciplines are motivated by external factors such as financial availability for APC, the opportunity to publish in high-impact journals, and awards for publications that fulfill researchers needs. This aligns with the SDT's distinction between intrinsic and extrinsic motivation, where external pressures rather than internal desires drive controlled motivation.

One key concern is finding the balance between expectations and available resources. While institutions encourage researchers to apply for external grants and produce high-impact publications, many academics struggle with limited funding opportunities, excessive administrative burdens, and a lack of institutional support (Stupnisky et al., 2023; Kwiek, 2021; Taamneh et al., 2022). These constraints are especially problematic in STEM disciplines, where institutional performance is under a pressure without corresponding development in resources or autonomy (Deci & Ryan, 2020; Barker & Manning, 2024).

Academic authorities should implement a proactive and flexible management approach. Thus, the key components of the AMO model — providing researchers with the necessary skills (e.g., training and development), motivations (e.g., recognition and incentives), and opportunities (e.g., funding and collaboration)—should be tailored to the specific challenges of each discipline. Benítez-Núñez et al. (2024) emphasize the importance of this alignment, demonstrating that the effectiveness of AMO practices in enhancing research performance depends on how well they are tailored to disciplinary

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contexts and career stages. Importantly, these strategies play a significant role in supporting researchers' autonomy, competencies, and relatedness, which are essential to maintaining intrinsic motivation according to SDT principles. University management should enhance funding accessibility, reduce bureaucratic complexity in grant applications, and improve work-life balance by addressing mental health concerns and academic burnout. The success of research institutions depends on their ability to adapt to the evolving needs of academic staff while aligning their strategic goals with the broader vision of scientific progress. The need for tailored management strategies is evident and crucial in fostering a sustainable and high-performing academic environment. The principles of NPM and Performance Management, which highlight efficiency, performance measurement, and accountability, have increasingly influenced academic institutions, as seen in data gained from the respondents (Lewis, 2024). Our findings align with the broader literature which emphasizes that enhancing institutional outcomes influence the recruitment, career development, and institutional strategies tailored to academic needs (Camilleri, 2021; Taamneh et al., 2022). While often controversial, NPM has already shaped the educational institutions. However, if it is carefully adapted, it can support productivity by streamlining practices and resources and catalyze researchers to increase their scientific productivity.

In summary, the AMO framework emphasizes the organizational tools and practices that enhance researchers' abilities, motivation, and opportunities to achieve scientific productivity. At the same time, SDT is more universal and focuses on psychological needs as core drivers of sustained academic engagement. Integrating these two frameworks can help make performance management within the NPM paradigm more balanced—aligning institutional goals with the well-being and intrinsic needs of academic staff. This is particularly important nowadays because the increasing focus on performance in academia has shifted the emphasis from the quality and originality of research output, especially in publications, toward practices associated with publication metrics, causing pressure for both authorities who have to fulfill their university goals, and researchers who are the leading actors in this strategy.

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SUSTAINABILITY IN THE ITALIAN HOSPITALITY INDUSTRY: CHALLENGES AND OPPORTUNITIES

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ABSTRACT

The hospitality industry has recently identified sustainability as a key priority, driven by increasing consumer demand, regulatory requirements, and the long-term benefits of responsible tourism. Hotels worldwide are implementing environmental, social, and economic sustainability measures, yet many face challenges in fully integrating these principles into their business strategies. This study aims to address this gap by examining sustainable practices in Italian hotels, with a focus on the extent of adoption, the barriers encountered, and the opportunities for growth. A qualitative research approach was adopted, involving the conduction of semi-structured interviews with managers of five hotels located in different regions of Italy. The findings reveal a strong awareness of sustainability, with hotels adopting initiatives such as energy-efficient technologies, waste reduction programs, and partnerships with local communities. However, the analysis also uncovers several constraints that impede the full implementation of these practices. These include financial constraints, bureaucratic complexities, and a lack of institutional support. While some hotels leverage sustainability as a key differentiator in a competitive market, others struggle to justify the upfront investment costs. The study emphasises the necessity for targeted financial incentives, comprehensive staff training, and more accessible sustainability certification frameworks to facilitate widespread adoption. Future research should explore consumer perceptions of sustainable hospitality and assess the long-term economic impact of sustainability initiatives in the tourism sector.

Keywords: Sustainability, Hospitality Industry, Environmental Practices, Social Sustainability, Economic Sustainability, Sustainability Barriers, Green Technologies.

INTRODUCTION

The concept of sustainability has evolved into a pivotal aspect of the contemporary hospitality industry, exerting a significant influence on operational decisions, customer preferences, and the long-term viability of businesses. The heightened awareness of climate change, resource depletion, and the

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social implications of tourism has exerted mounting pressure on hotels to adopt sustainable practices (Legrand *et al.*, 2022; Mbasera *et al.*, 2016; Shahzad *et al.*, 2024; Yasmeen *et al.*, 2024). The hospitality industry accounts for a considerable proportion of global energy consumption and waste production, positioning it as a pivotal sector for sustainability transformations (Gössling and Peeters, 2015; Legrand *et al.*, 2022). The transition towards more sustainable models is not merely an environmental necessity but also a response to evolving market expectations, where travellers are more inclined to choose accommodations that align with their values (Li *et al.*, 2024, 2021; Warren at al., 2018).

Italy, as one of the world's most visited countries, presents unique challenges in the implementation of sustainability initiatives. The tourism sector plays a crucial role in the national economy, contributing approximately 10% to GDP (Coscarello and Manella, 2024). However, the rapid expansion of tourism has given rise to concerns regarding its environmental and social impact, particularly in culturally and ecologically sensitive areas. Many Italian hotels, particularly small and family-owned establishments, recognise the importance of sustainability but struggle to adopt structured sustainability programmes due to financial and regulatory barriers (Ruhanen *et al.*, 2015; Smith *et al.*, 2022).

Given this theoretical framework, the following study aims to explore how sustainability is perceived and implemented within the Italian hospitality sector, focusing on the environmental, social, and economic dimensions. Through a qualitative analysis of semi-structured interviews with hotel managers, the research seeks to understand the motivations behind sustainability adoption, the barriers encountered, and the potential benefits of sustainable business practices. The study also investigates the role of sustainability certifications – such as the ISO 21401 – in influencing industry standards and the extent to which regulatory frameworks support sustainability transitions. The results provide valuable insights for hoteliers, policymakers, and industry stakeholders striving to enhance the sustainability of Italy's hospitality sector.

LITERATURE REVIEW

Environmental Sustainability and Technological Innovation

The hospitality industry has become increasingly cognizant of its environmental impact, with the sector now being recognised as a significant contributor to energy consumption, water usage, and waste production (Gössling and Peeters, 2015; Legrand *et al.*, 2022). The transition towards more environmentally sustainable operations is not merely an ethical imperative but also a strategic business decision, as environmentally conscious travellers increasingly prefer accommodations that are environmentally sustainable (Legrand *et al.*, 2022; Mihalic, 2016; Mishra and Kumar, 2024).

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Technological innovation is among the most impactful measures in this regard, playing a critical role in enhancing energy efficiency, reducing waste, and optimising resource management (Kholijah, 2024).

However, energy consumption continues to be a predominant environmental concern for the hotel sector. According to recent studies, the hospitality sector accounts for nearly 1% of global carbon emissions, with a significant share derived from electricity and heating needs (UNWTO, 2023). The integration of renewable energy sources such as solar panels, geothermal heating, and wind power has been widely advocated as a sustainable solution (Kholijah, 2024; Legrand *et al.*, 2022). A notable example is the adoption of solar energy in numerous Italian hotels, particularly in coastal and rural regions (Mejjad *et al.*, 2022). Nonetheless, the integration of solar energy has been gradual, primarily due to the substantial initial investment costs and the necessity for government incentives (VDA Group, 2022).

The development of smart energy management systems has also been a key factor in optimising electricity use. IoT-based solutions, including motion-sensor lighting and intelligent climate control systems, are gaining popularity in high-end and eco-certified hotels (Gössling and Peeters, 2015; Legrand *et al.*, 2022). These innovations contribute significantly to energy savings, with studies indicating that smart thermostats alone can reduce heating and cooling costs by up to 30% (Gössling and Peeters, 2015). However, the adoption of these technologies remains uneven, as many small and mid-sized hotels struggle to justify the upfront costs without clear long-term financial returns (Ruhanen *et al.*, 2015; Smith *et al.*, 2022).

Another critical aspect of environmental sustainability is waste reduction. A significant number of hotels have phased out single-use plastics, opting for alternatives such as biodegradable packaging, reusable water bottles, and bulk dispensers for toiletries (UNEP, 2022). While these measures align with global efforts to eliminate plastic pollution, compliance remains inconsistent, with some hotels implementing these practices solely to meet regulatory requirements rather than as part of a long-term sustainability strategy (Calisto *et al.*, 2021; Khatter, 2023).

Technologies aimed at conserving water have also gained traction, particularly in Mediterranean countries facing seasonal water shortages (UNEP, 2022). The adoption of advanced filtration systems, water recycling programmes, and low-flow fixtures is becoming increasingly prevalent in eco-conscious hotels (Gössling and Peeters, 2015). Nevertheless, a significant challenge persists: many hotels lack the necessary infrastructure and technical expertise to implement comprehensive water management systems (Legrand *et al.*, 2022).

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Social Sustainability and Community Engagement

The concept of social sustainability in the hospitality industry encompasses a wide range of factors, extending beyond the reduction of environmental impacts to the fostering of positive relationships with local communities, the assurance of fair labour practices, and the promotion of cultural preservation (Elbelehy and Crispim, 2024; Zientara *et al.*, 2025). Furthermore, integrating community-based tourism initiatives and ethical business practices has been recognised as a means of enhancing both brand reputation and social equity (Dangi and Petrick, 2021).

Hotels, as key players in the tourism sector, assume a pivotal role in shaping local economies. By sourcing food, crafts, and services from local providers, hotels contribute to the redistribution of economic resources and support regional development (Bozzato, 2021). A significant number of Italian hotels, particularly those located in rural areas, have established partnerships with local farmers, wineries, and artisans. This ensures that guests experience authentic regional offerings while supporting local businesses (Mejjad *et al.*, 2022). This practice is not only conducive to sustainability, but also aligns with changing consumer preferences, as contemporary travellers increasingly seek cultural authenticity in their accommodations (Gössling and Peeters, 2015).

Another salient dimension of social sustainability is that of fair employment practices. The provision of ethical labour conditions, including fair wages, worker training programmes, and diversity in hiring, has been demonstrated to contribute to higher job satisfaction and reduced staff turnover rates (Legrand *et al.*, 2022). However, many hotels face challenges in balancing fair wages with profitability, particularly in highly seasonal destinations where fluctuating demand complicates workforce planning (Sheoran, 2025).

Cultural sustainability is a particularly salient issue in Italy, where many hotels are located within historical buildings or UNESCO-listed sites. The *Albergo Diffuso* model, which was pioneered in Italy, is a prime example of how hotels can integrate cultural preservation into their business model. This decentralised hospitality concept involves the transformation of existing historical buildings into guest accommodations, thereby reducing the environmental impact of new construction while revitalising rural and depopulated areas (Bozzato, 2021).

However, despite the numerous benefits of heritage-based hospitality, it is important to acknowledge the structural challenges that are often associated with this practice. Maintaining historical buildings requires significant investments in restoration, and hoteliers often struggle with restrictive building regulations that limit sustainability upgrades such as solar panel installations (Legrand *et al.*, 2022).

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Economic Sustainability and Competitive Advantage

The concept of economic sustainability in the hospitality industry pertains to the capacity of business entities to maintain financial viability while implementing sustainability initiatives (Khatter, 2023). There is a widespread perception among hoteliers that sustainability is an additional expense (Chan, 2021). However, a growing body of evidence shows that sustainable operations can result in long-term profitability and competitive advantage (Khatter, 2023; Knoppen and Knight, 2022).

The adoption of sustainable practices can result in cost savings, primarily through the reduction of energy consumption, waste, and water usage. More precisely, hotels which invest in energy-efficient appliances, LED lighting, and smart thermostats can reduce their operational costs by up to 20% per year (Menegaki, 2024). Furthermore, hotels often attract loyal customers willing to pay a premium, as travellers become increasingly aware of their environmental impact (Li *et al.*, 2024, 2021; Warren at al., 2018).

Luxury hotel brands have been particularly successful in marketing their sustainability initiatives, integrating green certifications and eco-conscious branding into their business strategies (Legrand *et al.*, 2022). However, the absence of immediate financial returns continues to act as a significant impediment to investment in sustainability measures for small and independent hotels. Financial constraints continue to be a primary obstacle to sustainability adoption, particularly for smaller hospitality businesses (Bozzato, 2021; Khatter, 2023), with managers expressing their reluctance to invest in sustainability certifications such as ISO 21401 due to high certification costs and administrative complexity (de Paula *et al.*, 2021). While governments and industry associations can play a crucial role in offering financial incentives, such support remains fragmented and inconsistently applied across regions, as evidenced by the case of Italy (Legrand *et al.*, 2022). In particular, the utilisation of public-private partnerships and green financing programmes has been posited as a potential catalyst for enhancing sustainability adoption, through mechanisms such as the provision of low-interest loans or tax reductions for hotels undertaking investments in energy efficiency and waste reduction initiatives (UNWTO, 2023). Absent such measures, sustainability risks remaining the preserve of high-end hotels rather than becoming an industry-wide standard.

METHODOLOGY

This study adopts a qualitative research design based on a multiple case study approach, allowing for a comprehensive understanding of sustainability practices in the Italian hospitality sector (Yin, 2009).

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This method is particularly suited to studying real-world applications of sustainability initiatives and their effectiveness in influencing consumer behavior (Tisdell *et al.*, 2025).

The primary method of data collection consisted of semi-structured interviews with hotel managers, allowing for an in-depth understanding of their perspectives on sustainability, the challenges they face, and the strategies they implement. This allowed to capture detailed, experience-based insights that quantitative surveys might overlook (Tisdell *et al.*, 2025). Interviews were conducted with managers from five hotels located in three different regions of Italy (i.e., Abruzzo, Marche, and Emilia-Romagna), ensuring a diverse sample in terms of geographic location, hotel size, and level of sustainability engagement (Hays and McKibben, 2021). Participants were selected using purposive sampling technique, prioritizing hotels that had either implemented sustainability initiatives or had expressed interest in doing so. Each interview lasted approximately 45 to 60 minutes and followed a flexible structure, allowing respondents to elaborate on key themes while ensuring consistency across interviews. The questions covered areas such as environmental management practices, community engagement, economic sustainability strategies, and perceived barriers to sustainability adoption.

The collected data were transcribed and analyzed using a Grounded Theory approach (Holt *et al.*, 2022), allowing themes and patterns to emerge organically from the interview responses. The analysis followed three key stages: open coding, where initial themes were identified; axial coding, where relationships between themes were established; and selective coding, where the findings were synthesized into a comprehensive framework. This process ensured that the analysis remained data-driven and reflective of participants' lived experiences.

RESULTS

The results of this study provide an in-depth understanding of the sustainability practices implemented in Italian hotels, the motivations behind these efforts, and the barriers encountered. Through the analysis of five interviews with hotel managers, three major themes emerged: environmental sustainability initiatives, social sustainability efforts, and economic considerations and challenges. While all hotels expressed an interest in sustainability, the degree of implementation and the perceived importance of sustainability varied significantly across the cases.

This heterogeneity aligns with previous findings in the literature (e.g., Legrand et al., 2022; Ruhanen et al., 2015), which highlight the variability in sustainability adoption based on hotel size, location, and available financial resources.

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Environmental Sustainability Initiatives

A salient finding of this study is the heterogeneity in the degree to which hotels integrate environmental sustainability into their operations. All five hotels interviewed had implemented at least some form of environmental sustainability initiative, but the scope and impact of these measures differed significantly depending on the hotel's size, location, and available resources.

Several hotels reported investments in energy-efficient systems, including LED lighting, motion sensors for climate control, and smart thermostats to optimise energy consumption. These findings are consistent with the broader literature, which underscores the role of technological innovation in reducing environmental footprints in hospitality (Kholijah, 2024; Gössling and Peeters, 2015). Furthermore, a select number of high-end establishments have gone a step further by integrating renewable energy sources, such as solar panels and geothermal heating, into their operations. However, managers of smaller hotels emphasised the high upfront costs of these technologies as a significant impediment to further implementation, reflecting concerns reported in earlier studies about the economic feasibility of such investments for SMEs (Smith et al., 2022; Calisto et al., 2021).

Another significant sustainability measure that has been adopted by the hotel industry is the management of waste and the reduction of plastic usage. Numerous hotels have replaced single-use plastics with biodegradable or reusable alternatives, particularly in guest rooms and food services. This aligns with global trends promoted by environmental policy and industry initiatives, as described by UNEP (2022) and Calisto et al. (2021). A number of hotel managers have reported a favourable response from guests, with some guests even explicitly choosing their hotel based on its environmental commitment. However, a few managers also expressed concerns about guest compliance, as some visitors still preferred the convenience of single-use products.

A further area of focus pertained to water conservation. Hotels in coastal and southern regions of Italy, where water scarcity is a growing issue, have implemented low-flow fixtures, water recycling systems, and rainwater collection tanks. However, several managers highlighted the challenge of upgrading plumbing systems in older buildings, which made it difficult to install the latest water-saving technologies.

Social Sustainability and Community Engagement

The practice of social sustainability was particularly evident in hotels that placed emphasis on the promotion of local economic development and the fostering of community engagement. A recurrent

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strategy among the interviewed hotels was the utilisation of locally sourced food and products, with some establishments entering partnerships with neighbouring farms and vineyards to provide organic and seasonal offerings. It was observed by hotel managers that this approach yielded benefits for the local economy and enhanced the guest experience by providing a more authentic and sustainable stay. One hotel had gone a step further by collaborating with local artisans to decorate guest rooms with handmade furniture and artwork, ensuring that the hotel reflected the regional culture. The adopted startegies supports the findings of both Dangi and Petrick (2021) and Elbelehy and Crispim (2024), who argue that community-based partnerships enhance both social equity and brand value.

The issue of employee welfare was identified as a key component of social sustainability. All of the hotels had introduced staff training programmes with a focus on sustainability education, ensuring that employees were aware of the importance of resource conservation and responsible waste management. A select few hotels have also been proactive in promoting fair labour practices, offering competitive wages and investing in employee well-being programmes. This echoes the conclusions of Legrand et al. (2022) and Zientara et al. (2025), who highlight the importance of internal sustainability and fair employment in improving staff retention and job satisfaction. However, smaller hotels found it more difficult to match the wages and benefits offered by larger chains, which sometimes led to high staff turnover rates.

An interesting aspect of social sustainability was guest involvement in sustainability initiatives. One hotel had introduced an eco-conscious rewards programme, where guests could earn discounts for choosing eco-friendly options, such as reusing towels and linens or participating in local environmental activities like beach cleanups. The response to such programmes was mixed, with guests displaying a range of reactions, from high enthusiasm to indifference, thus reflecting the ambivalence reported in literature on consumer-driven sustainability, which suggests a gap between attitudes and actual behaviours (Warren et al., 2018). As a result, hotels must find more effective ways to communicate the value of sustainability to their clientele.

Economic Considerations and Challenges

Whilst sustainability was widely recognised as beneficial in the long run, the financial burden of implementing green practices was a recurring theme across the interviews. The most significant challenges identified were high investment costs, uncertain returns, and inconsistent government support, thus confirming earlier analyses (Chan, 2021; Khatter, 2023), which highlight how perceptions of high costs remain a primary deterrent to sustainability investment.

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Some hotels, particularly those with a strong brand identity linked to sustainability, were able to leverage their environmental and social efforts as a competitive advantage. These hotels proactively marketed their eco-friendly policies and found that travellers who prioritised sustainability were willing to pay premium rates. This finding is consistent with Knoppen and Knight (2022), who argue that "born sustainable firms" often outperform competitors through dynamic capabilities. However, smaller and mid-sized hotels often lacked the marketing resources to effectively communicate their sustainability efforts. It was further noted by several managers that while eco-friendly measures had indeed been adopted, there was a struggle to highlight these practices in a manner that would resonate with potential customers.

A further significant concern pertained to the financial implications of sustainability certifications, considering the whole process too complex and expensive. Concerns about certification complexity mirror observations by de Paula et al. (2021), who note that administrative burdens can deter smaller players from seeking formal recognition.

Furthermore, the implementation of sustainability practices on a daily operational basis was identified as a significant challenge faced by many hotels. For instance, several managers highlighted the challenge of effective waste separation, citing guests' reluctance to adhere to recycling guidelines as a significant concern. Furthermore, the absence of reliable suppliers for sustainable goods, particularly in more remote areas, was identified as a significant challenge.

CONCLUSION

This study underscores the mounting significance of sustainability in the Italian hospitality sector, unveiling both encouraging advancements and entrenched challenges. The findings indicate that while many hotels have embraced sustainability initiatives, their implementation remains uneven due to financial constraints, operational challenges, and varying levels of institutional support.

A leading finding of the research is the heterogeneity in sustainability approaches across different hotel types. Luxury hotels, with their greater financial resources, are more likely to invest in high-tech sustainability solutions, such as renewable energy sources, smart energy management systems, and internationally recognised certifications like ISO 21401. These hotels also have well-structured guest education programmes, ensuring that sustainability is integrated into the overall customer experience. In contrast, boutique hotels and family-run establishments prioritise cultural sustainability and community engagement, emphasising local sourcing, artisan partnerships, and heritage conservation. However, these smaller hotels often face significant funding limitations, which restricts their ability to

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adopt large-scale sustainability initiatives. Rural and family-owned hotels encounter the most significant challenges due to their geographical isolation from major supply chains, which hinders the procurement of sustainable products and services. Furthermore, many of these hotels lack the marketing resources necessary to effectively communicate their sustainability efforts to a broader audience.

Notwithstanding the differences, the study identifies common sustainability barriers across all hotel types. The high initial costs of sustainable technologies, such as solar panels and energy-efficient infrastructure, are a significant deterrent. Furthermore, while sustainability certifications can enhance credibility, their complex application processes and high fees act as significant disincentives for many hotels. Government incentives and financial support programmes do exist, but they are often inconsistent, bureaucratic, or difficult to access, thus limiting their impact.

Another key challenge pertains to the operational aspect of sustainability, particularly in areas such as waste management and guest compliance. It has been reported that frustration has been expressed by several hotel managers regarding a lack of guest participation in eco-friendly initiatives, such as recycling programs and water conservation measures. This finding suggests that sustainability efforts should not be limited to back-end operations but should also include effective communication strategies that educate and engage guests in sustainable behaviours.

From an economic perspective, while some hotels successfully market their green credentials to attract eco-conscious travellers willing to pay premium rates, others struggle to translate sustainability into a clear competitive advantage. This disparity is particularly pronounced in smaller and mid-sized hotels, where sustainability initiatives are frequently perceived as a supplementary expense rather than a strategic investment.

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TOWARDS RESILIENT AGRI-FOOD SYSTEMS: CIRCULAR AND SUSTAINABLE PRACTICES IN THE CONTEXT OF PERUVIAN SMALL-SCALE PRODUCERS

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ABSTRACT

Small-scale producers are playing a pivotal role in the transformation of agri-food systems by adopting practices rooted in circular economy principles, environmental sustainability, and climate resilience. This study investigates the case of the *Agroferias Campesinas*—a short supply chain initiative in Peru—to analyze how these dimensions interact in vulnerable rural contexts. The research highlights how traditional knowledge, cooperative governance, and ecological innovation are integrated by smallholder farmers to strengthen local food systems.

Drawing on 22 semi-structured interviews with producers participating in agroferias in Metropolitan Lima, the study uses thematic analysis to explore circular practices such as composting, value-added production, resource reuse, and crop diversification. These strategies optimize resource flows, enhance economic outcomes, and increase adaptive capacity to environmental and institutional disruptions. Agroferias emerge as multifunctional platforms that enable knowledge sharing, social cohesion, and territorial autonomy.

The findings align with global sustainability objectives, particularly the Sustainable Development Goals (SDGs) 1 (No Poverty), 2 (Zero Hunger), 12 (Responsible Consumption and Production), and 13 (Climate Action). As a work-in-progress, this study offers exploratory insights into grassroots-led sustainability transitions and highlights the need for further research on the institutional scaling and replicability of such place-based innovations. Smallholder producers, rather than being passive beneficiaries of policy, are shown to be key agents in constructing regenerative and resilient agri-food systems.

Keywords: Circular economy; Sustainability; Resilience; Agri-food systems; Small-scale producers; Short supply chains

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INTRODUCTION

The agri-food systems of the Global South are undergoing profound transformations driven by ecological degradation, climate uncertainty, and socio-economic fragmentation. In response to these systemic pressures, this study explores how smallholder producers in Peru enact circular, sustainable, and resilient strategies through territorially embedded markets. Specifically, it analyzes the case of the *Agroferias Campesinas*, a platform that integrates ecological practices, local knowledge, and market autonomy. These dynamics highlight the urgency of identifying models that enable adaptation and transformation grounded in collective action and socio-ecological rationality (Altieri et al., 2015; Chimi et al., 2025).

In recent years, the concepts of circular economy, sustainability, and resilience have emerged as key lenses to rethink agri-food systems in contexts marked by vulnerability and marginalization. Circular economy challenges the linear model of extraction and disposal by promoting cycles of reuse, local valorization, and waste minimization (Perdana et al., 2023; Van Hoof et al., 2024). Sustainability, meanwhile, requires integrated strategies that consider not only ecological regeneration but also social well-being and economic viability (Wezel et al., 2014; Chimi et al., 2025). Resilience—understood as the capacity to absorb, adapt, and transform in response to disturbances—is critical in regions exposed to climatic, institutional, and commercial shocks (Darnhofer, 2021; Walker et al., 2004).

However, these frameworks cannot be applied in abstract or technical terms alone. Their local enactment depends on cultural, territorial and organizational dynamics that shape how producers engage with sustainability transitions. As noted by Bruni et al. (2025), future-oriented innovation in agri-food systems requires not only new business models, but also "fit-for-context" governance mechanisms and inclusive structures of participation. Similarly, Chimi et al. (2025) and Van Hoof et al. (2024) emphasize the relevance of embedding ecological innovation within culturally grounded knowledge systems and socially cohesive networks.

In the case of Peruvian peasant organizations, this involves a hybridization of ancestral practices—such as lunar planting calendars or composting—with emerging strategies like biodigester use, territorial branding, and short-value-chain platforms (Mazaud et al., 2020; Martín-García et al., 2023). These configurations reflect not just adaptation, but a proactive redefinition of value creation and autonomy (Karipidis & Tselempis, 2014; Penone et al., 2024).

This paper contributes to ongoing debates by analyzing the *Agroferias Campesinas*—a network of short supply chains—as a territorial innovation model for circular and resilient transitions in peri-urban

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Andean regions. These agroferias are more than markets: they are socio-technical and cultural devices that articulate production, exchange, learning, and identity (Sutherland, 2023; Calvo-Iglesias et al., 2006). They allow smallholders to reduce their dependency on intermediaries, retain value locally, and build resilience through community organization (Meinzen-Dick et al., 2019; Janker et al., 2019).

By focusing on these dynamics, the study seeks to offer an integrated, place-based perspective that situates sustainability not as an external mandate but as a locally constructed process anchored in socio-ecological interdependence (Geissdoerfer et al., 2017; FAO, 2023). In doing so, it aims to advance theoretical insights into how circularity, resilience, and sustainability converge through everyday practices, organizational learning, and market innovation in marginalized rural settings. Rather than framing smallholders as passive recipients of policy, this approach recognizes their agency in generating context-specific solutions to systemic challenges (Altieri & Toledo, 2011; Mazzucato, 2018). The study thus contributes to broader debates on sustainability transitions by foregrounding territorialized knowledge, cooperative governance, and embedded economic practices as levers of structural change. This paper presents a preliminary analysis within a broader research effort on sustainability transitions in peri-urban agri-food systems.

THEORETICAL FRAMEWORK

Circular Economy in Smallholder Agri-food Systems

Circular economy approaches are gaining relevance in agri-food systems as an alternative to extractive and linear production models. In smallholder contexts, circularity is not expressed through technological sophistication, but through low-input, knowledge-intensive strategies rooted in traditional practices. These include composting, the transformation of surplus into value-added products, and the reintegration of organic waste into productive cycles (Perdana et al., 2023; Atkins et al., 2024). Such practices not only reduce dependency on external inputs but also increase the adaptive capacity of producers facing environmental and market volatility.

Unlike industrial models, circular strategies among small producers are embedded in social relations, community-based learning, and collective governance structures. As noted by Van Hoof et al. (2024), these territorial and participatory mechanisms allow circular initiatives to function as platforms for innovation and sustainability. They also reinforce local autonomy and contribute to resilience by reducing losses, optimizing resource flows, and reinforcing linkages among producers.

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In this logic, branding and marketing strategies embedded in local identity can also become circular practices. The work of Tselempis et al. (2020) shows that farmers' engagement in local food brand development is influenced not only by market opportunities but by perceived utility, relational proximity, and symbolic value—all dimensions consistent with territorially rooted circular systems. These branding mechanisms provide added value to agricultural outputs and support producers in sustaining short value chains that reflect cultural and ecological uniqueness.

The success of circular models depends on their capacity to adapt to regional conditions and cultural norms. Geissdoerfer et al. (2017) emphasize that circular economy initiatives must be context-sensitive and systemically integrated to generate lasting sustainability outcomes. In regions like rural Peru, circularity is driven less by formal policies than by incremental innovations anchored in local knowledge and ecological awareness (Kusumowardani et al., 2022).

Sustainability in Agri-food Systems

Sustainability in agri-food systems encompasses ecological regeneration, social well-being, and economic viability. In small-scale agriculture, this triad is articulated through practices that preserve soil fertility, ensure intergenerational continuity, and foster market integration. Environmental dimensions include crop rotation, agroecological soil management, and the use of natural inputs, which reduce pressure on ecosystems while sustaining productivity (Altieri et al., 2015; Wezel et al., 2014).

Social sustainability is grounded in community cohesion, mutual support networks, and the empowerment of rural actors. Practices such as knowledge exchange, intergenerational learning, and inclusive organizational structures strengthen social capital and contribute to territorial viability (Janker et al., 2019; Meinzen-Dick et al., 2019). The role of women and youth is particularly relevant, as equitable participation enhances autonomy and continuity (Sutherland, 2023).

Economic sustainability is built around stable incomes, market diversification, and value addition. Agroferias, as short supply chain platforms, offer producers access to direct markets and eliminate intermediaries—thereby improving price stability and fostering entrepreneurial capacities (Martín-García et al., 2023; Penone et al., 2024). In this regard, Karipidis and Tselempis (2014) show that farmers' willingness to maintain quality certifications is strongly linked to perceived economic benefits and long-term viability—suggesting that quality assurance mechanisms are not only compliance tools but strategic decisions tied to sustainability outcomes. These economic strategies are

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closely tied to cultural and territorial identity, reinforcing the embeddedness of sustainability in everyday practices.

In this perspective, sustainability is not a static attribute, but an evolving process shaped by place-based rationalities and socio-ecological interaction. As noted by Chimi et al. (2025) and FAO (2023), sustainability in smallholder systems often reflects a synthesis between ancestral knowledge and adaptive strategies that respond to contemporary pressures such as climate change, rural depopulation, and institutional fragility.

Resilience in Peasant Agri-food Systems

Resilience refers to the capacity of agri-food systems to absorb, adapt, and transform in response to external stressors—such as climate change, market disruptions, and institutional fragmentation (Walker et al., 2004; Béné et al., 2023). In peasant systems, resilience is not merely reactive but is actively constructed through localized strategies that integrate ecological, technical, and organizational dimensions.

One critical aspect of resilience is diversification—both in production and marketing. As shown by Villacis et al. (2022), producers who combine food crops with livestock, forestry, or artisanal processing are better able to withstand shocks. Similarly, self-consumption and community cooperation enhance food security and reduce market vulnerability.

Knowledge systems are also central. The integration of ancestral practices (e.g., lunar calendars, terracing, seed conservation) with appropriate innovations (e.g., biodigesters, drip irrigation) strengthens adaptive capacity (Chimi et al., 2025). This hybridization of knowledge enables producers to reconfigure their systems in the face of environmental unpredictability.

Moreover, resilience is underpinned by governance mechanisms and community networks. As emphasized by Darnhofer (2021), social infrastructures—like producer associations, horizontal training, and mutual aid—function as buffers against systemic uncertainty. Agroferias, in particular, act as territorial devices that support not only market access but also organizational learning and emotional solidarity.

In this sense, resilience is not just an ecological property, but a socio-territorial process rooted in collective agency, historical memory, and relational rationalities. Recognizing this complexity is essential for designing policies and frameworks that support smallholders in contexts of persistent volatility.

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METHODOLOGY

Study Design

This study employs a qualitative approach, designed to explore the interactions between the circular economy, environmental sustainability, and the resilience of agri-food systems, applied to small-scale agricultural producers. This qualitative design is ideal for obtaining an in-depth understanding of the experiences and perspectives of producers in real-world contexts, aligning with the thematic analysis guidelines proposed by Braun and Clarke (2006).

Study Context

The *Agroferias Campesinas*, a formal initiative in Peru, serves as the setting for this study. These fairs bring together small-scale agricultural and livestock producers with the aim of promoting direct and solidarity-based trade between rural and urban areas. By eliminating intermediaries, these short supply chains not only seek to generate fairer incomes for producers but also to foster sustainable practices and strengthen connections between rural and urban regions. With a total of 80 associated small-scale producers, these fairs represent a well-established model of short supply chains in the context of a developing country, such as Peru.

Primary Data

The study was based on interviews conducted with 22 small-scale producers from various parts of the country, selected for their active participation in the *Agroferias Campesinas* in Peru's capital, Metropolitan Lima. The participants included both agricultural and livestock producers, allowing for the capture of a diverse range of productive strategies and sustainable approaches. This approach ensured that the interviews reflected the specific practices and challenges faced by the producers in their local contexts.

Data Collection Procedure

Semi-structured interviews were conducted, with an average duration of 30 minutes, during October and November 2024. These interviews were conducted in person at the sales stands of the Agroferias Campesinas and during the Perú Mucho Gusto event, where the association was represented by its members. This qualitative approach combines structured questions with spontaneous reflections, following Flick's (2018) recommendations to generate a comprehensive understanding of participants' practices and challenges. All participants signed an informed consent protocol, ensuring the

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confidentiality of the information and their right to withdraw participation at any time, in compliance with the ethical standards described by Flick (2018).

Data Analysis

The interviews were transcribed using Sonix software, which ensured accurate data capture. Subsequently, thematic analysis was applied, a widely recognized approach for identifying patterns and key categories in qualitative data (Braun & Clarke, 2006). This analysis followed the following stages: initial coding, organization of categories and consolidation into main themes**.** To ensure the validity of the findings, a cross-review process was implemented. The respondents' answers were systematically compared with one another and contrasted with existing literature, following the guidelines of Miles, Huberman, and Saldaña (2014).

RESULTS

Characterization of small-scale producers

This section presents a comprehensive profile of the 22 small-scale producers interviewed, who represent a diverse cross-section of participants from the *Agroferias Campesinas* in Peru. The characterization encompasses sociodemographic, educational, and cultural dimensions, as well as the familial structures that underpin their agricultural and commercial endeavors.

Sociodemographic profile. The sample exhibits gender parity, comprising 11 women (50%) and 11 men (50%), indicative of balanced participation across genders in both agricultural production and market activities. Notably, all participants were aged 40 or older, suggesting that leadership and representation within these collectives are primarily assumed by individuals with substantial life and sectoral experience.

Educational Attainment. A majority of participants (73%) reported having attained higher education, reflecting a relatively high educational level among these small-scale producers. This educational background potentially facilitates engagement with administrative, commercial, and technical aspects of agri-food value chains.

Family involvement in agricultural activities. Agricultural and commercial practices are embedded within family dynamics. The producers depend significantly on active family participation, with relatives contributing to core production and marketing tasks. These familial networks serve not only

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to distribute labor but also to enable intergenerational knowledge transfer, enhancing both economic viability and social resilience.

Cultural identity. A defining feature of the sample is the strong cultural affiliation: 14 of the 22 producers self-identify as members of Indigenous communities. This cultural rootedness is reflected in their continued application of traditional agricultural knowledge and practices. Cultural identity emerges as a vital asset, informing sustainability and adaptation strategies that blend ancestral wisdom with contemporary innovations.

Productive context. The producers surveyed operate across three principal agroecological regions of Peru: i) Andean highlands (45%): Characterized by the cultivation of potatoes, quinoa, and maize, along with diversified cropping systems, ii) Amazon rainforest (32%): Focused on the production of tropical fruits such as cacao and coffee, as well as aromatic herbs, iii) Coastal region (23%): Involved primarily in livestock production and value-added food processing, including jams and artisanal liquors.

Circular economy

The small-scale producers interviewed demonstrated a strong commitment to the circular economy, employing strategies that maximize resources and minimize waste. One of the most recurring practices was the reuse of waste, particularly through composting and its use in animal feed. As one producer mentioned: *"We don't throw anything away; everything left over from the harvest goes into compost and then returns to the soil to produce more crops."* (P15). Another producer explained: *"Fruit peels are perfect for feeding animals, and that helps us save a lot on food."* (P18).

Value-added production emerges as a key strategy to diversify income. A farmer highlighted: *"With the fruits that don't sell, we make jams that are in high demand at the fairs."* (P10). This practice allows surplus resources to be utilized while generating products highly valued by urban consumers.

The use of local resources, such as recycled or renewable materials, reinforces sustainability principles. One participant commented: *"We use reusable packaging for our products, which helps protect the environment and reduce costs."* (P1). An Andean producer described how they combine several circular economy strategies: *"I collect agricultural waste to make compost, use fruit scraps to feed my animals, and with the leftover fruits, I make jams. Everything is utilized."* (P20). According to the National Climate Change Adaptation Plan (2022), practices such as the valorization of by-products have the potential to

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reduce agricultural waste by up to 30%, strengthening the viability of models like those observed in the *Agroferias Campesinas*.

Sustainability

Sustainability is a cross-cutting theme in the practices adopted by small-scale producers. Crop rotation was identified as a widely used technique to preserve soil fertility. A farmer explained: *"Every season, I change the crops so the soil stays healthy, and we don't need as much fertilizer."* (P9). Data from the Ministry of Agriculture and Irrigation (2023) highlight that 45% of agricultural land in the Peruvian Andes uses this practice, aligning with the findings of this study. Additionally, natural pest control, based on the use of plant extracts, was particularly prominent among small-scale producers. As one participant mentioned: *"We make our own pesticides with local plants; it's cheaper, and we don't harm the soil."* (P5).

Resilience of agri-food systems

Resilience is crucial for small-scale producers in diverse aspects, particularly environmental ones, as they face challenges such as droughts and frosts. Crop diversification was mentioned as a central strategy. A participant stated: *"We plant potatoes, corn, and quinoa at different times so that if one crop fails, we have another to rely on."* (P7).

Water storage, through reservoirs or local irrigation systems, is another prominent practice. A producer commented: *"We built a reservoir to take advantage of the rain, and with that, we can irrigate during the dry season."* (P8). According to the MIDAGRI report (2023), about 35% of agricultural areas in Peru already use some form of reservoir or efficient irrigation system, reinforcing the applicability of this strategy at a national level.

Finally, local and traditional knowledge continues to play an important role. An elder farmer explained: *"My grandfather taught us to plant according to the phases of the moon. That has helped us achieve better harvests, even with this unpredictable climate."* (P14).

A young producer summarized the strategies adopted by his family: *"We diversify our crops and store water in reservoirs. Moreover, we learn from the elders how to face these climatic variations using their traditional techniques."* (P7).

Connection with the Agroferias Campesinas

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The *Agroferias Campesinas* play a significant role in facilitating the implementation of the practices mentioned above. By providing direct sales spaces, producers receive immediate feedback from consumers, which helps improve the quality of their products.

Additionally, the fairs foster community support networks, where producers not only share knowledge but also buy and sell inputs among themselves for their productive processes. One farmer remarked: "I buy fruits from other colleagues to make jams, and they buy fertilizer from me that I produce with my compost." (P2).

DISCUSSION

The findings from the Agroferias Campesinas illustrate how circularity, sustainability, and resilience are not isolated concepts but interrelated practices embedded in the everyday lives of small-scale producers. The strategies reported—such as composting, value-added processing of surplus, reuse of packaging, and animal feed integration—demonstrate a strong adherence to circular economy principles, particularly those rooted in local knowledge and material efficiency. These practices align with the literature on circularity in agri-food systems that prioritizes low-input, locally adapted solutions over technological sophistication (Perdana et al., 2023; Atkins et al., 2024). The reuse of harvest residues for compost and livestock feed mirrors the territorially grounded circular strategies described by Van Hoof et al. (2024) and reinforces the socio-environmental logic observed by Tselempis et al. (2020).

Value-added production, such as jam-making from unsold fruits, not only minimizes waste but diversifies income, confirming Martín-García et al. (2023), who note that circular practices can also act as economic stabilizers in smallholder contexts. Furthermore, the use of renewable materials and reusable packaging illustrates how ecological and economic sustainability converge at the level of day-to-day decisions. These findings support the argument of Geissdoerfer et al. (2017) that context-sensitive circularity must emerge from embedded practices rather than prescriptive models.

Sustainability, as observed in crop rotation, organic pest control, and territorial branding, reflects a holistic integration of ecological, social, and economic dimensions. Practices such as intercropping and homemade biopesticides show how producers conserve soil health and reduce reliance on chemical inputs, aligning with agroecological principles established by Altieri et al. (2015) and Wezel et al. (2014). Social sustainability manifests in the central role of family labor and Indigenous identity, both of which enhance knowledge transmission and cultural continuity—two pillars emphasized by Meinzen-Dick et al. (2019) and Sutherland (2023).

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Economically, direct sales through agroferias provide price autonomy and foster horizontal trade among producers, in line with the short supply chain models analyzed by Karipidis & Tselempis (2014). These market platforms also enhance symbolic capital by valorizing cultural products and local narratives, reinforcing the role of branding as a sustainability strategy (Tselempis et al., 2020).

Resilience emerges as a transversal logic in producer strategies, particularly in their responses to climatic variability and institutional constraints. The diversification of crops (e.g., potatoes, corn, quinoa) is a clear adaptation strategy to environmental stressors, echoing the resilience framework proposed by Darnhofer (2021) and Villacis et al. (2022). Water storage infrastructures and lunar planting calendars demonstrate both infrastructural and epistemic resilience, the latter being essential for long-term adaptability as noted by Chimi et al. (2025). The coexistence of traditional and modern knowledge—such as biodigesters alongside ancestral lunar cycles—supports Mazaud et al.'s (2020) concept of "post-dualist" innovation, where rural modernization does not negate cultural embeddedness.

Finally, the Agroferias Campesinas themselves act as resilience-enabling institutions. Beyond economic exchange, they serve as community hubs for input-sharing, peer learning, and emotional solidarity. This confirms the findings of Bruni et al. (2025) regarding the importance of territorially embedded governance and adaptive collaboration in building resilient business models for agri-food SMEs.

In sum, the practices observed in the Agroferias Campesinas materialize theoretical frameworks of circularity, sustainability, and resilience through localized, culturally grounded strategies. The study demonstrates how smallholder producers in Peru enact sustainability transitions not through formal policy mechanisms, but through cooperative learning, embedded innovation, and place-based experimentation—offering valuable insights for broader discussions on agroecological transformation and territorial development.

KEY CONTRIBUTIONS

This study makes three key contributions to the literature on sustainability transitions in agri-food systems. First, it offers an empirically grounded analysis of how circular economy, sustainability, and resilience are not abstract principles but interwoven practices shaped by local knowledge, cooperative structures, and ecological rationality. By focusing on the *Agroferias Campesinas*, the study highlights the importance of territorially embedded markets as socio-technical infrastructures that enable

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grassroots innovation and autonomy—thus enriching existing frameworks of place-based sustainability (Geissdoerfer et al., 2017; Bruni et al., 2025).

Second, the research contributes to circular economy literature by documenting how smallholder producers operationalize circularity through hybrid strategies. These combine ancestral techniques (e.g., lunar calendars, composting) with value-added production and resource recovery. This challenges technocentric models and reinforces the relevance of culturally adapted, low-tech circular systems in the Global South (Perdana et al., 2023; Van Hoof et al., 2024).

Third, the study provides methodological insight by illustrating how qualitative fieldwork—through semi-structured interviews and contextual interpretation—can capture the complexity of sustainability practices that are deeply relational, tacit, and situated. This approach supports calls for epistemologically plural research designs in agroecological studies and territorial innovation analysis (Altieri & Toledo, 2011; Chimi et al., 2025).

CONCLUSIONS

This study demonstrates that the interaction of circular economy, sustainability, and resilience manifests through practices deeply embedded in local knowledge, cultural identity, and community organization. The case of the *Agroferias Campesinas* illustrates how traditional techniques and ecological innovations coalesce to optimize resource use, foster environmental stewardship, and enhance autonomy among small-scale producers. These findings reaffirm that sustainability transitions in agri-food systems are not linear nor externally driven, but context-sensitive, culturally mediated, and co-produced by territorial actors.

The study shows that the circular, sustainable, and resilient strategies employed by small-scale producers are not isolated initiatives but interconnected responses shaped by family dynamics, cultural identity, and territorial conditions. The role of the *Agroferias Campesinas* in facilitating these strategies is particularly relevant, as they provide a space where producers can add value to surplus products, share inputs and knowledge, and access direct markets that reinforce autonomy and income stability. These findings suggest that supporting such territorially embedded platforms may be a viable pathway for fostering inclusive and ecologically grounded agri-food transitions in similar contexts. However, as a work-in-progress, the research remains exploratory, and further inquiry is needed to assess the long-term robustness and replicability of the observed dynamics.

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IMPLICATIONS AND FUTURE RESEARCH

The results of this study highlight the transformative role of smallholder producers in shaping sustainable and resilient agri-food systems through embedded circular practices. Although preliminary, this has direct implications for policy design and territorial development strategies. Public institutions and development programs should prioritize hybrid approaches that integrate traditional knowledge—such as lunar planting calendars, composting, and seed conservation—with ecological innovations like biodigesters and efficient irrigation systems. These practices are not only culturally coherent but also environmentally and economically effective in contexts marked by resource constraints and institutional volatility.

Policy frameworks would benefit from recognizing agroferias not merely as commercial venues but as socio-territorial infrastructures that foster autonomy, social cohesion, and agroecological learning. Institutional support should go beyond financial subsidies to include decentralized training, context-specific technical assistance, and participatory governance mechanisms capable of sustaining innovation from below.

From a research perspective, this study underscores the value of examining how circularity and resilience unfold across diverse agroecological zones and cultural settings. Future studies could explore the long-term institutional impacts of agroferias on producer livelihoods, food security, and biodiversity conservation. Comparative and longitudinal analyses would deepen our understanding of the scalability, limitations, and transformative potential of territorially embedded sustainability models. Interdisciplinary approaches are also needed to trace how material, symbolic, and organizational elements interact to shape sustainability transitions in practice.

By aligning policy innovation with grassroots strategies and advancing research grounded in territorial complexity, it becomes possible to support agri-food systems that are not only productive, but regenerative, inclusive, and resilient in the face of global challenges.

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THE ROLE OF CULTURAL IDENTITY IN SHAPING THE 'MADE IN ITALY' BRAND

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ABSTRACT

Purpose: this study explores the Made in Italy (MII) concept by examining its cultural value as a core component of its global identity and competitive advantage. Through a revision of existing academic literature, the research investigates how the concept of cultural identity shapes the symbolic value and international perception of the MII brand.

Methodology: the study employs a systematic literature review methodology, drawing on twenty-one scholarly sources, including peer-reviewed articles, conference papers, book chapters, and monographs, retrieved from the SCOPUS database and published between 2013 and 2024. A qualitative content analysis was conducted to identify, interpret, and categorize the main themes related to the cultural construction of MII.

Findings: the review develops a conceptual framework that positions cultural identity as a foundational pillar of the MII brand. Key dimensions emerging from the literature include the role of oral narratives, the embeddedness of production in specific territories, and the symbolic transmission of Italian heritage through products. The findings suggest that these elements collectively contribute to the authenticity, emotional appeal, and strategic positioning of the MII label in both domestic and international markets.

Originality: by adopting an interdisciplinary approach to the cultural value of MII label, this paper addresses a gap in the existing literature and lays the groundwork for future research into complementary dimensions of national branding. The results also provide valuable insights for policymakers, marketers, and cultural institutions seeking to preserve and enhance the MII identity in a globalized context.

Keywords: Please provide up to 10 Keywords which encapsulate the principal topics of the paper

INTRODUCTION

Over the time, the Made in Italy (MII) label has evolved from a mere indication of origin into a collective brand. It now encompasses a wide array of companies and reflects a multi-sectoral structure, involving diverse types of products and services (Temperini et al., 2016). Consequently, its

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value extends beyond product quality, embodying the distinctiveness of an entire cultural system historically associated with beauty, tradition, elegance, craftsmanship, identity, and a strong connection to place. MII label represents a collective heritage passed down to Italian industry, becoming a symbol of advanced production capabilities and a source of added value for the national manufacturing system (Temperini et al., 2016).

According to the semiotic approach proposed by several Authors (Eco, 1976; Eco, 1986; Semprini, 1995; Arvidsson, 2006), it can be stated that, in the context of an increasingly globalized marketplace, the MII label has evolved from a simple indication of geographical origin to become a complex signifier of quality, tradition, and cultural identity. Renowned worldwide for its association with fashion, design, gastronomy, and artisanal excellence, the MII brand conveys a set of symbolic values deeply rooted in Italian heritage. These values often transcend the physical characteristics of products, appealing to emotional and cultural dimensions of consumption.

Anchored in these cultural and semiotic frameworks, this paper presents a systematic review of academic literature focused on the role of the cultural identity concept in shaping the MII label. It aims to synthesize interdisciplinary perspectives, highlight key themes and debates, and identify gaps for future researches. The study includes contributions from fields such as marketing, cultural studies, communication, semiotics, and sociology, covering both theoretical discussions and empirical case studies.

By mapping how scholars have approached the cultural significance of the MII label, this paper aims to contribute to a broader understanding of how national identity is constructed, communicated, and contested through branding. Furthermore, it raises critical questions about the sustainability, authenticity, and symbolic power of national labels in an increasingly globalized and digital consumer landscape.

The review is guided by the following research questions:

RQ 1: How has the relationship between cultural identity and MII been conceptualized in academic literature?

RQ 2: What theoretical frameworks and methodologies have been employed to study this relationship?

RQ 3: Which key themes, patterns, and debates emerge across the literature?

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The remainder of this paper is organized as follows: section two presents the theoretical background; section three outlines the methodological approach; section four reviews the literature with particular attention to the economic conceptualization of MII; section five discusses the main findings; and sections six and seven examine the broader implications and limitations. Finally, section eight offers concluding reflections.

THEORETICAL BACKGROUND

Over the past decade, academic scholarship has shown a growing interest in unpacking the cultural dimensions underpinning the MII phenomenon. Researchers have examined how elements such as identity, narrative construction, and national imagery inform both the branding strategies (Dagyte-Kavoliune et al., 2021), and international reception of Italian products. This research seeks to explore the role of cultural identity in shaping the creation, dissemination, and perception of the MII label, drawing on insights from diverse disciplinary fields including marketing, cultural studies, sociology, and strategic management.

A recurring theme in the literature is the pivotal role of oral and narrative forms in transmitting cultural identity and the values embedded within the MII label (Giumelli, 2016; Kohler and Perrino, 2017; Tulante, 2013; Vacca et al., 2022). Consequently, the communicative dimension is intrinsically linked to the cultural foundations of the brand. The relationship between language and commerce illustrates how linguistic and cultural practices operate not only as vehicles of information but also as carriers of cultural meaning (Maghssudipour et al., 2023; Vrontis et al. (2021). Furthermore, as highlighted by several scholars (Faraoni, 2021; Lo Scocco and Motta, 2024; Mazzoli et al., 2019; Motta et al., 2024; Penco et al., 2021, Thrassou et al. (2021), communication strategies, managerial and marketing concepts are instrumental in informing corporate branding and positioning. A coherent and culturally resonant narrative is essential for reinforcing brand identity across both domestic and international markets.

By synthesizing this interdisciplinary body of literature, the present paper aims to elucidate the mechanisms through which Italian cultural identity is strategically mobilized in global and local contexts. It also seeks to identify emerging patterns in the evolution and representation of the MII brand, particularly in relation to the dynamics of digital globalization and shifting consumer preferences.

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METHODOLOGY

This study employs a systematic literature review methodology to investigate the relationship between MMI label and cultural identity concept. This approach offers a rigorous and replicable framework for identifying, evaluating, and synthesizing existing research. Unlike traditional narrative reviews, which may be subjective or selective in scope, systematic reviews follow predefined protocols for data collection, inclusion, and analysis, thereby ensuring methodological transparency and analytical robustness (Tranfield *et al*., 2003).

Given the interdisciplinary nature of the MII phenomenon, which intersects with marketing, business and management, cultural studies, and semiotics, this paper integrates scholarly contributions from different academic domains. Despite the disciplinary breadth, consistent selection criteria have been applied to ensure coherence and comparability across sources.

The objective is not merely to compile existing studies, but to critically examine and synthesize their findings. Through this process, the study aims to identify recurring themes, assess key theoretical and methodological contributions, and uncover gaps in the current literature. Ultimately, the methodology is designed to support a structured and comprehensive exploration of how cultural identity is articulated and operationalized within the MII brand discourse.

Literature search and selection

This study adopts a systematic literature review methodology, with a focus on peer-reviewed academic publications issued between 2013 and 2024. The paper is inherently interdisciplinary, drawing on scholarly contributions from the domains of economics, business management, international marketing, and cultural studies.

Scopus was selected as the primary database for data collection, due to its stringent selection criteria and comprehensive coverage of high-impact academic sources. The corpus includes journal articles, conference papers, conference reviews, book chapters and review papers published within the defined period. The search was conducted using the "Topic" feature, which enables the identification of relevant literature by scanning titles, abstracts, and author-supplied keywords.

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Scanning stage

According to the cultural conceptual dimension introduced in the previous sections, search has been conducted, considering the following string of keywords: "Made in Italy" and "cultural identity". Boolean combination was applied to expand the search scope.

Inclusion and Exclusion Criteria

The selection process was guided by clearly defined inclusion criteria, prioritizing studies that offered substantive insights into the cultural dimension of MII. Each publication was assessed for thematic relevance, methodological rigor, and contribution to the research objectives. While some papers contained tangential references to the topic, they were excluded if they lacked a direct analytical focus on the cultural drivers or implications of MII.

Of the eighteen documents initially retrieved, seven were deemed suitable for inclusion following a thorough screening process. The corpus spans from the earliest relevant contribution published in 2013 to more recent studies, reflecting an increase in scholarly interest over the past decade, with a notable intensification in the last few years.

THEORETICAL FRAMEWORK

According to the search criteria, eighteen documents, published between 2013 and 2024, have been found (Figure 1(a). The majority of the investigations was conducted by Italian authors, as reported in Figure 1 (b). Referring to the document type, as reported in Figure 2 (a), 10 studies were published as journal articles, whereas 2 are conference papers, 2 are conference reviews, 1 is a book chapter, and 2 are review papers. The distribution of the study by research fields can be observed in Figure 2 (b).

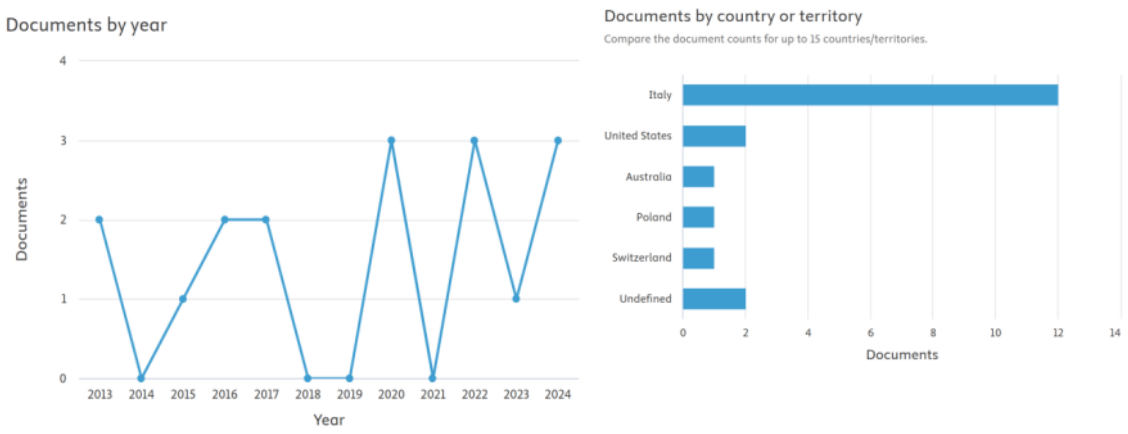
Cultural identity constitutes a foundational element of the MII brand, deeply interwoven with Italy's rich heritage, artisanal traditions, and aesthetic values. This dimension shapes both the domestic and international perception of Italian products, informing not only consumer expectations but also strategic branding choices. Among the eighteen studies reviewed, seven were selected for their focused exploration of cultural identity in relation to the MII paradigm. These contributions are presented below in chronological order.

Tulante (2013) examines the relationship between national identity and Italy's high-fashion industry through the analysis of two movies, Valentino: The Last Emperor (Tyrnauer, 2008) and Gomorrah

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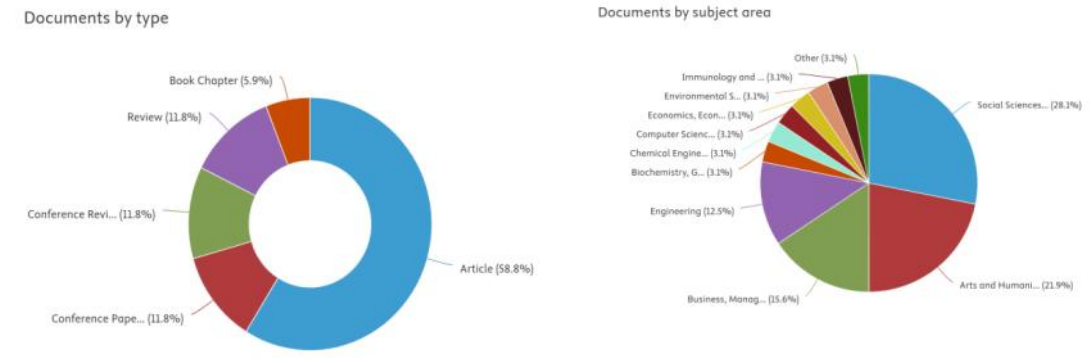
(Garrone, 2008). The study highlights the role of fashion as a cultural institution and underscores how national identity is often constructed through mediated and fictionalized narratives.

Della Corte et al. (2013) propose a model of innovation and internationalization tailored to small and medium-sized enterprises (SMEs) embedded in tradition and cultural identity. Recognizing the structural constraints of many Made in Italy firms, typically small, family-run, and resource-constrained, the authors argue that networking and knowledge-sharing are key to overcoming competitive disadvantages and enhancing international market access.



(a) **(b)**

Figure 1. *Document by year (a) by country or territory (b). Source: Scopus database*



(a) **(b)**

Figure 2. *Figure 2 Document by type (c) and by subject area (d). Source: Scopus database*

Giumelli (2016) explores the shifting meanings of the Made in Italy label in the context of globalization. The study problematizes the traditional understanding of Made in… as a fixed

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geographic marker, analyzing how cultural transformations and transnational production processes are reshaping consumer perceptions and brand authenticity.

Kohler and Perrino (2017) investigate how Italian family-owned businesses strategically deploy oral narratives to embed values such as authenticity, responsibility, and cultural continuity into their corporate identities. Through qualitative analysis of executive discourse, the authors show how Made in Italy is not merely a production label but a narrative construct aligned with broader cultural ideologies.

Napolitano et al. (2020) focus on the case of Tod's Group to examine the link between enterprise identity and local territorial heritage. Their study demonstrates how the industrial district's craftsmanship and "know-how" serve as key strategic assets, anchoring the company's competitive positioning in culturally embedded production practices.

Vacca et al. (2022) offer a design-centered perspective on cultural identity, analyzing how traditional craftsmanship is both preserved and reinterpreted through contemporary design processes. The authors argue that design acts as a mediator, generating new narratives that sustain cultural heritage while promoting innovation.

Finally, Di Salvo (2022) explores the construction of Italian identity in migratory contexts, specifically focusing on Italian female entrepreneurs in the catering sector abroad. The study introduces the concept of "perceived Made in Italy," analyzing how cultural, semiotic, and linguistic markers are mobilized to establish authenticity and credibility within diasporic business environments.

These studies collectively highlight the dynamic and performative nature of cultural identity in the MII brand. They reveal how heritage, narrative, and place-based knowledge are leveraged not only as marketing assets but as strategic resources for differentiation and internationalization.

RESULTS AND DISCUSSION

The literature review highlights that the MII label is not merely a certification of origin or quality, but a rich semiotic construct imbued with emotional and symbolic resonance. The emotional dimension emerges as a defining feature of the brand, contributing not only to its distinctiveness but also to its capacity for cultural and commercial evolution (Levy and Gendel Guterman, 2021). From this perspective, the MII label functions as a narrative device that communicates a national identity rooted in heritage, tradition, and localized knowledge.

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A recurring theme across the literature is the central role of oral and narrative practices in constructing and disseminating cultural identity. Scholars such as Kohler and Perrino (2017), Tulante (2013), and Vacca et al. (2022) emphasize how storytelling, both internal to firms and externally communicated, acts as a vehicle for articulating values such as authenticity, craftsmanship, and continuity. These oral narratives serve to align company identities with broader cultural discourses, thereby reinforcing the symbolic power of the MII label.

Di Salvo (2022) further expands this perspective by analyzing how Italian identity is constructed in migratory and transnational contexts. Her research illustrates how linguistic and cultural cues, embedded in personal and entrepreneurial narratives, are strategically used to establish perceived authenticity in global markets. This suggests that the emotional and narrative dimensions of MII retain their efficacy even when detached from the geographical territory, provided that the symbolic elements are preserved and communicated. Nevertheless, the connection with the territory remains a foundational element in the construction of cultural identity. Giumelli (2016) points out that the traditional concept of "Made in…" is historically tied to a specific place of production, reflecting localized expertise and cultural specificity. Similarly, Napolitano et al. (2020) demonstrate that firms such as Tod's actively incorporate regional craftsmanship and territorial heritage into their strategic positioning, leveraging local identity as a source of competitive advantage.

Overall, the findings suggest that the effectiveness of MII branding lies in its ability to balance authenticity and innovation, emotional appeal and strategic intent. Cultural identity is not a static attribute but a performative and adaptive process, sustained through narrative, territory, and symbolic practices across both domestic and international contexts.

FUTURE IMPLICATIONS

This study underscores the necessity for further research into how MII is perceived across diverse cultural and economic contexts. In particular, future investigations could adopt cross-disciplinary approaches that integrate insights from marketing, cultural studies, consumer psychology and tourism management. This approach could improve the understanding of the emotional and symbolic value that characterize the MII brand.

A central theme emerging from the literature is the pivotal role of cultural identity in shaping and sustaining the MII concept. As Italian products continue to proliferate in global markets, there is a pressing need to explore how this expansion impacts the preservation and evolution of their cultural essence. Future research could examine how MII navigates the tensions between globalization and

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authenticity, especially in contexts where traditional values are at risk of being diluted or commodified.

Existing literature may also delve into adaptive branding strategies that effectively integrate innovation with cultural heritage. Within this framework, several studies (Valeri and Sousa, 2024; Valeri, 2024; Valeri 2022) underscore the significant role of tourism in shaping the international perception of locally produced goods. Given Italy's status as a premier tourist destination, attracting millions of visitors annually, the interconnection between its cultural heritage, emblematic products, and tourism sector merits deeper scholarly attention. Future research might examine the extent to which tourism functions as a strategic platform for disseminating Italian craftsmanship, fashion, and gastronomy on both domestic and global scales. Additionally, investigating how the tourism sector can synergize with local enterprises to deliver authentic MII experiences could further strengthen the brand's visibility and consumer appeal (Stavrianea and Kamenidou, 2022; Ratna et al., 2024).

LIMITATIONS

Despite the contributions of this research, several limitations must be acknowledged. First, the data collection was limited to a single database, which may have constrained the diversity and breadth of sources analyzed. Incorporating additional databases and grey literature could reveal further themes or challenge the current interpretations.

Second, while the review adopts a global perspective on the MII phenomenon, it offers limited insight into regional variations within Italy itself. Future studies could benefit from a more granular analysis of how different territorial identities, such as those rooted in specific districts or artisanal clusters, contribute uniquely to the overarching MII brand.

Moreover, the current study is based primarily on academic perspectives and theoretical analyses. There is a need for more empirical research that captures consumer experiences and perceptions through qualitative and quantitative methodologies. Surveys, interviews, and ethnographic studies involving international consumers could provide valuable insights into the symbolic, emotional, and functional dimensions of the MII label.

Lastly, this paper offers a static snapshot of a dynamic phenomenon. Given the accelerating pace of change in global markets, driven by technological innovation, shifting consumer values, and geopolitical factors, longitudinal studies are needed to trace how the MII concept evolves over time.

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CONCLUSION

This research has demonstrated that cultural identity plays a foundational role in shaping the meaning, communication, and strategic deployment of the MII brand. As the findings suggest, the MII label has evolved beyond its original utilitarian purpose of indicating geographic origin to become a rich symbolic construct that conveys tradition, excellence, and emotional resonance. Central to this transformation is the oral and narrative transmission of cultural values, which scholars identify as key mechanisms for embedding Italian identity into branding strategies. Moreover, language emerges not merely as a tool for commercial communication, but as a carrier of culture that bridges the gap between producers and consumers across diverse markets. The reviewed studies further underline the importance of coherent and culturally grounded communication strategies in reinforcing brand identity and positioning in increasingly competitive and globalized environments.

In synthesizing contributions from marketing, cultural studies, sociology, and strategic management, this review contributes to a more nuanced understanding of how Italian cultural identity is not only preserved but also strategically mobilized to generate competitive advantage. It also highlights how digital globalization and evolving consumer values are reshaping the modes through which the MII brand is communicated and perceived. Ultimately, the intersection of culture, narrative, and branding offers fertile ground for future research, particularly in examining how authenticity, tradition, and innovation can be balanced within the evolving landscape of global markets.

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LINKING KMC, IMC, AND TQM TO SUSTAINABLE PERFORMANCE: EVIDENCE FROM THE CONSTRUCTION INDUSTRY

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ABSTRACT

The purpose of this paper is to investigate the impact of Knowledge Management Capability (KMC), Innovation Management Capability (IMC), and Total Quality Management (TQM) on Sustainable Performance (SP) in the construction sector. A quantitative methodology was employed using a structured online questionnaire to gather data from 700 Greek private organizations in the construction sector. The collected responses, totaling 254, were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate the relationships among KMC, IMC, TQM and SP. The results indicated that KMC and TQM have a positive and significant impact on SP, while IMC has only positive impact on SP. The originality of this research lies in its comprehensive model that integrates KMC, IMC, and TQM to assess their combined impact on SP, addressing a significant gap in existing literature. Practically, it underscores the importance for managers to develop strategies that integrate Knowledge Management, Innovation Management, and Total Quality Management practices to enhance sustainable performance, especially during economic challenges. However, the research is limited by its small sample size and focus on the Greek construction sector, which may affect the generalizability of the findings to broader contexts. .

Keywords: Keywords: Knowledge Management Capability, Innovation Management Capability, Sustainable Performance, Total Quality Management, construction

INTRODUCTION

In today's rapidly evolving knowledge-based economy, driven by the advancements of Industry 4.0, the effective utilization of modern technologies, development of innovations, and the implementation of Knowledge Management (KM) are crucial for the sustainable development of businesses (Xanthopoulou et al., 2023). Despite the growing recognition of the concepts of KM, Innovation Management, Total Quality Management (TQM), and Sustainable Performance (SP), the current literature lacks studies that explore the relationship among these constructs. This research investigates

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the impact of Knowledge Management Capability (KMC), Innovation Management Capability (IMC), and TQM on SP in construction sector. Through this research, we aim to provide a comprehensive framework that highlights the interconnectedness of abovementioned capabilities and their collective role in driving sustainable performance across organizations in the construction sector.

The following sections present the literature review, methodology and research methods, results, and conclusion.

LITERATURE REVIEW

Knowledge Management Capability (KMC) is essential for quality, innovation, and sustainable performance (Xanthopoulou et al., 2024). It reflects an organization's ability to acquire, integrate, and use knowledge for decision-making and problem-solving (Miranda et al., 2011; Chang & Chuang, 2011). KMC is dynamic and responsive to market changes (Tseng, 2016), requiring a learning culture that supports continuous knowledge creation, storage, dissemination, and application (Martinez-Conesa et al., 2017; Bose, 2003).

KMC includes two core dimensions: infrastructure capabilities—technology, structure, and culture—and process capabilities, which refer to the effective handling of knowledge flows (Gold et al., 2001; Alaarj et al., 2016). When these are aligned and supported by KM tools, they help organizations remain innovative and agile (Xanthopoulou et al., 2024).

INNOVATION MANAGEMENT CAPABILITY (IMC)

Innovation Management Capability (IMC) is an organization's ability to structure operations, manage resources, and foster a culture that supports innovation across technology, processes, and business models (Damanpour & Aravind, 2011; Szekely & Strebel, 2013). It enables adaptability and competitiveness in dynamic environments.

IMC includes two main dimensions: managerial innovation (strategy and leadership) and technological innovation (R&D and technical progress) (Tuominen & Hyvönen, 2004). Martinez-Roman et al. (2011) further highlight knowledge, processes, and human factors as critical to innovation capacity.

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Behavioral aspects also play a vital role. Attitudes toward innovation and leadership traits—like creativity, proactivity, and risk-taking—significantly influence innovation outcomes (Calantone et al., 2002; Marcati et al., 2008).

TOTAL QUALITY MANAGEMENT (TQM)

Total Quality Management (TQM) is a holistic approach aimed at continuous improvement across all organizational processes to enhance customer satisfaction (Foster, 2007). Though rooted in manufacturing, TQM is widely applied in services, emphasizing leadership, employee involvement, process optimization, and data-driven practices like benchmarking and quality measurement.

TQM focuses on reducing inefficiencies, improving product quality, and ensuring consistent delivery, contributing to both operational and sustainable performance (Akanmu et al., 2022). Its effectiveness depends on coordinated efforts across several areas: process management, continuous improvement, data use, employee empowerment, leadership commitment, and customer involvement.

SUSTAINABLE PERFORMANCE (SP)

Sustainable Performance (SP) is a multi-dimensional concept that integrates environmental, economic, and social goals to achieve both business success and long-term development (Adebambo et al., 2015; Du et al., 2022; Gong et al., 2018). It balances short-term profitability with long-term sustainability, ensuring current needs are met without compromising future capabilities (Gadenne et al., 2012). This approach is increasingly vital amid global sustainability pressures and regulatory demands (Johnson & Schaltegger, 2016).

SP comprises three core dimensions: a) Environmental: Reducing resource use, waste, and emissions to lessen environmental impact (Rao & Holt, 2005; Al-Koliby et al., 2022); b) Economic: Improving profitability, market share, and ROI through sustainable practices (Eltayeb et al., 2011); c) Social: Enhancing employee safety, work conditions, and broader community well-being (Paulraj, 2011).

THE RELATIONSHIP AMONG KMC, IMC, TQM AND SP

Below, the relationship of each construct with others is presented.

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THE RELATIONSHIP BETWEEN KMC AND TQM

The relationship between Knowledge Management (KM) and Total Quality Management (TQM) has been widely studied, with many researchers confirming a positive link between the two (Xanthopoulou et al., 2024; Honarpour et al., 2017; Barber et al., 2006; Choo et al., 2007; Hung et al., 2010). Studies highlight how KM processes—such as knowledge creation and application—enhance TQM elements like continuous improvement and customer focus (Hung et al., 2010; Aboyassin et al., 2011).

However, fewer studies specifically explore the connection between Knowledge Management Capability (KMC) and TQM. Notably, Xanthopoulou et al. (2024) found that KMC components, such as knowledge creation and dissemination, positively influence key TQM factors—including customer focus, strategic planning, and leadership commitment.

Based on the provided description, the research hypothesis is:

H1: KMC positively and significantly related to TQM

THE RELATIONSHIP BETWEEN KMC AND IMC

Knowledge creation and innovation are deeply connected, with numerous studies confirming that effective Knowledge Management (KM) practices enhance innovation (Obeidat et al., 2016; Xanthopoulou et al., 2023; Andreeva & Kianto, 2011). Research shows that knowledge creation, sharing, and application contribute significantly to innovation performance (Chen et al., 2010; Lee et al., 2013; Lai et al., 2014; Noruzy et al., 2013).

From a resource-based view, firms are encouraged to leverage their knowledge assets to build innovative structures that create strategic value (Gold et al., 2001). A strong KM strategy—covering acquisition, creation, sharing, and retention—is essential for driving organizational innovation (Robinson et al., 2006).

Based on the provided description, the research hypothesis is:

H2: KMC positively and significantly related to IMC

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THE RELATIONSHIP BETWEEN IMC AND SP

Innovation Management Capability (IMC) is widely regarded as a critical factor for organizations aiming to achieve a competitive advantage and long-term sustainable success (Liao et al., 2017; Phong and Lei, 2017). IMC involves the ability of an organization to effectively manage innovation processes, including idea generation, development, and implementation, which are key to driving sustainability. Limited studies have demonstrated the positive impact of IMC on SP (Zhang et al., 2019), highlighting that organizations with strong innovation management capabilities are better positioned to align their operational, social, and environmental goals.

Based on the provided description, the research hypothesis is:

H3: IMC positively and significantly related to SP

THE RELATIONSHIP BETWEEN KMC AND SP

Various researchers have highlighted the positive impact of KM on sustainable performance (Martinez-Falco et al., 2024; Al Koliby et al., 2022; Abbas and Sagsan, 2019; Lopez-Torres et al., 2019). Knowledge creation is essential for organizations to maintain a continuous competitive advantage, driving value creation, wealth, and sustainable growth. KM has the potential to transform how organizations compete by encouraging them to embrace social and environmental responsibilities while maintaining economic viability (Martins et al., 2019). In the context of sustainability, KM can be seen as a new business paradigm that fosters economic, social, and environmental sustainability (Abbas, 2020). Therefore, the development and enhancement of KM enables companies to effectively operationalize and implement sustainability principles (Caniglia et al., 2021).

Based on the provided description, the research hypothesis is:

H4: KMC positively and significantly related to SP

THE RELATIONSHIP BETWEEN TQM AND SP

Expanding TQM practices to incorporate sustainability, long-term survival, and growth is a natural progression of TQM research, especially in increasingly globalized economies (Fok et al., 2022; Agyabeng-Mensah et al., 2020; Bastas and Liyanage, 2018). Several studies highlight the positive influence of TQM on sustainable performance (SP) (Thanki and Thakkar, 2020; Khalil and Muneenam,

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2021). For instance, Khalil and Muneenam (2021) demonstrate that three TQM practices—strategic planning, process management, and human resource management—significantly and positively impact SP. Similarly, Nguyen et al. (2018) identified four quality management practices that have a strong positive effect on sustainability performance: top management support for quality management, design for quality, quality data and reporting, and continuous improvement.

Based on the provided description, the research hypothesis is:

H5: TQM positively and significantly related to SP

RESEARCH MODEL

Based on the above, the proposed research model that can be derived from the literature review presented above is as follows:

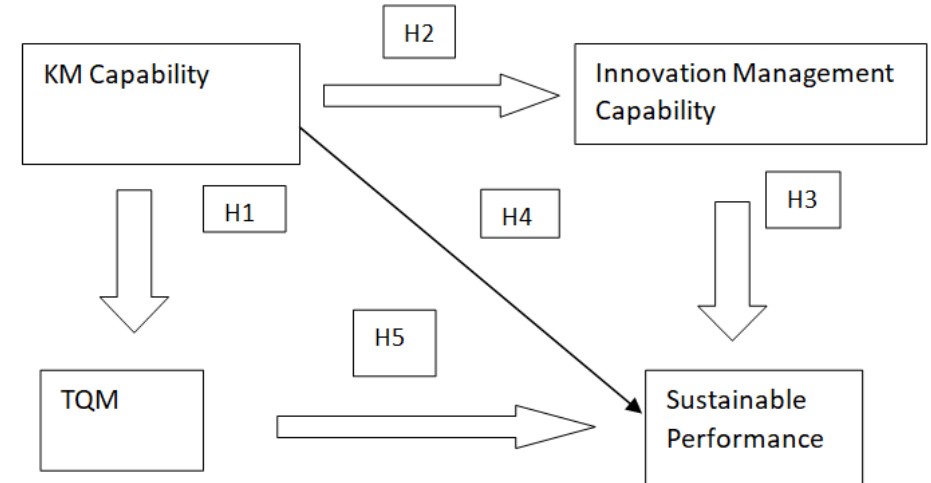


Figure 1. The proposed research model

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RESEARCH METHODOLOGY

THE RESEARCH DESIGN

This research aims to investigate the impact of KMC, IMC, TQM on SP in a construction sector. The focus of the research is the private organizations in the construction sector that use sustainable performance management methods and have innovation achievements.

For the aim of this research, we employed quantitative research methods and developed a structured online questionnaire with a 5-degree Likert scale (1: "I strongly disagree"–5: "I strongly agree") which we tested with the PLS-SEM method. The questionnaire's structure is described as follows: a) 20 questions for KMC (Xanthopoulou et al., 2023,2024) ; b) 15 questions for IMC (Xanthopoulou et al., 2023); c) 14 questions for SP (Akanmu et al., 2020); d) 19 questions for TQM (Xanthopoulou et al., 2024; Honarpour et al., 2018; Psomas et al., 2017).

THE SAMPLE

The above-mentioned questionnaire was delivered to 700 Greek private organizations in the construction sector that use sustainable performance management methods and have innovation achievement. We collected 254 full responses (a 36.29% response rate) from operations managers of the above-mentioned organizations. The data collection took place from December 2023 to February 2024, effecting the distribution of the questionnaire through the Google Forms platform.

VALIDITY ASSESSMENT

Data analysis was conducted using SmartPLS 3 and PLS-SEM to test the research model and hypotheses. Convergent validity was assessed via AVE, Cronbach's alpha, and composite reliability (CR), while discriminant validity was evaluated using the Fornell-Larcker criterion. Multicollinearity was checked using VIF (threshold < 3.33 or 5.0). We applied bootstrapping with 5,000 samples to test path significance and used the Stone-Geisser Q^2 test (omission distances 7 and 25 via blindfolding) to confirm the model's predictive relevance ($Q^2 > 0$).

RESULTS

The quantitative analysis was performed using SmartPLS 3, with Figure 2 illustrating the relationships among KMC, TQM, IMC, and SP. Convergent validity was confirmed, as all values met acceptable thresholds (Cronbach's alpha > 0.7, AVE > 0.5, CR > 0.7), and variable loadings exceeded 0.5.

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Discriminant validity was supported through the Fornell-Larcker criterion, and multicollinearity was not an issue, with all VIF values below 3.33.

Bootstrapping with 5,000 samples revealed that the path from IMC to SP ($\beta = 0.109$, $t = 1.869$, $p = 0.062$) was positive but not statistically significant. The relationship from KMC to IMC was both strong and significant ($\beta = 0.598$, $t = 12.841$, $p = 0.000$), as was the path from KMC to SP ($\beta = 0.208$, $t = 2.378$, $p = 0.017$). A similarly strong relationship was observed from KMC to TQM ($\beta = 0.634$, $t = 14.241$, $p = 0.000$), and from TQM to SP ($\beta = 0.440$, $t = 5.836$, $p = 0.000$), confirming their significant influence. These results support hypotheses H1, H2, H4, and H5, while H3 is only partially supported.

Further validation using blindfolding (omission distances of 7 and 25) showed Q^2 values of 0.199, 0.232, and 0.303, confirming the model's predictive relevance. One construct reached the minimum acceptable Q^2 value of 0, indicating overall model stability.

CONCLUSION

This research investigated the impact of KMC, IMC, and TQM on SP. The findings showed that KMC and TQM have a significant positive effect on SP, with TQM having the strongest impact, followed by KMC. IMC had a positive but weaker influence. These results are consistent with existing literature, supporting previous findings on the relationships among KMC, IMC, TQM, and SP (Shahzad et al., 2020; Permatasari et al., 2022; Pinzon-Castro et al., 2021; Akanmu et al., 2020; Xanthopoulou et al., 2024; Honarpour et al., 2018).

The originality of this study lies in its integrated framework, which combines KMC, IMC, TQM, and SP—an approach not previously addressed in a single model. By doing so, it contributes new knowledge to a relatively underexplored area and aligns with the context of the Fourth Industrial Revolution, where digitalization and technological change shape organizational strategy.

Practically, the findings provide valuable insights for business managers in the construction sector, offering guidance on how to implement knowledge, innovation, and quality management strategies to support sustainable development, especially during periods of economic or geopolitical instability.

However, the study has limitations. The sample size was relatively small and focused solely on the Greek construction sector, limiting the generalizability of the findings. Local cultural and organizational factors may also have influenced responses. Future research should involve larger,

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more diverse samples from both service and manufacturing sectors to validate and extend these findings across broader contexts

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CHILDREN'S GAME? CHALLENGES AND OPPORTUNITIES ASSOCIATED WITH USER EMOTIONS IN METAVERSE.

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ABSTRACT

This study explores the emotional implications and developmental opportunities within metaverse applications, using Roblox as a representative case study. The objective was to identify key challenges arising from user interactions in virtual environments. A qualitative analysis was conducted based on the experiences and perceptions of Roblox users, chosen for its relevance and prominence within the metaverse landscape. Data collection focused on capturing user insights to uncover behavioral patterns and emerging trends. The findings underscore the necessity of designing business strategies that leverage the social interaction potential of the metaverse while ensuring safe, conflict-free virtual spaces. By integrating theoretical frameworks with practical user-based insights, this research offers a comprehensive perspective that aligns technological evolution with user expectations and emotional responses. Although the analysis centers on Roblox, which may limit generalizability across all metaverse platforms, the study provides foundational insights into the broader dynamics of virtual interaction. The reliance on qualitative data introduces potential biases inherent in participant narratives, which should be addressed in future research. This study highlights the urgent need for clear behavioral policies and platform-specific guidelines to regulate user conduct in virtual environments. Equally important is the advancement of technological safeguards that enhance both security and the overall user experience. On a societal level, the metaverse presents transformative possibilities for human interaction, enabling novel modes of communication and collaboration.

Keywords: Metaverse, Virtual reality, Emotions, gamification, Challenges, Opportunities, User Experience.

INTRODUCTION

This study aims to explore the emotional and ethical challenges and opportunities associated with metaverse-based gaming applications, using Roblox as a case study. Specifically, the research

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examines how user behavior within these environments can generate insecurity, fear, and hate, while also identifying strategies to foster safe and inclusive virtual spaces.

One of the consequences of ongoing technological advancement is the increasingly blurred boundary between physical and virtual realities (Han et al., 2022). This technological evolution drives a continuous pursuit of novel forms of entertainment and interpersonal interaction (Zhao et al., 2022). Within this context, the metaverse emerges as a transformative paradigm, aiming to dissolve the barriers between real and virtual spaces to establish new modes of social engagement (Cheng, 2023a; Mancuso et al., 2023). Conceptually, the metaverse constitutes a digital environment where individuals engage in social and economic interactions via avatars, offering a parallel reality unbound by physical constraints (Huang et al., 2023; Koohang et al., 2023).

The rise of the metaverse as a platform for social development presents significant potential for new business models, innovative interactions, and immersive gaming experiences (Oh et al., 2023; Zuo and Shen, 2024). It enables the formation of shared digital spaces that facilitate communication, collaboration, and creativity among users and organizations alike. Gaming platforms, in particular, leverage this technology to create highly personalized and interactive experiences, tailoring services to users' individual preferences and behaviors (Palmucci et al., 2024; Zuo and Shen, 2024).

Despite these advancements, the integration of metaverse technologies also introduces complex ethical and emotional challenges. These include concerns related to user conduct, content moderation, and emotional well-being within virtual environments. By analyzing user-generated content on Roblox, this study identifies recurring emotional themes and behavioral patterns, shedding light on critical areas for intervention to enhance user safety and social cohesion in the metaverse.

THEORETICAL BACKGROUND

Definition and characteristics of the metaverse

The metaverse refers to a shared virtual space where users can interact with each other. This space is built around 3D simulations and virtual environments using virtual and augmented reality (AR) technologies (Kye et al., 2021). Users can explore these environments and create digital identities to interact with others (Rodrigues et al., 2024). The metaverse can also have a virtual economy system that allows users to buy and sell goods and services in a virtual world. (Mancuso et al., 2023). In addition, it includes the creation of new spaces and objects by users, allowing them to further customize their experiences (Zhao et al., 2022).

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The configuration of the metaverse may vary depending on the platform or the environment in which the user is working (Cheng, 2023a). This includes the choice of hardware and software platform to ensure a smooth experience in the metaverse through virtual or augmented reality devices. (Huynh-The et al., 2023). Security and privacy are also crucial in metaverse situations, as users may share personal information or collaborate with others online (Huang et al., 2023). In addition, user experience optimization is essential to ensure that the metaverse is an immersive and satisfying experience. This may include selecting the resolution and graphic quality, configuring motion controls, and configuring audio settings (Lee et al., 2021; Zhao et al., 2022).

Elements of the Metaverse

In the context of metaverse development, stakeholders fall into several categories (Koohang et al., 2023). First, users constitute the fundamental element of the metaverse as they interact with both other users and the virtual environment (Rane et al., 2023). These users can be individuals or groups and use the metaverse for different purposes such as entertainment, education, or work (Díaz et al., 2020).

Second, developers are professionals and companies in charge of creating and maintaining metaverse operations. Their responsibilities range from the design of the platform to the development of new features and functionalities, as well as the correction of bugs reported by users (Zabel et al., 2023).

Third, virtual asset owners are users who own digital assets within the metaverse, such as real estate, virtual objects, and non-fungible tokens. (Bamakan et al., 2022; Cheng, 2023b). These owners have the ability to buy, sell, and trade assets on the virtual platform.

Finally, companies can take advantage of the metaverse to promote their products or services and even establish a virtual presence that allows them to interact with their customers and employees effectively (Palmucci et al., 2024). Thus, metaverse is a powerful new technology with the potential to transform society and business.

Emotional and ethics aspects associated with the use of the metaverse in Games

Integration of the metaverse into the video game industry has created a complex ethical landscape (Dwivedi et al., 2022). This emerging technological phenomenon presents a number of moral considerations and social implications, ranging from game design and intent to player behavior and responsibilities (Gadekallu et al., 2023).

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User behavior in metaverse environments is determined by the confluence of technological, economic, and social factors that shape interactions in these virtual environments (Zuo and Shen, 2024). A particularly relevant aspect is the asymmetric distribution of gambling assets, in which a minority of players exercise disproportionate control over resources, raising questions about long-term sustainability and fairness in these virtual ecosystems. (N. Yao et al., 2023). In addition, player identity and real-world interactions, such as purchase decisions influenced by the perceived similarity between the user and their avatar, play a crucial role in players' self-perception and engagement within these virtual spaces. (Rane et al., 2023).

The distinctive characteristics of the metaverse, including its digitally mediated, immersive, and shared nature, significantly influence user behavior, thereby affecting consumer identity, social influence, and the notion of ownership within virtual ecosystems (Zhou, Chen and Jin, 2024). The appeal of digital assets in the metaverse, such as blockchain-based luxury NFTs, underscores the importance of psychological evaluation and risk assessment in consumer behavior, influencing decisions in global virtual markets (Konstantoulaki et al., 2024; Sung et al., 2023).

In parallel, game studies reveal a significant influence of financial incentives and game design on player engagement, often relying on a limited group of individuals to maintain ecosystem sustainability (Mandujano et al., 2021; N. Yao et al., 2023). Negative attributes of gamer behavior in the metaverse, such as threats to privacy and security, economic concerns, and addiction, underscore the need for ethical and responsible design and the use of virtual spaces (Albayati et al., 2023; Elsotouhy et al., 2024).

METODOLOGICAL DESIGN

We adopt a methodology based on the analysis of the Roblox Application. This analysis is based on a sentiment analysis of user reviews and ratings over the past year (Oh et al., 2023).

For our study, we collected data from the Roblox app on Google Play Store by dynamic web scraping using Python. We collected 34,326 reviews with ratings from users who rated the app with 1–5 stars from 2023 to 2024, focusing on the most relevant reviews based on their length and information. The approach adopted in this study combines qualitative and quantitative methods, inspired by Creswell and Plano Clarke's proposal. After cleaning and normalizing the comments, relevant topics were identified through lexical analysis and topic modeling (Creswell and Clark, 2017). Sentiment analysis was performed using the NRC lexicon, assigning sentiment scores, as suggested by Tidytext (Silge and

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Robinson, 2020). Visualization of results was carried out using bar charts and word clouds (Gandhi and Pruthi, 2020; Sharma, 2020; Wang et al., 2020).

Roblox Case Background

The online video game platform Roblox, created by David Baszucki and Erik Cassel in 2006, has evolved significantly since its launch, positioning itself as one of the leaders in the development of a new economy based on metaverses. Initially conceived as an educational and entertainment platform for young people, Roblox has grown into a dynamic virtual ecosystem that allows users to design interactive worlds and experiences (Danial Ibrahim, 2022).

The company's main goal has always been to build a "human co-experience" in which users can share immersive experiences without boundaries. This vision has been a key driver of the platform's success and has attracted an ever-expanding community (Sara Ferrer, 2023).

One of the outstanding features of Roblox is its robust virtual economy. Users can design, buy, and sell virtual items using virtual currency “Robux.” This economy has given rise to an active and thriving virtual trading community where users create and trade digital products from avatar clothing to game accessories (Oh et al., 2023). Additionally, developers have the opportunity to earn real money from their creations, turn their games into paid experiences, and share a portion of the revenue generated by the platform (Gautam Raturi, 2022).

FINDINGS

Sentiment Analysis with NRC

Examining the summary statistics of our sentiment data, we noted that most emotions have a low frequency and are generally low in our observations, with means close to zero. Interestingly, sadness and other negative emotions were more common and may be more intense, suggesting a trend toward the expression of negative emotions in our dataset (see Figure 1). On the other hand, joy and positive feelings are present, but to a lesser extent and with lower intensity. Surprises were the least frequent and least intense emotions.

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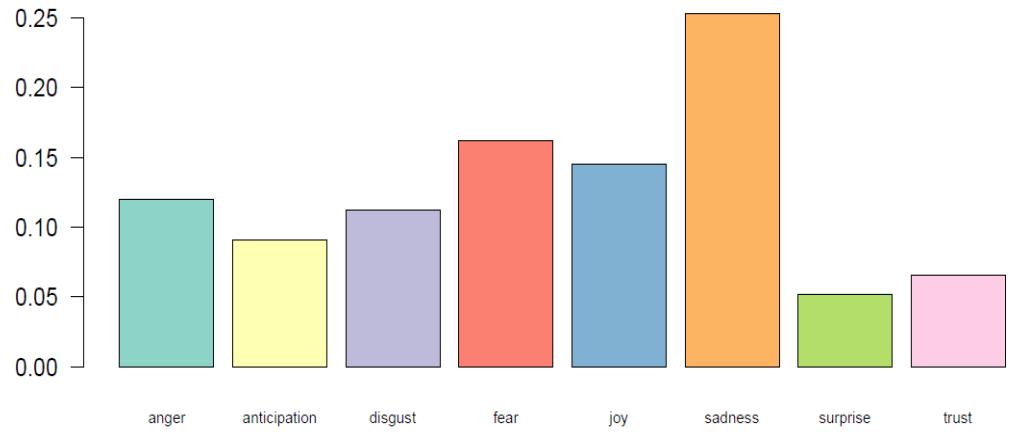


Figure 1. Emotions Roblox App Comments

Emotional Evolution Assessment with Syuzhet

To understand how these words evolved over time, we relied on the Syuzhet library (LaFave and Mainz, 2018). This tool allowed us to visualize the interaction between happiness and sadness tendencies associated with these themes during the study period. Using this method helps strengthen our understanding of emotional behavior over time (Rebora, 2023).

This detailed and simplified analysis provides a deeper understanding of emotional changes over time (see Figure 2). It is useful for understanding how sentiments evolve in different contexts such as social networks, product reviews, or narrative studies. This approach offers a valuable perspective for interdisciplinary research and practical application in various fields.

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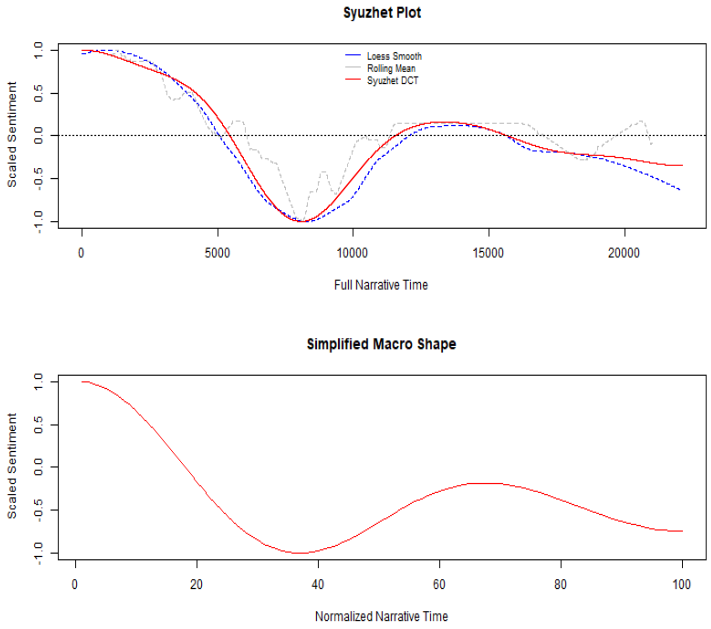


Figure 2. Emotional Evolution with Syuzhet

Interpretation of our data reveals an emotional narrative that begins with positive feelings but then decreases to a low point around the middle of the period studied. These feelings tend to increase slightly but stabilize at a lower level than at the beginning. Such patterns suggest correlations with specific events or themes mentioned in the data.

Happiness		Sadness	
Fun	Wonderful	Poor	Tired
Good	Comfort	Disconnected	Disappointing
Safe	Peaceful	Bored	Lost
Reward	Sincere	Error	Slow
Lively	Enjoy	Failure	
Pleasant	Quiet		
Loved	Freedom		
Anger		Trust	
Crazy	Complaint	Problem	Warning
Serious	Hate	Terror	Demanding
Wrong	Disgust	Pain	Doubt
Guilt	Offend	Danger	
Annoy	Block		
Taunt	Expel		
Fake	Irritating		
Injustice			

Table 1. Most frequent words associated with an emotion

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Table 1 lists the words most frequently associated with emotions. From this table, it is clear that sadness, anger, and confidence are conceptually related to the emotions that demonstrate problems in game interaction.

When evaluating the entire period from which information was extracted, we can appreciate the prevalence of sadness as a constant emotion. Fun oscillates and increases significantly during the last period analyzed (see Figure 3).

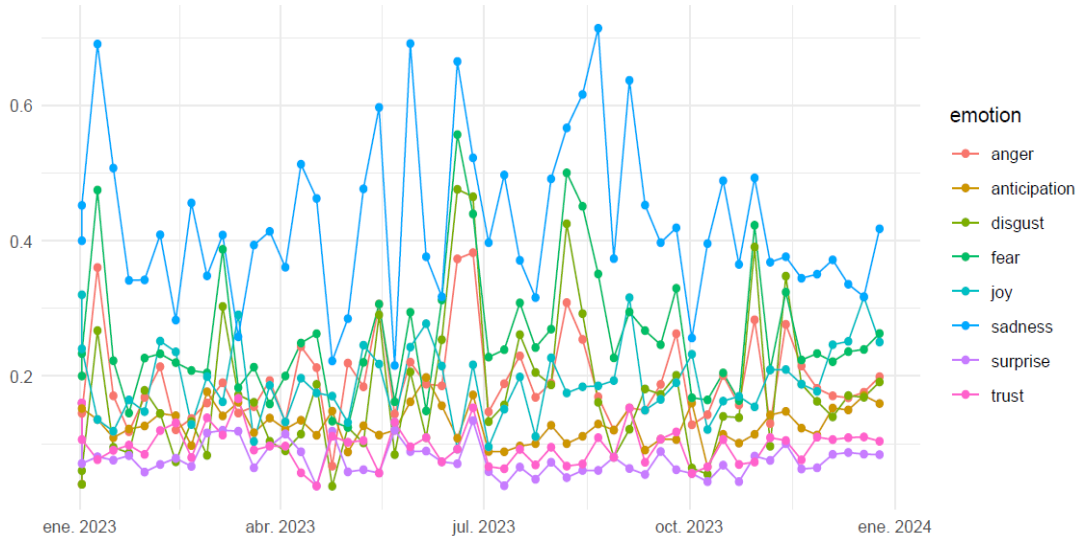


Figure 3. Evolution of emotions in the comments and ratings of the Roblox app.

Finally, based on the information gathered, we propose a conceptual model that indicates the main challenges and opportunities associated with these emotions that affect user experience.

Challenge 1: Security

Security in virtual environments constitutes a critical concern due to the emotional distress (such as fear and disgust) that users may experience, often resulting from incidents of harassment and verbal abuse mediated through avatars. Platforms like Roblox have reported such occurrences, which negatively impact users' emotional well-being, erode trust in the platform, and diminish active participation. Accordingly, the implementation of effective protective mechanisms is essential. One of the most effective strategies involves the deployment of behavioral filters capable of moderating interactions in real time. The effectiveness of these filters largely depends on their precision in detecting and blocking inappropriate content promptly. In addition to technological solutions, it is

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imperative to establish explicit and stringent policies regarding acceptable conduct within these platforms. User education plays a vital role in fostering awareness and promoting adherence to community standards.

Challenge 2: Hate Speech Control

Hate speech represents a significant source of negative user experiences within the metaverse, encompassing insults, threats, and various forms of harassment. The immersive and frequently anonymous nature of these environments exacerbates the prevalence of aggressive behavior.

Avatar customization, while enhancing individual expression and creative engagement, introduces substantial moderation challenges. The ability to create avatars that resemble other users increases the risk of identity impersonation, which can facilitate harmful interactions under the guise of familiarity and trust, thus compromising user safety. Platforms must actively cultivate a culture of respect and accountability by raising awareness about the detrimental effects of hate speech and the necessity of maintaining a secure and trustworthy environment.

Opportunity 1: Social Interaction

The metaverse holds considerable promise as a facilitator of positive social interaction. When adequately moderated, these platforms can serve as safe spaces for collaboration and innovation. In the context of education, virtual environments offer immersive learning experiences that surpass the physical constraints of traditional classrooms. Moreover, the metaverse has the potential to advance social inclusion and diversity by connecting individuals from varied backgrounds and capabilities. Such inclusive virtual spaces can foster empathy and mutual understanding. For instance, individuals with physical disabilities may interact in these environments free from the barriers encountered in the physical world.

Opportunity 2: New Business Models

The metaverse is poised to transform societal and business paradigms through a range of innovative applications. Businesses can develop virtual workplaces that enhance communication and collaboration among employees through avatars. These digital environments can replicate traditional office settings, facilitating meetings, brainstorming sessions, and team-building activities without geographic limitations. Multinational corporations, for example, could convene employees from diverse locations in virtual conference rooms, thereby reducing travel costs and improving operational efficiency.

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In the domain of advertising and marketing, the metaverse offers unique opportunities for immersive consumer engagement. Brands can design virtual experiences that capture attention more effectively than conventional media, while simultaneously generating valuable insights into consumer behavior and preferences.

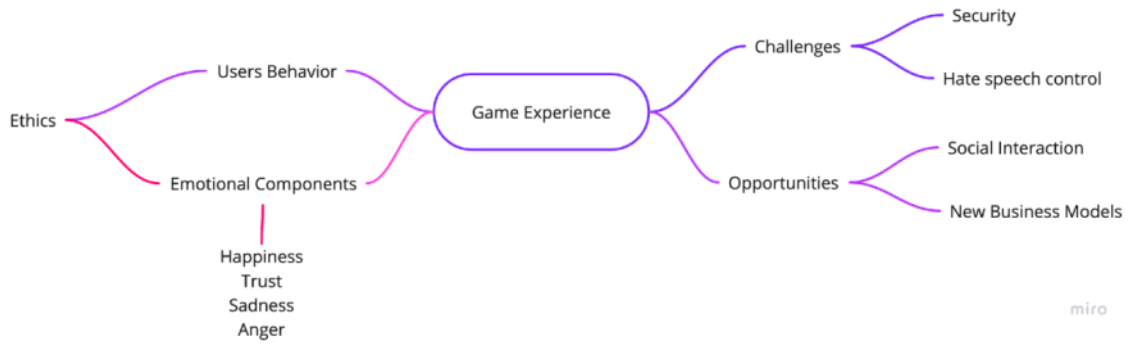


Figure 6. Challenges and Opportunities Metaverse Game Experience

DISCUSSION

Contributions

The user experience in a gaming context uncovers several threats in an ethical context (Wu et al., 2022). Thus, in the sentiments of Roblox users' rating comments, it can be seen that negative sentiments predominate over positive ones.

Safety in virtual environments is critical because of the negative experiences that users may face, such as harassment and abuse (Huang et al., 2023). Promoting violence-free virtual environments is essential for ensuring a positive and safe experience for users. In Roblox, incidents of harassment and inappropriate behavior have generated an unsafe environment. These problems not only affect users' emotional well-being but also diminish their trust in the platform (Xu et al., 2023).

Hate speech is a significant component of the negative emotions experienced by metaverse users. Avatar personalization, which is advantageous in terms of individual expression, presents challenges for detecting and preventing impersonation (Zhao et al., 2022). To mitigate these problems, it is essential to implement technologies and policies that can effectively identify and block hate speech. Automated moderation systems can analyze user behavior and detect offensive content in real-time (Acemoglu and Restrepo, 2018; Huang et al., 2023).

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Effective moderation of user interactions in metaverse environments is important for creating a safe environment (Oh et al., 2023). This not only creates a constructive space for collaboration and innovation but also promotes social inclusion and diversity (Zallio and Clarkson, 2022).

Implications

As for public policymakers, clear and mandatory standards for security on virtual platforms must be established, ensuring that all companies in the metaverse implement effective measures to protect users from harassment and abuse. To control hate speech and impersonation, laws that criminalize these online behaviors should be enforced to ensure that virtual platforms cooperate with authorities to identify and punish offenders. In addition, the adoption of identity verification systems in metaverse environments should be promoted to prevent user protection. The promotion of inclusion and diversity is another fundamental aspect. It is necessary to develop policies that encourage metaverse platforms to create inclusive and accessible spaces for all users regardless of their physical abilities or cultural backgrounds. In addition, awareness campaigns that educate users on the importance of inclusion and respect in virtual environments should be supported.

Limitations and Future Research Lines

The limitations of this study are related to the fact that the data correspond to the opinions of Roblox users; therefore, future studies should delve deeper into the perceptions of the participants of the metaverse. In addition, we raise the opportunity to further investigate these emotions through user interviews in future research.

It is crucial to investigate advanced AI algorithms that can detect and mitigate abusive behavior. In addition, the effectiveness of different moderation technologies and their limitations should be studied to understand how these systems can be improved to adapt to the constantly evolving behaviors of the metaverse. The psychological and social impacts of the metaverse should also be a priority area of research. It is critical to investigate how negative experiences in the metaverse affect the emotional and psychological well-being of users, and what strategies can mitigate these effects. In addition, it is important to study how the metaverse can promote social inclusion and diversity and how virtual dynamics can influence social interactions and perceptions of identity.

CONCLUSION

Metaverse is an emerging virtual world that, although still in its early stages of development, has the

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potential to revolutionize the way we live, work, and play. Companies that can successfully develop and implement metaverse-based solutions are strategically positioned to take advantage of the many benefits offered by this new technology. However, this potential also presents significant challenges that must be comprehensively addressed to ensure that the metaverse is an inclusive, safe, and equitable environment for all users. Virtual environments are not exempt from biases and discriminations that already exist in the real world. This is closely related to the social and interactive nature of the metaverse. If the designers of these environments are unaware of these issues, it is possible that virtual spaces will be created that not only reflect but also amplify these inequities, thus harming the user experience. Therefore, it is essential to adopt an inclusive and mindful approach for metaverse design and development.

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THE IMPORTANCE OF LOCATION IN HOSPITALITY ENTREPRENEURSHIP PROJECTS

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ABSTRACT

The location of a hospitality business is a critical factor influencing its success. This paper explores the strategic considerations involved in location decisions, including proximity to natural attractions, transportation networks, land costs, and the influence of government incentives. The research developed emphasizes how aligning operational practicalities, with market demand, can determine a project's profitability. Using the case of the hotel Africa Jade Thalasso, located in Korba, Tunisia, this research illustrates how a strategic location can transform underdeveloped regions into thriving tourism destinations. Korba, an agricultural and coastal town, offers unique advantages such as pristine beaches, affordable land, and excellent access to major airports, positioning it as an ideal investment location. This study also highlights the role of government incentives while promoting investment in underutilized regions. Finally, this paper's conclusions allow to suggest that the development of an appropriate location strategy, coupled with supportive policies, can increase profitability, enhance guest satisfaction, and drive regional economic growth. Furthermore, this paper is a contribution to entrepreneurs in the hospitality sector, which are advised and encouraged to perform thoughtful location evaluations to ensure sustainable success and optimized returns.

Keywords: Location strategy, hospitality entrepreneurship, regional development, emerging markets, government incentives, investment analysis.

INTRODUCTION

The success of hospitality entrepreneurship projects is strongly influenced by the choice of location. This paper examines the factors that determine location decisions, such as proximity to tourist attractions, transportation infrastructure, land acquisition costs, and government incentives. Through

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the case study of Africa Jade Thalasso in Korba, Tunisia, the research demonstrates how strategic location choices can turn underdeveloped areas into successful tourism hubs. Korba, a coastal and agricultural town, benefits from its unspoiled beaches, affordable land, and convenient location between two major airports.

This research also explores the role of government policies in encouraging investments in less-developed regions, which can help boost local economic growth. The findings suggest that a comprehensive location analysis, including financial, operational, and environmental factors, is essential for ensuring the success and sustainability of hospitality projects. By focusing on location, entrepreneurs can increase profitability, enhance the guest experience, and contribute to regional development, making it a key element in the hospitality industry's growth.

The objective of this research is to examine the critical role of location in the success of hospitality entrepreneurship projects. It aims to analyze the strategic factors influencing location choices, including proximity to tourist attractions, transportation accessibility, land costs, local regulations, and market demand. Additionally, the study evaluates how location decisions impact the financial viability of hospitality projects by examining their effects on daily rates, occupancy rates, operational costs, and return on investment (ROI). By utilizing the case study of Africa Jade Thalasso in Korba, Tunisia, the research demonstrates how strategic location choices can transform underutilized regions into thriving tourism hubs, generating broader economic and social benefits. Ultimately, the study seeks to provide a framework for integrating location analysis into business plans, offering practical insights for entrepreneurs to make informed decisions that drive sustainable growth.

THE CASES OF AFRICA JADE THALASSO AND THE RESIDENCE TUNIS

Location is one of the most critical determinants of success in hospitality projects. The strategic decision regarding where to place a hotel or resort can significantly influence financial performance, operational costs, and customer satisfaction. Studies indicate that location analysis involves multiple factors, including proximity to tourist attractions, accessibility to transportation hubs, local infrastructure, and the surrounding economic environment. These elements collectively impact occupancy rates, average daily rates (ADR), and ultimately, return on investment (ROI).

Research has consistently demonstrated that location is strongly correlated with financial outcomes in the hospitality sector. A study by Baker and Pizam (2014) explores how strategic location choices affect hotel profitability, focusing on the proximity to popular tourist destinations and transportation networks. Hotels located near high-demand areas typically experience higher occupancy rates and can charge premium prices, thus increasing revenue. Similarly, Liu et al. (2016) found that accessibility

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and market demand are key factors that influence the profitability of hotels, with well- positioned properties commanding higher ADRs and yielding better overall financial performance.

In the context of Africa Jade Thalasso in Korba, Tunisia, the strategic location of the hotel plays a vital role in its success. Korba, situated in Nabeul, an agricultural region with a rich natural environment, offers significant advantages such as pristine beaches and affordable land. These characteristics provide an attractive setting for hospitality investment. Similar to the region of Alentejo, in Portugal, which is known for its rural, yet scenic appeal, Korba benefits from low land costs while also being strategically positioned near two major airports. This combination of affordability and accessibility makes it an ideal location for attracting hospitality entrepreneurs, especially because they mainly work with bookings of all-inclusive packages from European tour operators.

Market demand is a critical consideration in location analysis. The specific type of hotel being developed influences how location affects financial performance. Luxury hotels often require locations close to high-end attractions or in premium areas, while budget hotels can be more flexible, benefiting from proximity to transportation hubs or regional centers rather than expensive tourist attractions. Boutique hotels, on the other hand, thrive in locations that offer unique or cultural experiences to attract niche markets.

Being Tunisia a good example of an emerging market, the authors considered the tourism sector and selected two cases of hospitality for examination, both located in the surroundings of Tunis, the capital city.

In the case of Africa Jade Thalasso, which will be the main focus of analysis on this paper, it is a resort-style hotel, with a location that aligns very well with the demand for all-inclusive holiday packages. Tourists booking such trips generally prioritize destinations with convenient transport access and reliable local amenities. These types of tourists are typically less concerned with the specific location within a city, as long as the hotel meets the requirements of their all-inclusive package. This is supported by studies like Dwyer and Forsyth (2008), who highlight that travelers purchasing packaged deals from agencies often opt for locations that are well-connected to major airports, reducing the importance of the destination's proximity to cultural or recreational centers.

Another key aspect of location analysis is understanding local competition and its effect on revenue and occupancy projections. A highly competitive market can lead to price wars and reduced profit margins, especially in saturated tourist areas. On the other hand, a location with limited competition may offer opportunities for a dominant market share. Smeral (2009) found that hotels in regions with high competition often need to differentiate themselves through unique value propositions, while those in less competitive areas can maintain higher prices without losing market share.

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Korba, being situated in a less developed, agricultural region, benefits from relatively low competition in the immediate area. However, the hotel's strategic location and affiliation with established tour agencies provide a competitive edge. The all-inclusive model in collaboration with European agencies ensures a steady flow of tourists, mitigating potential issues related to local competition. According to Hernandez et al. (2017), the all-inclusive model is especially successful in areas with limited direct competition, as it simplifies the decision-making process for tourists and guarantees consistent occupancy rates. In Korba, this model has played a pivotal role in establishing the hotel without worrying about competition

Government incentives also play a crucial role in location selection for hospitality projects. Many governments offer tax breaks up to 10 years with 0% tax payment, subsidies, and infrastructure support to attract investment in underserved regions. Cuccia et al. (2016) discuss how public policies and incentives can promote investment in less-developed areas, thus fostering regional economic growth. In Tunisia, for example, the government has provided various incentives for tourism projects, especially in regions like Korba, where infrastructure is still being developed to accommodate tourism. The combination of government support and the strategic location of the hotel has allowed Africa Jade Thalasso to thrive in a region that otherwise might have been overlooked.

Considering the Tunisian business framework, together with Korba's business environment, one can draw the SWOT Analysis of the importance of location for Africa Jade Thalasso's, from an entrepreneur point of view, as shown below, in Table 1.

STRENGTHS	WEAKNESSES
Improved security funds	Strict budgeting program
OPPORTUNITIES	**THREATS**
Low cost Governmental incentives	Accessibility Potential Negative Reviews

Table 1: SWOT Analysis of the importance of location for Africa Jade Thalasso, from entrepreneur's point of view

To further emphasize the importance of location in hospitality projects, this section provides a comparative analysis between Africa Jade Thalasso, in Korba, a rural, coastal location; and The Residence Tunis, in the capital city Tunis, i.e. an urban, metropolitan area. This comparison highlights how location influences various factors critical to the success of hospitality investments. Som in depth analysis is shown below, in Figure 1.

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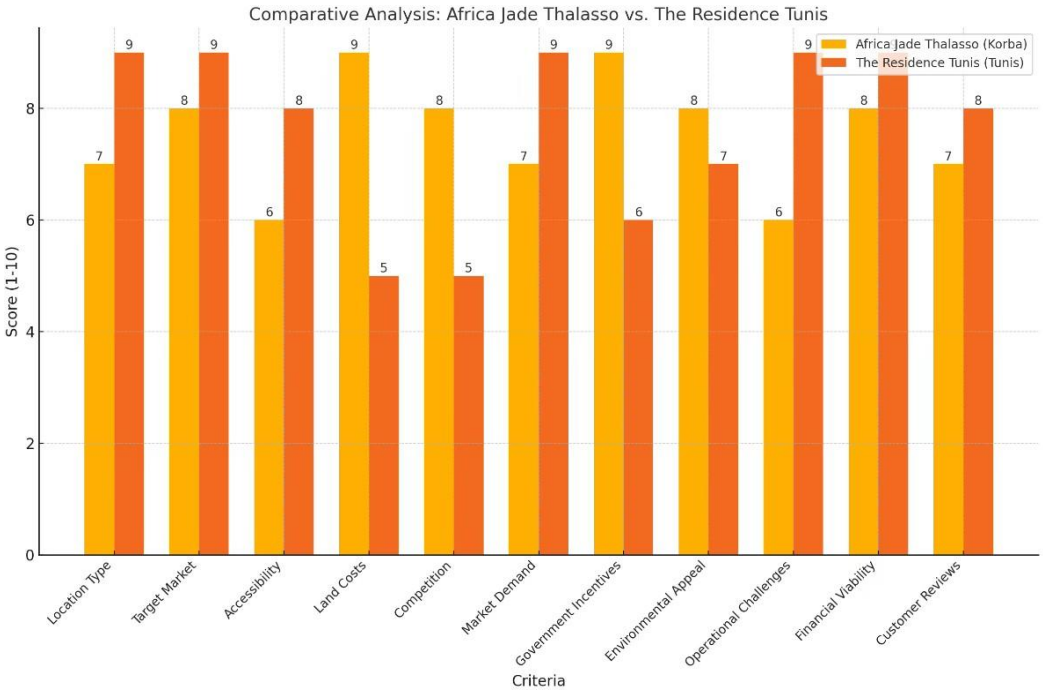


Figure 2: Comparative critical success criteria analysis: Africa Jade Thalasso vs. The Residence Tunis

Africa Jade Thalasso, located in the rural coastal town of Korba, benefits from pristine beaches, affordable land, and proximity to major airports. This strategic location enables the hotel to cater primarily to European tourists seeking all-inclusive holiday packages. The lack of direct competition in the area provides an additional advantage, allowing the hotel to maintain a stable market share with limited pricing pressure. Furthermore, the Tunisian government's incentives, including tax breaks and subsidies for rural development, significantly reduce financial risks for entrepreneurs investing in such areas (Cuccia, Rizzo, & Smeral, 2016). However, Korba's underdeveloped infrastructure poses challenges in accessibility and limits the availability of complementary services that could enhance the guest experience (Baker & Pizam, 2014).

Conversely, The Residence Tunis is situated in the bustling urban center of Tunis, offering a luxurious experience tailored to high-end tourists and business travelers. The metropolitan location ensures easy accessibility via international airports and well-developed road networks, providing convenience for guests. Urban settings also attract diverse clientele due to their proximity to cultural attractions, high-quality infrastructure, and broader service offerings. However, these benefits come at a cost. Land acquisition and operational expenses are significantly higher in urban areas, and intense competition necessitates continuous innovation and superior service quality to maintain profitability (Smeral, 2009). Additionally, government incentives are limited in urban regions, which are already economically active (Dwyer & Forsyth, 2008).

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The comparison between these two properties highlights distinct advantages and challenges associated with their respective locations. Africa Jade Thalasso capitalizes on its cost-effective rural setting, appealing to budget-conscious European tourists who prioritize tranquility and affordability over urban conveniences. Its business model aligns with the expectations of its target clientele, supported by the government's rural development initiatives. On the other hand, The Residence Tunis leverages the high demand for luxury accommodations and business facilities in an urban environment, albeit with higher operational costs and competitive pressures (Liu, Wei, & Zhang, 2016).

From a financial perspective, Africa Jade Thalasso benefits from lower initial investment requirements and consistent returns, driven by its all-inclusive model and supportive policies. Meanwhile, The Residence Tunis demands a substantial upfront investment but offers the potential for higher returns through premium pricing and diversified revenue streams (Hernandez, Kline, & Yeh, 2017). This contrast underscores the importance of aligning location choices with market segmentation and financial strategies.

Ultimately, this analysis demonstrates that no single location type is universally superior for hospitality projects. Success depends on aligning the property's offerings with the expectations of its target market and effectively navigating the specific challenges and opportunities presented by the location. Entrepreneurs must carefully evaluate their priorities—whether cost efficiency, exclusivity, or accessibility—and select a location that best supports their strategic objectives.

By examining both rural and urban settings, this comparative analysis provides practical insights into how location shapes the financial and operational dynamics of hospitality investments. These findings reinforce the critical role of thorough location analysis as a foundational step in developing sustainable and profitable hospitality ventures.

RESEARCH PROBLEM AND DATA

This paper aims to examine the impact of location on the success and financial viability of hospitality entrepreneurship projects. Specifically, we focus on the strategic decision-making behind location choices, assessing factors such as proximity to tourist attractions, accessibility, local competition, and financial outcomes such as revenue and ROI. The problem addressed is understanding how location affects the profitability and sustainability of hotel projects, including both successful and unsuccessful case studies. This analysis helps hospitality entrepreneurs make informed decisions about where to establish their businesses to maximize their potential for success.

The core research problem for this study is to understand the relationship between location and the financial performance of hospitality projects. The primary objective is to assess how various location

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factors—such as access to tourist attractions, transportation, and market demand—affect the financial outcomes of hotel investments.

Data Types: Qualitative and quantitative.

To address the research problem, we require both qualitative and quantitative data:

Qualitative data: Insights into location choices and their impacts, as well as customer experiences and feedback.

Quantitative data: Financial data, such as revenue, costs, ROI, and occupancy rates, to model the effect of location on financial performance is very important for the entrepreneur.

Data Types: Primary and Secondary

Primary Data: This data is collected firsthand by the researcher. In this study, primary data includes market surveys and customer reviews (e.g., TripAdvisor reviews), where travelers share their opinions on the quality of a location. These reviews often indicate whether the location is considered an advantage or disadvantage by customers. For instance, in the case of Africa Jade Thalasso, the hotel's strategic location in Korba, Tunisia, may receive positive reviews related to its access to pristine beaches and proximity to major airports. However, some reviews may indicate negative aspects of the area, such as being underdeveloped or lacking amenities, which can potentially impact the hotel's reputation and customer satisfaction.

Secondary Data: This data is collected from existing sources. Secondary data for this research includes industry reports, government publications, and research papers that provide information on the general factors influencing location decisions in hospitality. Also, case studies of comparable hospitality projects offered real-world examples of risk management strategies. These reports offer statistical information and insights into market trends, tourism growth, land costs, government incentives, and the competitive landscape in various regions.

METHODOLOGY

Data Collection Tools and Materials

The following tools and materials were used to gather the required data: Case Studies: We analysed successful and unsuccessful hotels in different locations, focusing on their financial outcomes and location choices. This method involved reviewing publicly available data on hotel performance, such as occupancy rates, revenue per available room (RevPAR), and financial reports. Market Surveys: Online surveys targeting hospitality entrepreneurs, managers, and guests were conducted to understand the perceived value of different locations. This data was used to evaluate the impact of location on guest satisfaction, occupancy rates, and the reputation of hotels in specific regions.

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Interviews with Financial Experts: To evaluate the financial viability and ROI of hotel projects based on location, we reached out to financial experts and hospitality consultants for their opinions on how location impacts a project's profitability. These interviews helped validate our hypotheses and provided insights into the economic factors that influence location decisions.

Methodology justification and limitations

The methodology adopted combines both qualitative and quantitative research approaches to provide a comprehensive understanding of location choices in the hospitality sector. By using case studies, we gain insights from real-world examples, helping to identify successful and unsuccessful location decisions and their financial outcomes. Market analysis tools allow for a deeper examination of location factors and their financial implications.

The use of both primary and secondary data adds value by combining real-time feedback from customers with pre-existing research findings. Customer reviews provide qualitative data that directly reflects guest satisfaction, while secondary data from industry reports gives a broader perspective on market trends and location-based factors.

The methodology employed is preferred over other approaches because it offers a comprehensive analysis by combining real-world case studies with expert opinions and customer insights. Unlike purely theoretical studies or models, this approach provides a practical perspective on how location choices affect hospitality businesses. It also allows for triangulation, where findings from different data sources are cross-verified for reliability.

During the research, several challenges were encountered, as e.g., Inconsistent Customer Feedback: Some customers' reviews on platforms like TripAdvisor contradict each other, with some praising the location and others criticizing it. For example, while some guests enjoy the tranquillity of Korba, others view it as underdeveloped. This inconsistency creates challenges in evaluating the overall impact of location on guest satisfaction. Furthermore, Access to Financial Data: Obtaining detailed financial data on hospitality businesses can be challenging due to privacy concerns and the competitive nature of the industry. This was mitigated by relying on expert interviews and public industry reports to gain insights into financial trends.

Despite the limitations and challenges, this methodology proved to provide a robust framework for evaluating the impact of location on the success of hospitality projects. By combining case study analysis, market analysis tools, and primary data collection, this approach offers a comprehensive understanding of the factors influencing location decisions. Despite some challenges, such as inconsistencies in customer feedback and limited access to financial data, the methodology is effective in providing actionable insights for hospitality entrepreneurs.

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DISCUSSION OF RISK ANALYSIS AND MITIGATION STRATEGIES

Risk management is a critical component of any hospitality project, particularly when location plays a pivotal role in the operation's success. For the Africa Jade Thalasso project in Korba, Tunisia, its location presents unique opportunities but also significant risks that could impact its financial and operational viability. Below, in Table 2, is shown an in-depth risk analysis with evidence-based proposals for mitigation of such.

1. Accessibility Risks: The underdeveloped infrastructure in Korba, including limited public transportation and road networks, may deter tourists. Although the property is near two major airports, inefficient connections between these airports and the resort could negatively affect the guest experience. Proposal: • Introduce private shuttle services from nearby airports, targeting group travelers and independent tourists (Baker & Pizam, 2014). • Collaborate with local government to improve road networks and signage around the region. • Negotiate with tour operators to include transportation in the packages offered to European tourists.
2. Market Demand Risks: The heavy reliance on European tourists and all-inclusive package deals makes the resort vulnerable to shifts in European market demand, economic downturns, or political instability. Proposal: • Diversify the guest profile by targeting North African and Middle Eastern tourists to reduce dependence on European markets (Dwyer & Forsyth, 2008). • Develop wellness retreats and eco-tourism initiatives to attract niche markets interested in sustainable and holistic experiences. • Implement dynamic pricing strategies that adapt to market changes and ensure profitability during low demand periods (Liu, Wei, & Zhang, 2016).
3. Competitive Risks: While Korba currently experiences low competition, increased development in the region could lead to price wars and reduced profitability in the future. Proposal: • Differentiate the property by enhancing its unique selling points, such as spa services, eco-friendly amenities, and local cultural experiences (Hernandez, Kline, & Yeh, 2017). • Develop strong branding and loyalty programs to ensure repeat business and positive word-of-mouth advertising. • Secure long-term partnerships with European tour operators to guarantee steady tourist inflows (Smeral, 2009).
4. Environmental and Climatic Risks: The resort's coastal location makes it susceptible to climaterelated risks, such as rising sea levels, coastal erosion, and weather patterns that may deter tourists during certain seasons. Proposal: • Invest in sustainable infrastructure, including renewable energy systems and ecofriendly waste management practices (Cuccia, Rizzo, & Smeral, 2016). • Create physical barriers such as seawalls to combat coastal erosion while maintaining the area's natural beauty. • Develop off-season packages, including wellness retreats and corporate events, to

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maintain occupancy throughout the year.
5. Financial Risks: Seasonal dependency and global economic uncertainties may lead to irregular cash flow, affecting the resort's financial stability. Proposal: • Establish alternative revenue streams, such as hosting local events, weddings, or corporate gatherings during low seasons. • Leverage government incentives like tax breaks and subsidies to reduce financial pressure (Dwyer & Forsyth, 2008). • Maintain a reserve fund to address unexpected operational or financial challenges (Baker & Pizam, 2014).
6. Reputational Risks: Negative reviews related to limited local amenities or perceived isolation could harm the resort's reputation on platforms like TripAdvisor. Proposal: • Actively monitor and respond to customer feedback on online platforms to address recurring complaints. • Enhance the guest experience through personalized activities, such as guided tours, cultural workshops, and adventure excursions (Hernandez, Kline, & Yeh, 2017). • Provide exceptional customer service through staff training and standardized operating procedures.
7. Political and Regulatory Risks: Changes in Tunisian tourism policies, tax regulations, or political instability could disrupt operations or increase costs. Proposal: • Build relationships with local government agencies to stay informed about regulatory changes and adapt quickly. • Diversify investments by expanding operations to other regions or markets to reduce reliance on a single property. • Engage in advocacy and lobbying efforts to ensure that tourism-friendly policies remain a priority for local and national governments (Cuccia, Rizzo, & Smeral, 2016).

Table 2: Risk Analysis and Mitigation Strategies.

Risk management is essential for the long-term success and sustainability of the Africa Jade Thalasso project. By addressing accessibility, market demand, competition, environmental, financial, reputational, and political risks, the resort can secure its operational and financial viability.

Implementing proactive mitigation strategies will enable the property to capitalize on its strategic location while minimizing potential vulnerabilities.

CONCLUSION

With this paper, we have explored the critical role that location plays in the success of hospitality projects. By examining the various factors that influence location choice—such as proximity to tourist attractions, transportation access, land costs, local regulations, and business or leisure hubs—we have highlighted how these elements impact key financial outcomes, including daily rates, occupancy rates, and operational costs.

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Our findings demonstrate that location is not only a determinant of demand but also influences the operational and financial feasibility of a project. Urban locations tend to offer higher potential for profitability due to increased demand and accessibility, though they come with higher costs and regulatory hurdles. In contrast, suburban or rural locations may offer cost advantages but require creative strategies to attract guests, such as targeting specific customer segments or adopting all-inclusive models.

The case of Korba in Tunisia, which 70% of customers are European tourists with an all-inclusive package, illustrates how strategic decision-making can mitigate location challenges and drive financial success, even in less developed areas. This reinforces the importance of aligning location with targeted market segments to ensure a project's financial viability.

Moreover, the comparative analysis between rural and urban hospitality projects underscores the need for tailored strategies. Urban locations offer immediate market access and higher demand but come with significant costs and competition. Entrepreneurs operating in such environments must focus on differentiation and creating unique value propositions to maintain competitiveness. On the other hand, rural ventures like Africa Jade Thalasso must capitalize on their natural appeal and niche markets, such as wellness and eco-tourism, to attract and retain guests.

By combining a strategic location analysis with proactive risk management and context-specific strategies, hospitality entrepreneurs can achieve not only profitability but also long-term sustainability. These findings emphasize that the success of any hospitality project lies in the careful alignment of location, market needs, and operational capabilities, ensuring a balance between exploiting opportunities and mitigating risks.

Overall, a thorough strategic location analysis is essential for any hospitality project. By understanding the interplay of location-related factors and their impact on financial metrics, developers can make informed decisions that maximize profitability and ensure the long-term success of their investments.

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FROM CODE TO CONNECTION: THE IMPACT OF SOCIAL-EMOTIONAL LEARNING ON ENGINEERING STUDENTS' WELL-BEING

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ABSTRACT

Social-Emotional Learning (SEL) has emerged over the past three decades as a foundational construct in educational psychology, child development, and school-based intervention research. In contrast to the vast amount of SEL programs and research results that show the benefits of embedding SEL programs in K-12 education, there is a research gap in forming and evaluating such programs in higher education.

In this work, we ran a semester-long SEL program in our undergraduate "Introduction to Programming for Engineers" course, where the students had to do and submit a weekly assignment. Extensive well-being measures in the form of the PERMA-Profiler measure were collected before and after the course, and the results were compared to a control group that did not participate in the SEL program.

Our main result showed that the class participating in the SEL activities showed significantly higher results in their well-being measures. In addition, we also saw that their loneliness measures were reduced in comparison to the control group.

The implications of our results in the context of business and management are very much in line with the "happy worker–productive worker" thesis. Thus, our successful experience in an academic setting can be implemented in work environments and combined with other existing well-being programs.

Keywords: Social-Emotional Learning, Well-being, Teaching

INTRODUCTION

Social-Emotional Learning (SEL) has emerged over the last few years based on worldwide social, cultural, and economic changes. These changes and the rise of SEL were consequential to the emerging distinction between cognitive competencies and social and emotional skills. Broadly defined, SEL describes a framework that focuses on the individual's ability to understand, express, and control emotions in a way that will contribute positively to educational and social contexts.

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Currently, almost all the literature on SEL programs has shown methods and frameworks that were implemented in K-12 education. Specifically, a review of more than 200 school-based SEL initiatives, encompassing 270,000 students, found notable improvements in attitudes, behavior, and academic achievement (Durlak *et al.*, 2010). In contrast to the vast amount of SEL programs and research results that show the benefits of embedding SEL programs in K-12 education, there is a research gap in forming and evaluating such programs in higher education.

One such program that tried to tackle this was presented in (Gallagher and Stocker, 2018) The authors presented a full semester SEL program that required the students to perform a SEL task on a weekly basis and submit a report on it. However, as noted by the authors in (Stocker and Gallagher, 2019) the main limitation of their study was the lack of a control group. A limitation that we were able to rectify in this work as we had the opportunity to teach two similar classes during the same semester: one class participated in the SEL program, while the other did not.

The main goal of the research was to evaluate whether incorporating the SEL program suggested in (Gallagher and Stocker, 2018) would improve the well-being of the students. To do so, we adopted their SEL program and applied it to the undergraduate "Introduction to Programming for Engineers" course in the Industrial Engineering and Management Department. The well-being of the students was evaluated using a more robust measure than the one used in (Gallagher and Stocker, 2018), the PERMA-profiler (Butler and Kern, 2016). Our main result showed that the class participating in the SEL activities showed significantly higher results ($p < 0.05$) in their well-being measures.

The implications of our results in the context of business and management are very much in line with the "happy worker–productive worker" thesis, which posits that employees who experience higher levels of job satisfaction tend to be more productive in the workplace. This idea, rooted in organizational psychology, suggests that positive emotions and a sense of well-being at work can lead to increased motivation, better performance, and reduced turnover (Nielsen *et al.*, 2017; Vanhala and Tuomi, 2006; Wright and Cropanzano, 2000). Thus, our successful experience in an academic setting can be implemented in work environments and combined with other existing well-being programs (e.g., Page and Vella-Brodrick, 2013; Williams et al., 2018) as a means to increase performance and motivation in the organization.

LITERATURE REVIEW

The formalization of SEL as a distinct field occurred in the mid-1990s with the establishment of the CASEL organization in the US in 1994 (“https://casel.org/”, n.d.). CASEL’s “Five Core Competencies”

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framework—self-awareness, self-management, social awareness, relationship skills, and responsible decision-making—has since guided both program design and empirical evaluation.

In K–12 education, SEL programs are increasingly being implemented in a structured manner, supported by a growing body of empirical research. A review of more than 200 school-based SEL initiatives found notable improvements in attitudes, behavior, and academic achievement (Durlak *et al.*, 2010). Research, including a comprehensive review by Wigelsworth et al. (2016), shows that students who participate in SEL programs experience attitudinal shifts such as enhanced self-efficacy, a stronger sense of belonging, increased trust and respect for teachers, heightened academic motivation, and better stress management. Behaviorally, these students tend to exhibit more prosocial behavior, greater classroom engagement, increased participation in constructive extracurricular activities, lower levels of aggression and conduct issues, reduced substance use, and fewer suicide attempts. Academically, they also show notable gains in subjects like math, language arts, and social studies, and higher overall achievement scores.

In contrast to the vast amount of SEL programs and research results that show the benefits of embedding SEL programs in K-12 education, there are very few similar programs that were formed and evaluated in the context of higher education. The authors of (Gerdes, 1994) showed that emotional and social adjustment have been found to predict college student attrition as well as, or even more accurately, academic adjustment items. In (Wang *et al.*, 2012) the authors showed that exposure to a SEL curriculum during the first semester at college may contribute to developing social and emotional competence in students. The authors of (Smith *et al.*, 2021) showed that undergraduate students who took a positive psychology course showed improved well-being compared to their peers who took other psychology courses. A dissertation from 2023 (Gill, 2023) concluded that when instructors, faculty, and professors work together to provide emotional support, students perform better academically and have a lower rate of failure or dropout. Another dissertation (Hurtado, 2020) examining the application of SEL frameworks in higher education concluded that the relationship between social-emotional skills and student outcomes is complex and not fully captured by traditional measures of achievement, highlighting the need for further research and more comprehensive frameworks.

The most comprehensive SEL for higher education program that was implemented and evaluated is published in (Gallagher and Stocker, 2018; Stocker and Gallagher, 2019). The authors presented a semester-long program based on tenets of social-emotional learning. During the semester, every week, 46 students (mostly females, 76%) from the Statistics for Social Sciences course completed activities

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that were meant to reduce stress and anxiety. The results showed significant improvement in students' ability to appraise stressors as positive challenges, rather than threats. However, their ability to cope with stressors and their levels of math anxiety did not show improvement.

METHODS

Participants

Participants were first-year undergraduate students from the university's Industrial Engineering and Management Department. The 71 students were enrolled in an "Introduction to Programming for Engineers" course and were divided into two study groups. One group studied on Tuesdays and was used as the control group (45 students, 25 Females, 20 Males, Average age = 22). The other group studied on Thursdays and participated in the SEL activities (26 students, 18 Females, 8 Males, Average age = 22).

Two important notes concerning the participants: (1) The selected course, "Introduction to Programming for Engineers", is notoriously known for being the most challenging course in the first year of studies. This course is very time-consuming (4 hours of lecture and 2 hours of recitation per week); its average grade is around 60 (out of 100), and around 40% of the students fail in the first exam. (2) 17 additional students were enrolled in these classes but were omitted from the analysis because they either did not fill out the pre- or post-questionnaire or decided not to participate in the (elective) SEL activities.

The SEL project

In the semester's first meeting, we explained the SEL project to the students. The SEL project comprised 12 weekly activities that the students would complete and submit to the course website for review. The student received a small grade bonus of 5 points for participating in the project, and they can decide for themselves if they wish to opt out at any time. Participating students needed to perform and submit all the weekly assignments to receive the bonus. They can choose to pass on a single assignment by submitting a "Free Pass" token as their weekly assignment.

The selection and construction of the weekly SEL activities were based on the guidelines published in (Gallagher and Stocker, 2018). Each activity was outlined in a paper-based handout comprising five main sections. These sections covered the activity's benefits, supporting empirical evidence, the social-emotional learning activity itself, the required documentation to confirm completion, and additional

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resources for further information. Most activities were adapted from the Greater Good in Action (GGIA) Curriculum Guide, produced by the Greater Good Science Center (at the University of California, Berkeley). These activities are all research-backed activities meant to increase meaning and happiness in one's life (see Appendix A for a sample of a weekly assignment).

Each week, we took 10-15 minutes from the class to discuss the idea behind the weekly activity, how it connects to SEL, and the instructions for what they needed to submit. We often discussed the previous week's assignment and got some reflections from the students in class. After completing each activity, students submitted either a brief, guided reflection piece (around one paragraph) or a component of the activity they completed (if appropriate). The submissions were meant to hold students accountable for completing the activity without being burdensome.

Assessment Measures

The assessment measure that was used in the experiment was the PERMA-Profiler (Butler and Kern, 2016). The PERMA-Profiler is a psychological assessment tool designed to measure well-being based on Martin Seligman's PERMA model (Seligman, 2011), which includes five core elements: Positive Emotion, Engagement, Relationships, Meaning, and Accomplishment. The measure consists of 23 items assessing the five pillars of well-being and additional dimensions such as negative emotion, health, loneliness, and overall well-being. Respondents rate items on an 11-point Likert scale, providing a comprehensive snapshot of their psychological functioning. The PERMA-Profiler has demonstrated good psychometric properties, making it a widely used instrument in positive psychology research and applied settings.

The five pillars of the PERMA model are the following:

1. Positive emotion (P) – Emotions can be negative or positive. Numerous reviews support the value of positive emotion across a range of life outcomes. Example item: "*In general, how often do you feel joyful?*".

2. Engagement (E) – Engagement in positive psychology focuses on flow, in the organizational domain on vigor, dedication, and absorption, while in the academic context, it includes behavioral, cognitive, and other educational domains. Example item: "*How often do you become absorbed in what you are doing?*"

3. Relationship (R) – numerous papers show the connection between social support and ties to reduced depression and psychopathology, better physical health, lower mortality risk,

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healthier behaviors, and other positive outcomes. Example item: "*To what extent do you receive help and support from others when you need it?*"

4. Meaning (M) – A sense of meaning has been defined in terms of having direction in life, connecting to something larger than oneself, feeling that one's life is valuable and worthwhile, and having a purpose in what one does. Meaning has been linked to better physical health and higher life satisfaction. Example item: "*In general, to what extent do you lead a purposeful and meaningful life?*"

5. Accomplishment (A) - Accomplishment involves a sense of working toward and reaching goals, mastery, and efficacy to complete tasks. Competence is a core basic human need, and superior performance is often recognized and acknowledged in Western societies. Example item: "*How much of the time do you feel you are making progress towards accomplishing your goals?*"

Alongside the 15 items for the five main pillars, three additional items were meant to assess the degree of negative emotions (N), such as "*In general, how often do you feel anxious?*". Three additional items were meant to assess self-perceived physical health (H), such as "*In general, how would you say your health is?*". Two additional items assessed one's loneliness (Lon) and happiness (Hap) values. The overall computation of the PERMA score is the mean of the 15 main items and the general happiness question.

RESULTS

The goal of the study was to examine, for the first time, in a scientifically controlled manner, whether the SEL framework presented in (Gallagher and Stocker, 2018) will improve the well-being of undergraduate students. Our analysis was based on the PERMA-profiler measures that were distributed before and after the course took place.

Impact of SEL activities on students' PERMA measure

Both study groups completed the PERMA questionnaire in the first and last weeks of the semester. Table 1 presents the descriptive statistics results of the post-class PERMA questionnaire for group A (the control group).

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Measure Control	Mean (A) pre	SD (A) pre	Mean (A) post	SD (A) post	t-value	P-value
P	7.06	1.38	7.33	1.31	-0.89	0.37
E	7.65	1.2	7.58	1.24	0.27	0.78
R	7.65	1.5	7.89	1.27	-0.78	0.43
M	7.53	1.69	7.31	1.63	0.60	0.54
A	7.37	1.15	7.14	1.43	0.82	0.41
PERMA	7.45	1.1	7.37	1.17	0.30	0.76

Table 1. Results of the pre- and post-questionnaires, Control group

As we can see, the results of the pre- and post-questionnaire did not show any difference in any of the six measures. It is safe to conclude that the control group did not exhibit any significant change in their well-being measures.

Table 2 shows similar statistics for the treatment group, and we can see a significant increase in the overall PERMA value between the pre- and post-measures. The pre-measured value was 7.1, and the post-measured value was 7.75, which amounts to a significant difference (independent two-sample t-test, $t = -3.2$, $p < 0.01$). Additionally, we can see that not all the individual components of the PERMA measure showed significant improvement. While the Engagement (E), Relationship (R), and Accomplishment (A) showed significant improvement ($p \leq 0.01$), the Positive emotions (P) and sense of Meaning (M) showed improvement but did not pass the statistical significance test due to the large standard deviations.

Measure Treatment	Mean (B) pre	SD (B) pre	Mean (B) post	SD (B) post	t-value	P-value
P	7.05	1.17	7.47	1.21	-1.53	0.129
E	7.15	0.85	7.95	0.9	-3.45	0.002*
R	7.00	0.70	7.50	0.75	-2.50	0.010*
M	7.29	1.49	7.71	1.15	-1.22	0.22
A	6.9	0.75	7.6	0.8	-3.00	0.004*
PERMA	7.1	0.8	7.75	0.85	-3.20	0.003*

Table 2. Results of the pre- and post-questionnaires, Treatment group

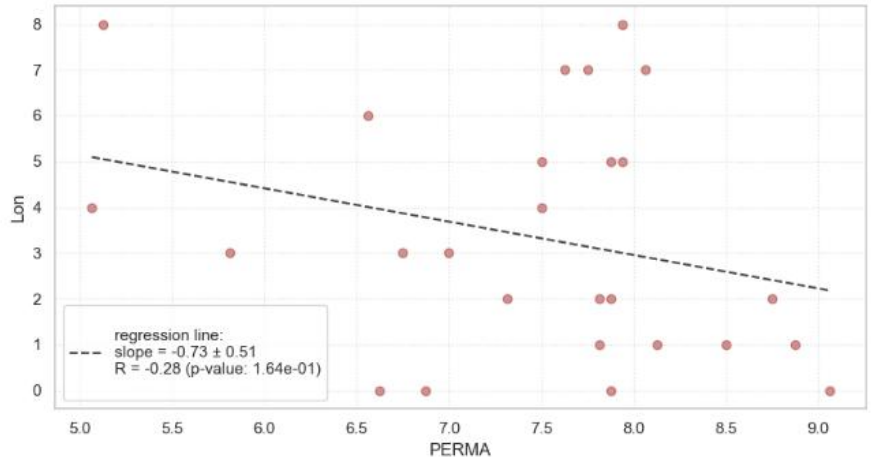
Looking at the general Happiness question (Hap), we can observe a decrease in the happiness values between the beginning and the end of the semester, regardless of whether the SEL program was implemented in class. The mean values were (Mean(B) pre = 7.93, Mean(B) post = 7.32), with deviation values of (Std(B) = 1.51, Std(B) = 1.56), and no statistically significant difference. The only conclusion we can draw from this measure is that our students were less happy at the end of the semester. This is probably related to the fact that the programming course is hard and time-consuming, and the

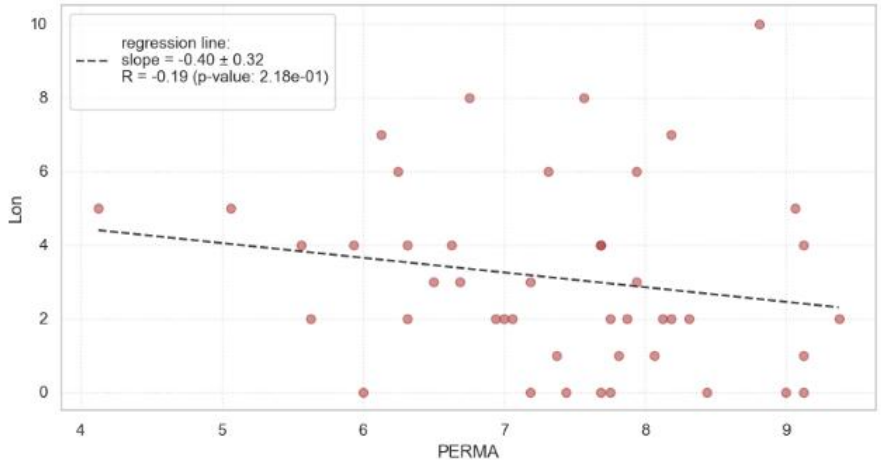
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students are now more concerned about the exam than they were at the beginning of the semester. Even such SEL activities could not overcome the decrease in happiness.

Predicting Loneliness through PERMA measures

Though not explicitly part of the PERMA measure, the loneliness question was added as a self-reflection on one's loneliness in daily life. The mean values of both groups were low in comparison to the other questions on the board (Mean(A) = 3.03, Mean(B) = 3.34), and the standard deviations were





considerable (Std(A) = 2.37, Std(B) = 2.63). Therefore, we cannot conclude differences concerning one's loneliness measure. With that in mind, we wanted to explore whether we can predict the students' feelings of loneliness based on their PERMA measures. To do so, we conducted a regression analysis on the control and treatment groups to explore the connection between PERMA and Loneliness values.

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Figure 1 and Figure 2 present the regression lines, the slope, R value, and p-value. There is a slight negative correlation between one's PERMA value and the Loneliness value, and we can see that as the PERMA value increases, the Loneliness value decreases. We can also see that even though the correlation is low to medium in the treatment group (R = -0.28 vs R = -0.19), it was not statistically significant.

As the overall PERMA value was not highly successful in predicting the Loneliness value, we explored whether any of the individual components of the PERMA could show a better correlation and predictive abilities to the Loneliness value. We explored the individual components, and while most did not improve the overall PERMA value, we did see that the Relationship (R) component showed a medium-strong correlation to Loneliness values. Figure 3 and Figure 4 show the regression lines for the Relationship component in both groups: the control and treatment groups. The control group shows a low-medium correlation with R = -0.26 and $p < 0.1$, and the treatment group shows a medium-strong correlation with R = -0.43 and $p < 0.05$. These results show that the PREMA values post-intervention, and specifically the Relationship component, can be used to predict the student's Loneliness value with reasonable accuracy.

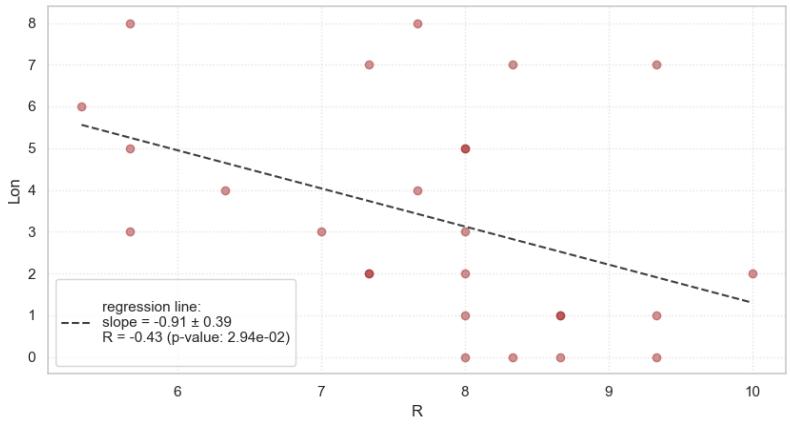


Figure 3 - Regression line for the Relationship (R) value in the treatment group

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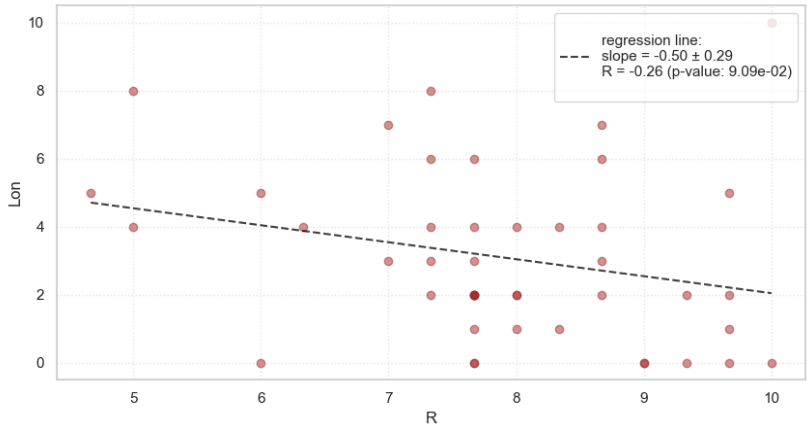


Figure 4 - Regression line for the Relationship (R) value in the control group

DISCUSSION

The results of our controlled experiment showed, for the first time, that implementing an SEL program in academic education does improve the well-being of the participants. Our results showed that the overall PERMA value was significantly increased in the treatment group and remained unchanged in the control group.

In addition, some of the feedback received from the students was touching and impactful. As each student had to submit a personal reflection on their weekly activity, some of the submissions described meaningful experiences that caused the student to reflect deeply about various aspects of their life. On top of that, almost every week, I was personally approached after class by a few students who wanted to share their experiences, and sometimes reflected on life-changing experiences that occurred following the weekly assignment. I never experienced such a deep connection with my students in my 15 years of teaching courses (of various levels, departments, and universities). The implication of the SEL project was broader than what could be measured in the PERMA questionnaire.

In the second analysis of the results, we tried to predict the loneliness (Lon) value first through the overall PERMA value and then through its individual components. It is well known that loneliness has a significant negative impact on well-being (Erzen and Çikrikci, 2018). It is associated with increased risks of mental health issues such as depression, anxiety, and stress, as well as physical health problems like weakened immune function, cardiovascular disease, and even premature

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mortality. Overall, loneliness undermines both emotional resilience and life satisfaction, making it a serious public health concern.

It was surprising to find out that the PERMA value was not a very strong predictor of the Lon trait. However, the Relationship (R) component in the PERMA measure proved to be highly successful in predicting loneliness. While the correlation between both values is not very surprising, it does provide a way to predict and treat extreme cases of loneliness in class. In addition, as the Relationship proved to be significantly improved via the SEL program (mean pre = 7, mean post = 7.5, P = 0.01), we now have a way to impact and improve the loneliness values of the students. This result also hints at the importance of addressing the in-class relationships among the students as a way to improve their overall well-being.

CONCLUSIONS

Since its inception, the educational notion of Social-Emotional Learning has strived to improve the lives of its students. The SEL process was meant to develop social skills, emotional control, decision-making, relationship management, and many other individual traits that improve overall well-being.

While a substantial amount of research shows the advantages of applying SEL methods and techniques to schools of younger children (denoted as K-12 education in the US), the current literature is very much lacking in similar research oriented towards adults in academic settings (college or university level education). The program presented in (Stocker and Gallagher, 2019) is a complete course SEL intervention program grounded in psychological research and has shown promising results when implemented in a selected course at Thiel College and the University of Wisconsin in the US. However, the main limitation of the abovementioned SEL program was that there was no control group in their experiments. A limitation that we were able to overcome in our experiment.

Overall, our main result in this paper is that applying the SEL program in the treatment group was successful. The post-experiment questionnaire results showed a significant improvement in the overall PERMA-profiler measure, a well-established measure of one's well-being. The significant improvement was a byproduct of significant improvements in three of the five main pillars of the PERMA measure: Engagement (E), Relationship (R), and Accomplishment (A). Positive emotions (P) and Meaning (M) values also showed improvement, but did not pass the significance test (it might be that a larger sample set is needed).

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Another important observation from the results was the analysis that the PERMA and, specifically, the Relationship component can be used as a predictor of one's Loneliness value. It is well known from the literature of Positive Psychology that feelings of Loneliness are one of the main predictors and factors of depression and anxiety (Erzen and Çikrikci, 2018; van Winkel *et al.*, 2017). Our results show that the SEL activities that aim to improve the PERMA values of the participants will also decrease the level of Loneliness and consequently reduce the amount of depression experienced by them.

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APPENDIX A – A SAMPLE ACTIVITY

Here is an example activity from the SEL project given in the fourth week (the description is a shortened version due to space constraints).

Activity # 4 – Dealing with stress

- **Why is this activity essential for me?** We all experience stressful events from time to time in our lives. We also understand from various research in the last couple of years that a stressful life directly impacts our health. However, a new study in the field also shows that stressful events might not have a negative impact – it depends on our perspective. If we believe we have all the necessary resources to cope with stress, we might see the event as a challenge and an opportunity to grow and prosper. In this activity, we will learn how to reframe stressful events in a way that will positively impact our performance and general well-being.

- **Why does it work?** By framing our interpretation of stressful events, we can use stress as a tool to enhance our performance. For example, stress releases chemicals like Adrenaline that help us think faster. Stress also increases our heart rate, and more glucose reaches the brain to improve performance. It is very much about the framing of the event and how we deal with it.

- **What do I need to do? (time required: ~30 minutes)** Do the following steps to complete this activity:

  (1) Watch a TED talk by Dr. Kelly McGonigal titled "How to make stress your friend."

  (2) Think of a stressful event that might occur soon (next couple of weeks) that you feel stressed about.

  (3) Think of yourself at the same event. How would you feel? Which emotions or physical sensations are you expected to feel? Write them up and think about how you can describe these emotions differently, in a way that will benefit you.

  (4) When describing a stressful event, do you consider it a threat or a challenge? If a threat, let's try to reframe it. Describe, in a few sentences, times in your lives when you managed to cope successfully with stressful events. Now, think whether you have available resources or abilities currently not in place to cope with the

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stressful event. If it is a challenge, let's try to understand it. Describe, in a few sentences, what resources or abilities allowed you to cope with it successfully?

- **What do I need to submit?** Submit what you wrote on steps 2 to 4 above.

- **What if I want to know more?** Refer to the following paper. Jamieson, J.P., Peters, B.J., Greenwood, E.J. and Altose, A.J., 2016. Reappraising stress arousal improves performance and reduces evaluation anxiety in classroom exam situations. *Social Psychological and Personality Science*, *7*(6), pp.579-587.

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BOOK OF CONFERENCE ABSTRACTS

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ENTREPRENEURIAL ECOSYSTEM'S ROLE IN SHAPING FEMALE ENTREPRENEURIAL SUCCESS AMID INSTITUTIONAL VOIDS

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ABSTRACT

Entrepreneurship has long been celebrated as a catalyst for economic empowerment and social transformation, particularly in developing economies where structural unemployment and informality dominate labor markets. Conceptualized as an agentic and emancipatory force, entrepreneurship is frequently positioned as a pathway to autonomy and resilience, especially for marginalized populations (Acs et al., 2017). However, this optimistic narrative frequently obscures the socio-institutional constraints that delimit entrepreneurial possibility—constraints that are particularly acute for women in conservative, patriarchal societies. Entrepreneurship does not unfold in an institutional vacuum; it is embedded in webs of formal rules, informal norms, and cultural logics that shape who can participate, under what terms, and to what effect (North, 1990).

In deeply patriarchal contexts such as Pakistan, Iran, and Afghanistan, female entrepreneurship constitutes not merely an economic pursuit but a sociopolitical act—a defiant repositioning of gendered space, legitimacy, and authority (Brush et al., 2019). These women navigate what feminist institutionalists have called "gendered institutional voids"—spaces where formal institutions (e.g., finance, legal rights) are weak or exclusionary and informal norms (e.g., family control, mobility restrictions) uphold male dominance (Mackay et al., 2010). The result is a structural double bind in which women must simultaneously build ventures and contest the legitimacy of their very participation in public economic life (Al-Dajani et al., 2015).

The entrepreneurial ecosystem (EE) framework has gained prominence as a systems-level perspective to understand how entrepreneurship is nurtured or stifled within specific spatial, cultural, or sectoral contexts (Spigel, 2017). EEs comprise a complex interplay of institutions, networks, financial systems, and support infrastructures operating at the macro, meso, and micro levels (Stam & Spigel, 2017). Yet, despite its theoretical sophistication, EE research has largely overlooked gender as a structuring force—often assuming that a well-functioning ecosystem will automatically serve all entrepreneurs equally. This gender-neutrality is deeply problematic in contexts where patriarchal norms interact with institutional voids to reproduce gendered exclusions (Brush et al., 2019).

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This study addresses this critical gap by investigating how institutional voids moderate the relationship between entrepreneurial ecosystems and female entrepreneurial success in three high-relevance contexts: Pakistan, Iran, and Afghanistan. Drawing upon institutional theory and feminist institutionalism, the research interrogates how formal institutions, informal norms, and their intersections shape women's experiences within entrepreneurial ecosystems. It situates entrepreneurship not as a neutral field of opportunity but as a contested terrain where power, gender, and legitimacy are constantly negotiated.

This research aims to answer the following research questions.

1. How do women entrepreneurs in Pakistan, Iran, and Afghanistan access and experience different components of the entrepreneurial ecosystem?

2. What institutional voids—formal and informal—do they encounter, and how do these shape their entrepreneurial outcomes?

3. To what extent do institutional voids moderate the relationship between ecosystem support (finance, networks, services) and female entrepreneurial success?

4. How do differences in institutional environments across the three countries affect these dynamics?

This study will adopt a cross-sectional quantitative research design. Data will be collected through structured survey instruments administered to women entrepreneurs in Pakistan, Iran, and Afghanistan. The sample will include women engaged in both formal and informal enterprises, capturing a range of business types, sectors, and stages.

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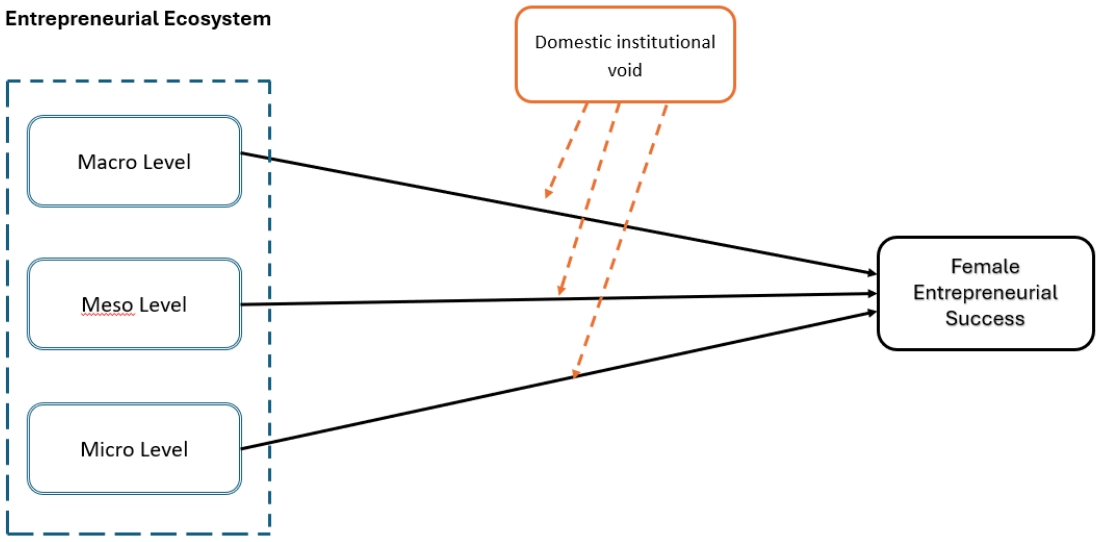


Figure 1. Conceptual Framework

Data analysis will employ hierarchical regression and structural equation modeling to examine the moderating effects of institutional voids on the relationship between ecosystem quality and entrepreneurial outcomes. Country-wise disaggregation will enable comparative insights.

This study will significantly enrich feminist institutional theory by empirically validating the concept of "gendered institutional voids" and demonstrating their dynamic effects on entrepreneurship. It also contributes to the entrepreneurial ecosystem literature by embedding gender as a critical analytic lens, positioning institutional voids as not merely environmental weaknesses but as relational exclusions shaped by power, culture, and gender (Mackay et al., 2010). Finally, by focusing on three under-researched Global South contexts, the study offers a much-needed departure from Eurocentric EE models, advancing a more pluralistic and situated theory of entrepreneurial ecosystems.

The findings will inform gender-sensitive entrepreneurship policy across development agencies and national governments. Recommendations will include: Reforming financial systems to eliminate male guarantor requirements and introduce collateral-free credit schemes for women (Khan et al., 2020). Creating women-only incubators and training programs, particularly in regions where mixed-gender spaces face cultural resistance (Brush et al., 2019). Engaging religious and community leaders to build cultural legitimacy for women's entrepreneurship (Tajeddini et al., 2020). Developing legal frameworks that enforce women's property and business rights, supported by enforcement mechanisms.

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For ecosystem practitioners, NGOs, and support organizations, this research will offer concrete strategies to support women entrepreneurs in patriarchal contexts: Invest in digital platforms that provide mentorship, e-commerce access, and peer networking—particularly useful where mobility is restricted. Design capacity-building programs that integrate psychological capital development alongside technical skills. Build cross-sector coalitions to advocate for inclusive ecosystem development that considers both formal and informal barriers.

To conclude, entrepreneurial ecosystems hold immense promise as vehicles for inclusive economic growth. However, in patriarchal societies marked by institutional voids, ecosystems cannot be assumed to be gender neutral. Without deliberate, gender-conscious design and reform, even the most sophisticated ecosystems may replicate the very exclusions they seek to dismantle. This study argues that only by confronting and restructuring the gendered institutions at the heart of ecosystem design can women's entrepreneurship evolve from survival to sovereignty. It is a call not merely for more entrepreneurship, but for just entrepreneurship.

Keywords: Entrepreneurial Ecosystems; Female Entrepreneurship; Emerging Markets; Institutional voids

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BLOCKCHAIN TECHNOLOGY ADOPTION IN WINE AND OLIVE OIL SUPPLY CHAINS: A CASE STUDY ANALYSIS THROUGH THE LENS OF DIFFUSION OF INNOVATION THEORY

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ABSTRACT

INTRODUCTION

The growing demand for transparency and traceability in agri-food supply chains is accelerating the adoption of emerging technologies such as blockchain technology (BCT). BCT offers immutable, decentralized, and transparent records that enhance trust among stakeholders (Pattanayak et al., 2024; Silvestri et al., 2023). While BCT adoption is growing, the extent and effectiveness of its implementation vary across different industries and companies.

The wine and olive oil industries, characterized by complex supply chains and high vulnerability to fraud, can significantly benefit from BCT (Parry et al., 2024; Bianchini et al., 2024; Sabbagh et al., 2025). However, the adoption process is influenced by multiple factors, including technological awareness, costs, perceived benefits, and regulatory pressures (Malik et al., 2022; Galati et al., 2021). Understanding these factors is crucial for evaluating how and why companies integrate BCT into their operations.

The Diffusion of Innovation (DOI) theory (Rogers, 2003) is adopted in this study to examine BCT adoption among selected wine and olive oil companies. By analyzing case studies, this research explores the key drivers, barriers, and outcomes of blockchain adoption.

RESEARCH AIM

The primary aim of this research is to analyze the adoption of BCT in wine and olive oil companies using the Diffusion of Innovation (DOI) theory. Specifically, the study seeks to: (1) Identify the factors influencing BCT adoption in the selected companies; (2) Examine the perceived advantages and challenges associated with BCT implementation; (3) Evaluate the level of adoption; (4) Provide recommendations for facilitating BCT diffusion in the agri-food sector.

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METHODOLOGY

This study adopts a qualitative multiple case study approach, which is suitable for exploring contemporary phenomena in depth within their real-life context (Yin, 2009). Using a multiple case study approach enables researchers to determine whether a finding is unique to one specific case or consistently appears across several cases (De Massis et al., 2015). The unit of analysis is individual wine and olive oil companies that have implemented BCT in their supply chain operations. Data were collected through semi-structured interviews, which allowed for both a clear structure and the flexibility to explore relevant topics across different cases (McIntosh & Morse, 2015). The analysis is based on the DOI theory that explains how innovations spread within industries. The five key stages in the adoption process are:

- **Knowledge** – Awareness of BCT and its potential benefits.

- **Persuasion** – Evaluation of BCT's relevance and perceived advantages.

- **Decision** – Commitment to adopting BCT after assessing feasibility.

- **Implementation** – Integration of BCT into business operations.

- **Confirmation** – Continued use or discontinuation based on outcomes.

This study places particular emphasis on the overall adoption process, starting from whether companies had prior knowledge of BCT, through to how their perceptions evolved, decisions were made, and implementation was managed. While awareness is necessary to trigger interest, it is during the persuasion phase that firms begin to assess BCT's relevance, value, and alignment with their specific operational, cultural, and strategic contexts. The five attributes of innovation identified by Rogers (2003) - relative advantage, compatibility, complexity, trialability, and observability - play a central role in shaping these evaluations. The Decision phase sheds light on how companies assessed the feasibility and strategic fit of BCT before committing to adoption, while the Implementation phase highlights the practical challenges encountered during the integration of BCT into business operations (Moraes et al., 2025). This comprehensive perspective allows for a deeper understanding of how these perceived characteristics influence the decision to adopt BCT, highlighting both the motivations and potential barriers faced by firms in these sectors. The Confirmation stage was not considered in the analysis, given that an adequate period has not yet passed since adoption of BCT by investigated companies.

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RESULTS

The results of the study illustrates that the motivations for adopting BCT include improving transparency, traceability, and sustainability, while also enhancing market positioning, product value, and consumer trust. Challenges encompass high implementation costs, resource constraints, the need for external collaboration, organizational complexity, and difficulties in measuring direct economic benefits. The benefits of BCT adoption are seen in better communication of product quality and origin, increased consumer trust, enhanced reputation and brand image, product differentiation, improved market penetration, stronger competitive positioning, and greater process efficiency. The results are summarized in the table 1.

DOI phases	How It Relates to BCT Adoption in Wine & Olive Oil Companies	Findings from Case Studies
Knowledge	Awareness of BCT and understanding its potential benefits.	- Most companies had limited or no knowledge of blockchain prior to first exposure. - Initial awareness was often raised through external partners, trade fairs, or sectoral networks. - Early knowledge linked blockchain mainly to traceability and anti-counterfeiting.
Persuasion	Evaluation of BCT's relevance and perceived advantages.	
Relative Advantage	The extent to which BCT is perceived as better than existing systems.	- Enhancing transparency, traceability, authenticity, and sustainability. - Strengthening market positioning and increasing product value. - Combating counterfeiting and improving supply chain integrity.
Compatibility	The degree to which BCT aligns with existing values, past experiences, and needs of adopters.	- BCT aligns with consumer demand for transparency and sustainability. - Supports storytelling and building customer trust. - Facilitates foreign market penetration, especially for premium products.
Complexity	How difficult blockchain is to understand and implement.	- High implementation costs and resource constraints. - Organizational complexity in integrating BCT.

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Trialability	The extent to which companies can experiment with BCT before full adoption.	- Difficulty in isolating direct economic benefits. - Uncertainty about return on investment limits willingness to trial.
Observability	The extent to which benefits of BCT are visible to others.	- Better communication of product origin and quality. - Enhanced consumer trust, brand image, and corporate reputation. - Product differentiation and added value attract competitors' attention.
Decision	Commitment to adopting BCT after assessing feasibility.	- Decision influenced by market differentiation needs and perceived competitive advantages. - Engagement in pilot projects before full adoption. - Availability of external technological support for solving organizational complexity was critical in final decision-making.
Implementation	Actual integration of BCT into business operations.	- Implementation faced challenges such as resource constraints, technological complexity, and need for training. - External collaboration (with IT providers or consortiums) was essential. - Early adopters focused on integrating BCT for traceability, certification, and marketing purposes.

CONCLUSION

BCT offers significant potential for improving transparency and trust in the wine and olive oil industries. However, adoption is influenced by perceived advantages, compatibility with existing systems, complexity, ability to trial, and visibility of successful cases. The DOI framework provides a robust theoretical basis for understanding BCT diffusion and highlights key barriers to adoption. Future research should explore quantitative measures of BCT impact and investigate strategies to overcome complexity and trialability constraints.

Keywords: Blockchain, Wine, EVOO, Supply Chain, Diffusion of Innovation Theory, Multiple Case Study.

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ONLINE SHOPPING MADE EASY? EXPLORING THE EFFECTS OF PANDEMIC-TRIGGERED INTERNET SELF-EFFICACY

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ABSTRACT

The COVID-19 pandemic led people worldwide to develop essential online shopping skills, boosting their internet self-efficacy and comfort with digital activities (Shaw *et al.*, 2022). While offline shopping resumed and nearly returned to pre-pandemic levels post-lockdown (Brüggemann and Olbrich, 2023), the digital habits formed during the pandemic may still influence online shopping intentions by improving attitudes and perceived behavioural control. Despite this, there remains a significant research gap, as theoretical models and empirical evidence have yet to capture these effects fully.

Existing intention models, such as the Theory of Reasoned Action and the Theory of Planned Behaviour (TPB), offer a foundation for exploring how technology-related beliefs intersect with the typical factors considered when modelling intentions. TPB's emphasis on behavioural beliefs as antecedents of intentions creates an opportunity to consider technology-related factors, particularly those that facilitate individuals' ability to use internet technologies conveniently and easily. These factors include personal beliefs about self-efficacy in using the internet and perceiving this as an easy task, which points to perceived ease of use, a factor typically employed in the technology acceptance model (TAM) (Davis, 1989; Lim and Ting, 2012). Although this type of modelling follows rather strong logic, it is not yet supported by empirical evidence. To address these gaps, this study integrates self-efficacy theory (Bandura, 1986), TPB, and TAM to examine how internet self-efficacy and perceived ease of use influence attitudes and behavioural intentions toward online shopping.

Based on post-pandemic data (1,586 respondents) from the US and Lithuania, it was revealed that the internet self-efficacy developed during the COVID-19 pandemic has a lasting impact on consumers' intention to continue shopping online. This study, therefore, extends the application of the self-efficacy theory by demonstrating that confidence gained in using online technologies during a crisis continues to influence attitudes, perceived ease of use, and behavioural control in the post-pandemic period. The findings show that perceived ease of use mediates the relationship between internet self-efficacy and attitude, as well as between internet self-efficacy and perceived behavioral control. Additionally, cross-country comparisons revealed that US consumers scored higher across all study

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constructs than Lithuanian consumers, likely due to greater technological infrastructure, a more established e-commerce culture, and higher pre-pandemic familiarity with online shopping.

This study makes significant contributions to the literature on technology adoption and its relation to self-efficacy theory and post-pandemic consumer behaviour. From the managerial perspective, it offers several practical implications for e-commerce businesses. Since internet self-efficacy strongly influences perceived ease of use, attitudes, and behavioural intentions, businesses should focus on building user confidence through intuitive website design, simple navigation, and accessible support such as live chat or tutorials. Moreover, the mediating role of perceived ease of use highlights the need for a seamless, fast, and user-friendly shopping experience to foster positive attitudes and a sense of control. Lastly, continuously collecting customer feedback and adjusting the online store website or app design based on customer preferences can further strengthen customers' attitudes and even online shopping intentions.

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Keywords: COVID-19, online shopping, internet self-efficacy.

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EMPLOYEES' OCD (OBSESSIVE-COMPULSIVE DISORDER) AND ITS IMPACT ON ORGANIZATIONAL OUTCOMES

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ABSTRACT

This study examines how a leader's obsessive-compulsive disorder (OCD) affects their leadership effectiveness, with a focus on leadership style and decision-making. The model incorporates employee trust in both the leader and the organization as mediators, while employee attachment style moderates these relationships.

Leaders with OCD exhibit specific behavioral patterns that influence their leadership style. OCD is characterized by intrusive thoughts (obsessions) and repetitive behaviors (compulsions) aimed at reducing anxiety. These traits can manifest in leadership as extreme perfectionism, a high need for control, and a strong focus on detail and order. While these characteristics may lead to a structured and highly disciplined work environment, they can also result in micromanagement, inflexibility, and an aversion to uncertainty. Consequently, leaders with OCD may gravitate toward an authoritarian or transactional leadership style, which emphasizes rules, procedures, and performance monitoring. Conversely, their meticulous attention to detail and strong work ethic could also foster a transformational leadership style in certain contexts, particularly when their perfectionism translates into high standards and a commitment to continuous improvement.

OCD impacts decision-making processes by increasing risk aversion and causing over-analysis. Leaders with OCD may occasionally struggle with making decisions due to excessive doubt and fear of making mistakes, leading to delays in decision-making. Their heightened focus on potential risks and errors may result in more conservative, data-driven decisions that prioritize accuracy over speed. However, this can also be a strength in industries where meticulous planning and attention to detail are crucial. On the downside, an excessive need for certainty can stifle innovation and agility, limiting a leader's ability to respond dynamically to change.

Employee trust in the leader and the organization mediates the relationship between the leader's OCD and their effectiveness. When employees perceive the leader's meticulousness and commitment as beneficial, trust in the leader increases, fostering a stable and high-performing work environment.

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However, if the leader's compulsive behaviors lead to rigidity, excessive control, or unpredictability, trust may erode, reducing team cohesion and overall effectiveness.

Similarly, trust in the organization plays a key mediating role. If employees believe that the organizational structure supports their leader's meticulous approach (e.g., through clear processes and strong quality control mechanisms), they may feel more secure and aligned with the leader's vision. In contrast, if the leader's OCD-related behaviors create an environment of stress or uncertainty, trust in the organization may diminish, which leads to lower engagement and performance.

Employee attachment style influences how individuals respond to leaders with OCD. Employees with a secure attachment style, who are generally comfortable with structure and authority, may interpret an OCD leader's behavior as a sign of dedication and reliability, strengthening their trust in the leader and the organization.

However, employees with an anxious attachment style may react negatively to an OCD leader's control-oriented behavior, perceiving it as excessive scrutiny or unpredictability. This could lead to increased stress and decreased trust. Similarly, employees with an avoidant attachment style, who value autonomy, may resist the leader's micromanagement tendencies, potentially undermining their trust in the leader and the organization.

This research model highlights the complex interplay between a leader's OCD, leadership effectiveness, and employee trust, while considering the different moderating effects of attachment style. Understanding these dynamics can help organizations support leaders with OCD in optimizing their strengths while mitigating potential challenges, ultimately fostering a more effective and trust-based leadership approach.

There is existing research focusing on employees with OCD and how it affects their job performance, absenteeism, and workplace stress. On the contrary, there is little research exploring leaders with OCD and how their traits shape their leadership styles, team dynamics, and decision-making. Our contribution brings forward a unique angle by positioning leaders as the focal point, offering valuable insight into how mental health conditions in leadership roles can uniquely influence organizational culture and performance. Furthermore, trust is a well-established predictor of team performance and satisfaction, but it's has rarely been studied as a mediator between a leader's clinical traits and their leadership effectiveness. Our model adds depth by showing how employee trust mediates the impact of a leader's OCD on overall effectiveness. Lastly, individual differences in how employees interpret

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or respond to leaders with OCD traits have not been explored in literature. By introducing attachment style as a moderator adds a psychological lens to understanding why some employees thrive and others struggle under OCD-driven leadership in this study.

Keywords: Obsessive Compulsive Disorder, leader effectiveness, trust in employee, trust in organization, attachment styles, anxious, avoidant, dismissive, secure

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QUALITY TOURISM, HOSPITALITY, AND ITS IMPACT ON ECONOMIC DEVELOPMENT: A CASE STUDY OF LAS VALERAS (CUENCA, SPAIN)

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ABSTRACT

This research focuses on analyzing the significant role that the development of tourism can play in revitalizing the economy of small towns. It is a line of research that is particularly interesting in countries whose economies are highly dependent on tourism, such as Spain. As will be discussed in this work, the role of tourism can even be multiplicative if careful and continuous management is applied over time. To illustrate the economic relevance of tourism in small towns, the economic development of a small village located in La Mancha will be analyzed. Specifically, the impact of tourism on Las Valeras (Cuenca) will be examined since the late 20th century, observing how its economy has been greatly revitalized due to several factors: its natural environment, its historical-artistic and intangible heritage (based on the diversity of festivals and its rich gastronomy), which are very attractive to both national and international tourism (Tirado Zarco, 2005).

Building on these ideas, this research has been divided into several sections. First, the historical evolution of this village is addressed; then, the valuation of the natural and environmental surroundings (Sotelo Navalpotro, 2008), the tangible and intangible heritage of the locality, and the values of its inhabitants are analyzed; this allows for the main results and conclusions to be drawn. The analysis of tourism development in Las Valeras is carried out, among other things, by addressing the Strategic Plan implemented by the Town Hall of the locality (Organización Mundial del Turismo, 1999), which includes, among other actions: new forms of promotion (notably the use of the Internet and social media); and the constant improvement of infrastructure (including sustainability (López López and Esteban Curiel, 2011), conservation, and rehabilitation of historical and artistic heritage (Ayuntamiento de Las Valeras, 2024), such as the ruins of the Roman city of Valeria, a key part of its tourist significance in the region, along with its natural surroundings and the variety of sports that can be practiced, such as hiking, canoeing, climbing, etc.). Furthermore, the study of this village's heritage is divided into three main sections: natural, historical-artistic, and intangible related to celebrations and commemorations (Holy Week, Moors and Christians Festivities, etc.). There is also an analysis of the strategies implemented for tourism development and the awareness and involvement of the inhabitants.

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To achieve this, the methodology employed focuses on both primary sources (in particular, testimonies from owners of accommodations, restaurants, bars, and shops) and secondary sources of information (supplemented by various tourist guides and books about this village, magazine articles, and research papers).

Several aspects underlie the interest in studying the role of tourism as an engine of economic development in this village. Firstly, the evolution of tourism marketing in this village has transitioned from ignorance of effective strategies and promotion to the elaboration and implementation of a Strategic Plan for tourism, which is also sustainable in nature, allowing for a significant improvement in results and the achievement of proposed objectives. Secondly, the Town Hall approaches the strategic plan with the awareness that tourism does not follow a constant line but is rather seasonal, and that the celebration of festivals and commemorations has a significant impact on the increase in the number of visitors. However, it is true that the attraction of historical-artistic heritage favors the arrival of tourists interested in culture throughout the year. In fact, Las Valeras is internationally known for the ruins of the Roman city of Valeria.

As recommendations for management, this work highlights the wide range of possibilities for the development of tourism in Las Valeras, considering the benefits for the natural environment, the recovery of natural areas, and environmental awareness. In terms of the socioeconomic aspect, the diversification of activities and the revaluation of local production, the creation of jobs, and increased income have been considered, among others. Additionally, the improvement of the village's facilities and infrastructure has been taken into account (Orduna Luna, 1999). Undoubtedly, the benefits in the cultural sphere and the opening of new markets for agricultural, livestock, and artisanal products are also significant.

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Keywords: tourism, hospitality, economic development, heritage, environmental surroundings.

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CASASIMARRO, THE SPANISH TOWN OF GUITARS: A CASE STUDY FOCUSED ON FAMILY BUSINESSES DEDICATED TO THE ARTISANAL MANUFACTURE OF GUITARS

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ABSTRACT

This research focuses on the transformation of Casasimarro, a town in the province of Cuenca, situated in the region of Castilla-La Mancha (Spain), which, over the centuries, has gained significant popularity and economic importance This is primarily due to the recognition and fame, both national and international, that it has acquired from a substantial milestone in artisan guitar manufacturing. With this purpose, the present investigation provides new information to illustrate how this craft has been consolidated from the 18th century to the present day. It begins by describing how the pioneer was D. Alfonso Anselmo Alarcón in the 18th century, whose work gave rise to a dynasty of guitar makers that eventually branched into two new lineages: Carrillo and Leal.

The analysis of the development of Casasimarro from a sociodemographic and economic perspective focuses on guitar manufacturing throughout the past centuries, allows us to conclude its importance beyond mere economics, as this town has achieved national and international prestige and fame based on the artisan activity of its guitar makers. For this reason, we delve into the three families of guitar makers: Alarcón, Carrillo, and Leal, along with their marketing and distribution strategies. The latest generations of the Carrillo and Leal families have not only significantly improved the quality of the instruments they manufacture but have also crossed national borders, taking their products to various countries across all five continents (Leal Pinar, 2005).

Several aspects underlie the interest in studying how this small town expanded due to the business of artisan guitar manufacturing. First, despite these guitars being of extraordinary quality, the manufacturers' initial lack of knowledge and limited use of marketing strategies restricted their sales. However, over time, they have become aware of the significant importance of marketing for the development and improvement of their positioning in both national and international markets. Second, most companies dedicated to the manufacture of musical instruments understand sales are seasonal, and therefore tend to define their business strategies by seasons, employing marketing strategies that allow them to optimize their sales across all periods. Nevertheless, the workshops in

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Casasimarro produce guitars over the entire year, fundamentally based on the creation and maintenance of loyal customer segments, among which Keith Richards of the Rolling Stones can be mentioned (Lozano, 2017; Rtve, 2023). Indeed, the quality of their guitars is of worldwide renown, making custom guitar manufacturing an important line of activity.

Building on these ideas, this work analyzes the evolution of the marketing strategies of these artisan guitar manufacturing companies. To do so, in-depth research is carried out, concentrating on primary sources (particularly the testimonies of the guitar makers) and secondary information sources (supplemented, among others, by biographies, historical newspapers, magazine articles, and research articles). Much of this secondary information examines the strategies employed by these families in their businesses and how they evolved over time, with the aim being to reconstruct and gain a deeper understanding of the historical and economic development of the village.

Funding: This work is part of the R&D, article 60, Code 240434UCTR in which the authors participate.

Keywords: handmade guitar manufacturing, business strategies, prestigious clients.

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FROM ENGAGEMENT TO RETENTION: THE CRITICAL ROLE OF COACHING LEADERSHIP IN WORKFORCE STABILITY

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ABSTRACT

In an era of constant and profound organizational change, leadership has become a critical factor in ensuring adaptability, performance, and employee retention. As organizations continuously restructure their processes and frameworks, new leadership paradigms have emerged, prompting increased scholarly interest in particular Coaching Leadership (Ellinger and Ellinger, 2021; McCarthy and Milner, 2020; Ribeiro *et al.*, 2021). This style of leadership is seen as a tactical means by organizations that wish to improve its employees' performance and cultivate their engagement (Ellinger and Ellinger, 2021; Ribeiro *et al.*, 2021; Hamlin *et al.*, 2006). Coaching Leadership fosters more engaged employees (Ellinger *et al.*, 2003; Kim *et al.*, 2013), who benefit from an ethos of empathy and trust that eliminates the excessive need for control. Some studies have shown that this style of leadership leads to employees enhanced affective commitment and work commitment (e.g. Ribeiro *et al.*, 2021). The empirical research demonstrates a positive relationship between Coaching Leadership and workers' job satisfaction, organizational commitment, proactivity, teamwork, and overall quality of professionals' work-life (Kim, 2014; Kim *et al.*, 2013; Lawrence, 2017). As a result of their engagement, employees improve their performance because when organizations invest in their development, employee feels appreciated, and job satisfaction leads to higher productivity (McCarthy and Milner, 2020).

This study explores this line of research and aims to find out whether Coaching Leadership competencies influences employee's engagement and turnover intention, but also to examine the complex interrelationships among these variables. Specifically, it examines (i) the relationship between Coaching Leadership skills and employee engagement, (ii) the relationship between Coaching Leadership and turnover intention, (iii) the extent to which engagement influences turnover intention (iv) and the relationship between Engagement, Coaching Leadership and turnover intention.

The empirical study is based on data collected through an online questionnaire distributed via social networks, yielding a sample of 204 respondents. The data was exported to IBM SPSS Statistics software and analysed to build a database to determine the dimensionality, consistency, reliability and

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validity of the variables under study. To this end, the scales were refined using Exploratory Factor Analysis (EFA) and the Cronbach's Alpha coefficient (CA). To test the research hypotheses, a regression was carried out using the PROCESS Hayes (Hayes, 2018) the method with 5000 bootstraps. Our results shown that all direct effects of the first three hypothesis are statistically significant and that the model explains a substantial proportion of the variance in the dependent variable, with an R^2 value of 0.9497, indicating an excellent fit. All direct effects are statistically significant, as indicated by the p-values < 0.001 and confidence intervals excluding 0. The finding of the present study suggests that there is a positive effect of Coaching Leadership Skills on employee engagement. This finding is consistent with findings of past studies by Ellinger et al. (2003), Kim *et al.* (2013) or Lee and Ding (2020) who concluded that Coaching Leadership Skills promote higher levels of Engagement in their employees and that, for this reason, the impact caused by Coaching Leadership has several positive repercussions in the workplace. Ellinger *et al*. (2003), Elmadağ et al. (2008), Lawrence (2017), Park *et al.* (2008) and McCarthy and Milner (2013), found that when employees experience behaviours characteristic of Coaching Leadership from their leaders, they tend to show higher levels of Engagement. Consistent with findings by Kim (2014), Lee and Ding (2020) and Ali *et al*. (2018), we also found a negative effect of Coaching Leadership Skills on employees' Intention to Leave. This finding highlights that leaders who exercise Coaching Leadership positively influence the behaviour of their employees and, when they feel an integral part of the organization and valued, they show higher levels of commitment and thus tend to reduce their Intention to Leave. Furthermore, we found a negative and significant relationship between Engagement and Intention to Leave. This finding is consistent with the study by Al Sahi *et al*. (2016) and Juhdi *et al*. (2013) who concluded that the existence of leaders who adopt Coaching Leadership in organizations enhances the increase in Engagement and, consequently, the Intention to Leave of their employees decreases. Finally, we found that indirect effects demonstrate significant mediation pathways where engagement acts as a mediator between Coaching Leadership and turnover intention.

This study contributes to the literature by examining the effects of Coaching Leadership on two critical workforce outcomes: employee's engagement and turnover intention. Our findings indicate a statistically significant positive relationship between Coaching Leadership Skills and employee engagement, and a negative relationship between Coaching Leadership Skills and intention to leave. Moreover, the results highlight the mediating role of engagement in the relationship between Coaching Leadership and turnover intention. This research not only enriches the theoretical discourse on leadership effectiveness but also offers practical implications for organizations seeking to build and engaged and committed workforce. Promoting a culture of coaching within leadership practices may thus serve as a catalyst for sustainable organizational success. Moreover, these results underscore the

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strategic value of Coaching Leadership to reduce turnover risks. By highlighting the role of Coaching leadership in strengthening employee commitment and retention, this study contributes to ongoing discussions on effective leadership in dynamic organizational settings.

Keywords: Leadership, Coaching Leadership, Engagement, Turnover Intention

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PROTECTING PRIVATE INVESTORS

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ABSTRACT

On August 23, 2023, the U.S. Securities and Exchange Commission (SEC) adopted the Private Fund Rules (Calabrese et al., 2023). The Private Fund Rules set out a series of regulations and requirements intended to regulate private funds advisers more stringently (SEC Fact Sheet).

Private funds are "privately offered investment vehicles that pool capital from one or more investors and invest in securities and other instruments or investments" (17 C.F.R. § 275). The investors for these private funds must be accredited investors. According to the SEC, accredited investors must be able to fend for themselves as the offerings directed towards them are often accompanied by minimal disclosures, higher risks, or involve intricate investment strategies (SEC Review, 2023). To qualify as an accredited investor, an individual typically must have a net worth exceeding $1 million or an annual income exceeding $200,000. Given their comparatively high earning and net worth, accredited investors are considered more financially sophisticated than the average investor. Correspondingly, private funds have been historically less regulated than other financial tools (Brummer, 2024).

Despite its traditional approach, in 2023 the SEC adopted rules requiring various disclosures from private funds (SEC Fact Sheet). In its original rule proposal, the Commission explained that despite its examination and enforcement efforts it had observed persistent problems. In particular, the Commission noted that a lack of transparency, conflicts of interest, and inadequate governance mechanisms continued to pose risks to investor protection (SEC Fact Sheet). Further amplifying the ongoing risk, SEC Chair Gary Gensler noted the interconnected nature of the financial market, stating that "[p]rivate funds and their advisers play an important role in nearly every sector of the capital markets . . . ." (SEC Press Release, 2023). Chair Gensler claimed that the proposed rules would benefit "all investors — big or small, institutional or retail, sophisticated or not" (SEC Press Release, 2023).

However, the SEC's attempts to bring greater transparency were thwarted in June 2024 when the U.S. Fifth Circuit Court of Appeals in *National Association of Private Fund Managers v. Securities. & Exchange Commission* unanimously vacated the SEC's new rules. The court stated that before

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promulgating the rules, the SEC needed to first demonstrate that a substantial level of fraud exists that can be addressed by rules.

This paper addresses a specific investment whereby corporate governance protections may be of critical importance, that is in the investment of private funds in public equity (PIPE) setting. In this context, conflicts of interest are most prevalent – the investment advisers have an interest in pitching PIPE investments in special purpose acquisition companies (SPACs), even when these investments may not be in the best interest of the investors. Without SEC regulation requiring full disclosure of conflicts of interest, corporate governance rules become the only means for recourse. Investors are left to rely primarily on fiduciary duty protections.

Keywords: Special purpose acquisition companies; private equity; private investments in public equity; fiduciary duty; securities regulations

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RE-EVALUATING SENSORY MARKETING: TOWARD AN ENHANCED-SENSORY PARADIGM, THE ROLE OF YOUTUBE AND CINEMATOGRAPHY FOR CREATING A CAPTIVATING CONSUMER EXPERIENCE

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ABSTRACT

Over the past decade, there has been a significant shift in consumer behavior. This shift is driven by a changing living paradigm influenced by exponential technological advancements, the rise of social media, numerous political conflicts, and global health crises (Petit et al., 2019; Duralia, 2020; Zwanka and Buff, 2020; Rayburn et al., 2021; Mirchevska, 2021; Rehman et al., 2023). This shift has emphasized on the need to adapt and to create highly stimulating, and personalized consumer experience (Stead et al., 2022).

As Desai (2024) states, in the current paradigm Non-Governmental Organizations (NGOs) are needed more than ever to support society, but as Orosa and Seijo state (2023), NGOs need to re-evaluate their marketing efforts, so as to survive and also to be able to gain resources and be able to fulfill their mission. That is since current context is very unstable, and also accompanied by increased competition among NGOs. Therefore, NGOs now more than ever need to adapt to the new living paradigm, so as to survive and be able to assist humanity during and after a global crisis (Orosa and Seijo, 2023; Vrontis et al., 2024).

Sensory Marketing (SenM) was identified during the past decade, and it is a powerful tool for NGOs in the new paradigm that seeks maximum sensory stimulation due to the overload of information both offline and online (Krishna, 2014; Petit et al., 2019). SenM is applied both online and offline and it is a powerful tool with tremendous potential for businesses and organizations. Due to its recent evolution and interdisciplinary nature, Online Sensory marketing (hereinafter OnSenM) remains underexplored and lacks a systematic interdisciplinary literature review as well as optimal online application. Nevertheless, it is considered one of the most promising marketing approaches from both theoretical and practical perspectives. (Krishna; 2008; Krishna, 2014; Rathee and Rajain, 2017; Areiza & Restrepo, 2018; Hussain, 2019; Petit et al., 2019; Worfel et al., 2022; Artunes and Verissimo, 2024).

As stated by Avgeropoulou and Melanthiou (2021), OnSenM is most effectively delivered through video, where moving images and sound enable immersive multisensory experiences.

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Enhanced-sensory videos, particularly on platforms like YouTube, blend visual storytelling with cinematic techniques to amplify engagement. These videos aim to evoke synesthetic responses, mentally simulating absent senses like taste, touch, or smell through carefully designed audiovisual cues, thereby deepening emotional resonance and consumer impact (Avgeropoulou & Melanthiou, 2021; Schlussel & Frosch, 2023). The present research introduces the concept of Enhanced-Sensory Marketing (ESenM) as a novel paradigm that integrates traditional sensory marketing elements with advanced digital technologies and the art of cinematography. (Avgeropoulou & Melanthiou, 2021; Schlussel & Frosch, 2023). ESenM aims to create deeply engaging, multi-modal experiences that align with contemporary consumers' expectations and behaviors in increasingly digitized environments (Krishna & Schwarz, 2014; Petit et al., 2019).

METHODOLOGY

This study adopts a mixed-method design, aligned with a four-stage progression from literature synthesis to empirical investigation and framework validation. Rather than relying solely on a single qualitative study, this research integrates systematic and narrative literature reviews, qualitative netnography, and quantitative audience survey, following a Critical Realism epistemology that seeks both empirical observation and theoretical explanation (Easton, 2010; Fletcher, 2017). Qualitative techniques will be employed across the first three stages. In Stages 1 and 2, a Systematic Literature Review (SLR) following an established protocol will be conducted, alongside a narrative review of relevant grey literature. These sources will be analyzed thematically to identify how Online Sensory Marketing (OnSenM) and cinematographic strategies influence user engagement. In Stage 3, a netnographic approach will be used to examine maximum engagement and minimum engagement on NGO' campaigns on YouTube. Four NGO' video cases will be analyzed via Netnography based on engagement metrics and audiovisual composition. This will be complemented by semi-structured audience surveys, designed to capture cognitive and emotional responses to cinematic techniques. The research maintains a deductive orientation, drawing from established theories such as SOR, LC4MP, and Online Consumer Behavior models.

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RESEARCH DESIGN

RO	Stage	R-Method & Technique	R-Questions
RO1: To explore the interrelationship between OnSenM, cinematography, and higher-level user engagement on social media through a systematic literature review.	Stage 1: Qualitative	Qualitative: Systematic & Narrative Literature Review-SLR protocol + thematic analysis	What are the underlying relationships of OnSenM which, when emphasized through cinematography in a video, can lead to increased consumer engagement on social media?
RO2: To propose a preliminary theoretical framework for creating highly engaging YouTube videos for NGOs, using both a systematic literature review and a narrative review approach.	Stage 2: Qualitative	Synthesis of SLR and Narrative	What are the underlying characteristics of OnSenM, which if stressed through cinematography, on a YouTube video, can lead to increased consumer engagement for NGO' YouTube video campaigns?
RO3: To integrate cinematographic techniques into an OnSenM strategy for the benefit of NGOs, based on a detailed analysis of the existing literature.	Stage 3: Mixed Methods – Triangulation Qualitative & Quantitative	Triangulation: A. Qualitative – Netnography NGOs best & worst cases - Quantitative- B. Surveys audience	Can cinematographic techniques be applied in YouTube videos sponsored by NGOs to enhance consumer engagement?
RO4: To empirically test the conceptual framework and refine it based on the study's findings.	Stage 4: Finalized Framework-	Synthesis of results from stage 3.	Can an Online Sensory Marketing (OnSenM) strategy be used in YouTube videos to enhance engagement with the activities of NGOs?

THEORETICAL CONTRIBUTION

The present study advances the field of sensory marketing by introducing ESenM as a formal concept, which combines traditional sensory cues with modern technological tools and cinematography. The integration of synesthetic design, and cinematographic storytelling within this framework provides a multidimensional understanding of consumer engagement in digital spaces. By highlighting the critical role of narrative transportation and multisensory synchronization, the study contributes to a deeper theoretical understanding of how sensory experiences are constructed and internalized in digital contexts (Green & Brock, 2000; Laer et al., 2014). Moreover, the empirical netnography offers contextual insights that bridge existing gaps between theory and practice, responding to scholarly calls for more empirically grounded models of online sensory marketing (Petit et al., 2019).

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PRACTICAL CONTRIBUTION

This study offers actionable insights for marketers, particularly NGOs, seeking to apply Enhanced-Sensory Marketing (ESenM). By combining cinematic storytelling with OnSenM strategies, it presents a practical framework for creating more immersive, emotionally resonant, and memorable video campaigns. Positioned as both a conceptual model and an applied toolkit, this research aims to equips practitioners to engage digital audiences more effectively in an increasingly saturated media landscape for the benefit of NGOs.

Keywords: Sensory Marketing, Multisensory Marketing, Enhanced-Sensory Marketing, Consumer Behavior, Cinematography, AI in Marketing, Synesthesia, Storytelling, Digital Immersion, Experiential Marketing

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CREATING VALUE IN HEALTHCARE THROUGH CO-PRODUCTION: A CASE STUDY

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ABSTRACT

1. INTRODUCTION AND AIM

Global trends show a continuous rise in the world population, expected to grow by 2 billion in the next 30 years. At the same time, many countries are also experiencing an aging population. For example, the European Union estimates that by 2050 half a million centenaries will live in the EU-27. These trends will significantly impact many countries' fiscal systems (Yoshino et al., 2019), labour markets (Serban, 2012), economic growth (Nagarjan et al., 2016), and health-related services (England and Azzopardi-Muscat, 2017). Within such a context, this work focuses on healthcare, specifically examining the concept of "integrated healthcare".

Integrated healthcare extends beyond the traditional direct patient care model to establish collaboration between various organizations (e.g., hospitals and territorial care providers) and professionals (e.g., doctors, nurses, caregivers, physicians, etc.) while keeping patients at the centre of the process. However, implementing integrated healthcare systems remains challenging. Within this scenario, several scholars called for further research and emphasized the need for systems modelling approaches to address complex public health issues and, more specifically, identify leverage points and potential policy solutions (e.g., Atkinson et al., 2018). Starting from these considerations, this paper examines the care pathway for femur fractures within the context of elderly care by relying on System Dynamics (Forrester, 1961 and 1968) modelling principles and tools.

2. RESEARCH DESIGN

The research aims to develop a stock and flow diagram map and, subsequently, a quantified System Dynamics simulation model (Forrester, 1961 and 1968) to identify the key characteristics and leverage points in the femur fracture integrated care pathway. In this context, a case study (Yin, 2009) is developed to address the following research questions:

1. How can integrated pathways be structured and monitored effectively?

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2. How can the cooperation among professionals be enhanced to improve surgery outcomes, thereby reducing death rates and improving patients' quality of life?

3. Which policies can empower patients to reduce the number of traumatic events (i.e., femur fractures) and increase the probability of a full recovery after the surgery?

The case study focuses on the Italian National Healthcare System specifically by investigating the Tuscany region. The concept of "co-production in healthcare" (Ostrom, 1972 and 1996), where both professionals and patients collaboratively contribute to service delivery, frames the case study and will drive the discussion of the findings.

3. PRELIMINARY FINDINGS AND CONTRIBUTION

The research so far allowed the researchers to map health and social care service provision models in the Tuscany region, explicitly focusing on femur fracture care. Through a participatory modelling approach (e.g., Videira et al., 2019), an aggregated visual representation of the integrated pathway was first developed, alongside the identification of all the actors involved in the process. Such maps helped the researchers to develop a preliminary stock and flow diagram of the entire pathway where three main areas were identified: pre-hospital, hospital (from ER access to surgery and discharge), and post-hospital (home and care facilities). A core set of systemic policies has been preliminary identified, to be further tested by using the simulation model.

By addressing its research questions, this study allows to explore how health and social care organizations manage inter- and intra-organizational relationships to deliver efficient services for citizens. Using the System Dynamics model will be also possible to design and test policies that leverage such relationships, empower patients and professionals within the integrated care pathway, and improve (information and patient) flows in care pathways thus enhancing value for the entire system. Although still in the early stages, this study will enable researchers, professionals, and policymakers to explore "integrated healthcare" in practice, emphasizing collaborative, patient-centered care involving multiple providers and intensive co-production of value.

Keywords: Integrated Healthcare; Care pathways; Co-production; Femur fracture; Resource allocation; Value; System Dynamics.

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USING SYSTEM DYNAMICS MANAGEMENT FLIGHT SIMULATORS AND ROLE PLAYING TO EXPLORE THE ROLE OF TRUST IN GROUP-DECISION-MAKING

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ABSTRACT

MOTIVATIONS AND RESEARCH QUESTIONS

A wide body of literature has discussed how decision-making, at the individual and group level, takes place in complex and dynamic domains (e.g., Black, 1948; Rapoport and Wallsten, 1972; Brehmer, 1992). Within this context, several scholars demonstrated that human agents are affected by bounded rationality (e.g., Simon, 1972; Morecroft, 1983) and may perform poorly even with complete information (Miljkovic, 2005). Previous literature specifically pointed to the role that some factors, such as flawed mental models (Senge, 1990) or emotions (Lerner *et al.*, 2015) may play, thereby affecting the interaction (and decision-making) in teams of human agents. Starting from these considerations, this study aims to explore the role played by "trust" specifically by analysing how it acts in contexts characterized by group-level interaction. Considered a complex concept (Khodyakov, 2007) trust has been analysed by scholars from many disciplines (Bhattacharya *et al.*, 1998) and is regarded as a relevant factor in the field of management science (Renzl, 2008). In this scenario, extant literature provides several calls for more in-depth analyses of how trust dynamically acts and evolves in contexts characterized by group-level interactions (Li, 2017), even when there is collaboration among the decision-makers (Nielsen, 2004).

RESEARCH QUESTIONS AND RESEARCH DESIGN

Two main research questions are addressed in the study:

- RQ1: How does trust affect the interaction of human agents driving their behaviour in group decision-making?

- RQ2: How can a combined use of management flight simulators and role-playing techniques favour the analysis of trust in decision-making?

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A System Dynamics model (Forrester, 1961 and 1968), in the form of a management flight simulator (Morecroft, 1988; Davidsen and Spector, 2015), was built and used to assist group interaction and detect behavioural factors affecting the outcomes of a decision-making process. To this aim, four simulation-assisted games were organized. A Role-Playing technique (Clements, 2007; Barnabè et al., 2018) was used to organize the players in groups, assign them a task, and run the simulation. The domain chosen for the simulation was a regulated financial market. The theoretical lenses through which the simulations are analysed pertain to the Behavioural System Dynamics stream of research (Lane, 2017; Lane and Rouwette, 2023). Concepts from Game Theory are also used to discuss the results (Axelrod, 1980; Hardin, 1968).

MAIN FINDINGS

The results of the simulations and the feedback obtained by the participants show that trust plays a pivotal role in affecting group decision-making, even in contexts where the outcomes of decisions are understandable and shared. Additionally, the study shows how trust operates as a behavioural factor, thereby stimulating decision-makers to question their beliefs and mental models and.

CONTRIBUTION

This study expands the analysis of the behavioural factors that previous System Dynamics literature considered to focus more on a factor resulting from social interaction, i.e., trust. This study also contributes to the debate about the potential of Behavioural System Dynamics when used in class to favour discussion and learning.

Keywords: Trust; Decision-making; Behavioural System Dynamics (BehSD); Model; Simulation; Performance.

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THE INFLUENCE OF CONSUMER EXPERIENCE WITH AI ON CONSUMER BEHAVIOR: A SYSTEMATIC LITERATURE REVIEW

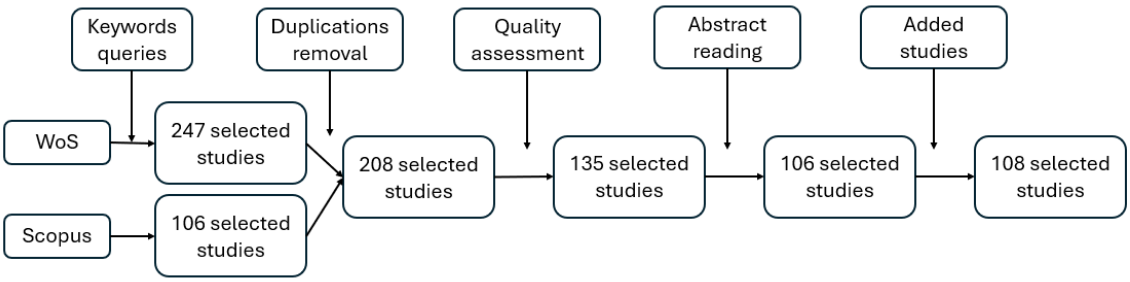
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ABSTRACT

The available literature implies that new technologies, such as artificial intelligence, influence consumer experience in different industries (Steinhoff et al., Buhalis and Sinarta, 2019), but consumers will also increase their adoption of artificial intelligence (Loureiro et al., 2021). According to the existing literature, AI is dramatically changing customer experience (Hoyer et al., 2021). This unveils the need for further understanding of the influence of consumer experience with AI on consumer behavior. This systematic analysis consists of a compilation of articles and books published between 2019 and September 2024. This systematic literature review covers the objectives, methodologies, theories, constructs, conclusions, gaps, limitations, and future research insights within this research's scope.

Figure 1. Screening process



Source: author's elaboration

The studies analyzed in this literature come from Web of Science and Scopus, 247 and 106, respectively. Firstly, duplicate studies were removed (208). After a quality assessment, which considered the rank of journals in Scimago 2024 (SJR 2024) and quartile analysis, the list of studies was reduced to 135. Subsequently, the content of the title and abstract was analyzed, and 27 studies were considered irrelevant to this research and removed. After reading the 106 studies, nine were excluded for not complying with the quality criteria applied in other studies (Macpherson and Holt, 2007; Pittaway et al., 2004) or for not having relevant content in the scope of this research. An additional 11 studies that were not included in the initial results from Web of Science and Scopes were frequently

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cited. Considering the relevance of those studies, they were included in this research; thus, a total of 108 studies were left to analyze.

Since 2019, approximately 19.700 articles have been published in journals such as the Journal of Business Research, Journal of Services Marketing, Journal of Retailing, Journal of the Academy of Marketing Science, and Journal of Service Management. The year with the highest number of publications was 2024, with 10.800 articles published.

The published studies that were analyzed in this systematic literature review focus mainly on e-commerce and retail (21,74%), tourism and hospitality (21,74%), banking (13,04%), and customer interaction & chatbots (13,04%). Regarding the methodologies deployed in those studies, 72,73% were quantitative, 18,18% qualitative, and 9,09% mixed. Considering the quantitative methodologies, they were mostly conducted with the support of PLS-SEM and NCA. The Stimulus-Organism-Response (SOR), Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), Commitment-Trust Theory and Self-Determination Theory were the most widely used theories.

By conducting this systematic literature review, it was possible to understand that artificial intelligence enhances both personalization and customer satisfaction (Ahmed and Aziz, 2024; Kautish and Khare, 2022; Ho and Chow, 2023; Arici et al., 2024; Pillarisetty & Mishra, 2022). If chatbots are enhanced with AI, besides supporting personalization, they also provide a better customer experience (Jiménez-Barreto et al., 2021; Rizomyliotis et al., 2022; Chen et al., 2021). When referring to AI chatbots, the literature suggests that different customer profiles interact in different manners with those chatbots, so there is a need to ensure personalized approaches (Ozuem et al., 2024; Dwivedi et al., 2023; Chen et al., 2021). The use of chatbots and digital assistants provides better interaction with customers, however, and to do so, it should consider both emotional and social factors (Jiménez-Barreto et al., 2021; Rizomyliotis et al., 2022; Chen et al., 2021). (Liu-Thompkins et al., 2022; Puntoni et al., 2021), also mention artificial empathy as a means to shorten the distance between human interaction and AI, ensuring a more natural experience.

Even considering the benefits implied by literature when using artificial intelligence, several studies state that companies need to adapt their business strategies (Zaki, 2019; Kim, 2023). When referring to the need for adaptation, companies must balance the use of AI with human interventions to ensure a better customer experience (Trawnih et al., 2022; Sheth et al., 2022). A need to ensure transparency, equity, and data protection has been pointed out as key principles for companies to thrive using artificial intelligence (Dolganova, 2021; Liu-Thompkins et al., 2022; Puntoni et al., 2021).

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According to (Ahmed and Aziz, 2024; Trawnih et al., 2022; Chen and Prentice, 2024) both trust and commitment are important mediators in customer experience with AI, which must be considered. The literature also states that trust in artificial intelligence depends on justice perception (Dolganova, 2021; Puntoni et al., 2021; Sheth et al., 2022), and both perceived interactivity and expectancy confirmation influence the acceptance of AI-based recommendations (Ahmed and Aziz, 2024; Chen and Prentice, 2024).

The literature suggests the benefits of a personalized customer experience (Ozuem et al., 2024; Dwivedi et al., 2023; Chen et al., 2021), but it also points out the lack of understanding of the limits of personalization and its impact on both customer privacy and trust (Ahmed & Aziz, 2024; Chen and Prentice, 2024; Weidig et al., 2024). Thus, this systematic literature review shed light upon the need for future research that explores how different levels of personalization affect customer experience and how to balance personalization with ethical concerns (Chen and Prentice, 2024; Weidig et al., 2024). According to (Jiménez-Barreto et al., 2021; Rizomyliotis et al., 2022; Ozuem et al., 2024; Chen et al., 2021), there's also a gap when it comes to understanding which elements of chatbots' design enhance satisfaction regarding customer experience. This has been pointed out as future research in terms of personalization (Jiménez-Barreto et al., 2021; Ozuem et al., 2024; Chen et al., 2021). Another important aspect of the literature is the fact that studies focusing on how to use AI as an enhancer of customer experience after flaws are still scarce or nonexistent and should be addressed (Ozuem et al., 2024; Dwivedi et al., 2023). Also, there are gaps in terms of understanding how artificial empathy may be implemented and how it may affect customer behavior (Liu-Thompkins et al., 2022; Puntoni et al., 2021). There is a lack of understanding of the means that companies may use to balance their strategies with artificial intelligence without compromising customer experience (Zaki, 2019; Kim, 2023).

Considering the findings of the systematic literature review, besides acknowledging gaps in the literature, the main frameworks, constructs, and theories were revealed, enabling future research to make a higher contribution to academia and companies.

Keywords: artificial intelligence; consumer experience; consumer behavior; systematic literature review

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THE INNER CHILD EFFECT: CHILDHOOD SYMBOLISM AS A DRIVER OF ADULT CONSUMER BEHAVIOR IN THE LUXURY MARKETS

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ABSTRACT

In recent years, the luxury market (Fletcher, Stephen et al. 2025) (Fletcher, Stephen et al. 2025) has become increasingly saturated with childhood imagery, including cartoon characters, dolls (He, Adkin 2025), and fantastical figures (Kotb, Jones et al. 2022). Notably, these elements are not directed at children, but at adult consumers. This paper investigates the underlying meanings of this trend and explores why such symbols resonate so strongly with mature audiences of luxury goods and services (Lee, Jeon et al. 2022).

Rather than drawing on conventional markers of status, achievement, connoceurship or sophistication, many contemporary luxury brands are tapping into values associated with childhood spontaneity, joy, innocence, and playfulness (Leveraging Labubu: Why major brands Are tapping Into toy culture 2025). A notable example is the recent popularity of Labubu dolls, which are often seen adorning luxury Hermès handbags (He, Adkin 2025). These whimsical figures allow adult consumers to reconnect with a sense of uninhibited joy and imagination, offering a momentary escape into a symbolic, fairy-tale-like space within the complex world of adulthood.

This phenomenon is gaining increasing relevance as Millennials and Generation Z emerge as key consumers of luxury goods and services (Zaczkiewicz 2025). These generations are characterized by a fluid perception of age boundaries: they continue to engage in activities traditionally associated with youth, such as playing video games, hosting parties, and adopting a carefree, playful attitude reminiscent of childhood (Noyen 2025). This behavior is particularly pronounced among high-income individuals, who are better positioned to avoid the constraints of everyday hardship and maintain a lifestyle oriented toward pleasure and emotional fulfillment. Moreover, these consumers are increasingly driven by personal nostalgia, seeking emotional connection through the cartoons, games, and characters that defined their formative years (Bhatia 2019) (Bohn, Wittenzellner 2024).

This study employs a qualitative interpretive approach, rooted in constructivist epistemology, recognizing that consumer behavior, especially in the luxury sector, is shaped not merely by function or price, but by symbolic meaning, affective memory, and cultural narratives. The aim is to explore

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how and why symbols associated with childhood appeal to adult consumers in the context of luxury branding.

The applied research method is Semiotic Analysis, the researcher decodes the symbolic meanings of childhood imagery (e.g. Labubu dolls, cartoon iconography) in luxury marketing, exploring advertising campaigns, luxury product designs, brand collaborations: Balenciaga x The Simpsons, Moschino x Barbie, Fendi x Fragment x Pokemon (Gonzalez-Cavazos, Quintanilla et al. 2025).

While previous studies have shown that archetypal communication appealing to the child archetype can influence consumer behavior more broadly (Sarkar, Sarkar et al. 2024), this research examines how childhood symbolism specifically contributes to perceptions of exclusivity within the luxury market.

Whereas status and success can be readily signaled through material possessions, the lightness, spontaneity, and playfulness of childhood are far more elusive, and therefore more desirable (Srivastava 2024) (Adamson 2024). In this context, childlike codes are perceived as truly exclusive.

Attributes such as naivety and emotional openness, often considered incompatible with high social and financial status, become aspirational precisely because they are scarce. For affluent and HNWI consumers, these qualities represent a kind of emotional luxury. A sense of freedom that is increasingly inaccessible in their structured, high-pressure environments. In contrast, mass-market consumers can engage with such emotions more freely and without social constraint.

Keywords: Symbols, Luxury Branding, Cultural Semiotics, Consumer Behaviour, Narratives, Kidults, Nostalgia, Childhood Symbolism, Gen Z, Millenials.

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TRANSFORMATIONAL LEADERSHIP AND GENERATIVE AI CAPABILITY: THE MODERATING EFFECT OF MIDDLE MANAGERS' WORK ENGAGEMENT

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ABSTRACT

1. INTRODUCTION

Generative artificial intelligence (GenAI) is redefining the technological boundaries of organizations, offering novel ways to automate, create, and reason across various business functions (Chowdhury et al., 2024; Farri & Rosani, 2025). Unlike previous artificial intelligence (AI) technologies focused on efficiency and data analysis, GenAI introduces adaptive and creative capabilities that challenge existing strategic routines (Fuller et al., 2025; Kanbach et al., 2024). As organizations begin to embed GenAI technologies into their core activities, the leadership of the top managers emerges as a critical factor in navigating the opportunities and challenges introduced by this new paradigm (Bevilacqua et al., 2025a; Jorzik et al., 2023).

The Upper Echelons Theory (UET) offers a foundational theoretical framework for understanding how executives' characteristics and behaviors influence strategic outcomes (Hambrick & Mason, 1984; Hambrick, 2007). UET posits that top managers' cognitive base, values, and leadership style significantly influence organizational decisions and performance (Boal & Hooijberg, 2000; Vera et al., 2022). Within this framework, transformational leadership has gained increasing attention as a leadership style that promotes change-oriented behaviors, fosters innovation, and aligns organizational vision with emerging technological imperatives (Bass 1985; Carter et al., 2013; Samimi et al., 2022).

However, while prior research has examined AI broadly, limited attention has been given to the specific case of GenAI capability (Bevilacqua et al., 2025b; Jorzik et al., 2023). Grounded on Mikalef & Gupta's (2021) definition of AI capability, GenAI capability refers to a firm's ability to structure, integrate, and leverage its AI-based resources. Moreover, most studies have focused on high-level strategic decision-making, often overlooking interactions across different managerial layers (Firk et al., 2022). In particular, recent contributions emphasize the importance of multi-level approaches, highlighting not only the strategic alignment between chief executive officer (CEO) and the top

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management team (TMT) but also the activating role of middle managers (MM) in operationalizing innovation and strategic change (Foss & Mazzelli, 2025; Heyden et al., 2017). This approach extends beyond the top-down perspectives of the UET, including the analysis of the complementary roles of the MM (Heyden et al., 2017). In particular, the MM's work engagement is conceptualized as a work-related mental state characterized by vigor, dedication, and absorption, contributing to organizational effectiveness (Ou et al., 2014).

2. OBJECTIVES

This study examines the role of transformational leadership in fostering the development of GenAI capability within organizations. It adopts a multi-echelon lens that considers how top managers' transformational leadership interacts with MM's work engagement. Specifically, it examines whether MM's work engagement moderates the relationship between top management leadership and the development of GenAI capability. The overarching objective is to develop a more comprehensive understanding of how cross-level leadership dynamics facilitate complex innovation processes.

3. RESEARCH DESIGN

This study adopts a quantitative research approach based on a cross-sectional survey, with data collected from CEOs, TMT members, and MM working in European firms (Heyden et al., 2017). A non-probabilistic sampling method will ensure participation from diverse organizations at various stages of AI integration. Finally, a comprehensive data analysis will be conducted to test the relationship between transformational leadership at the upper echelons and GenAI capability, and to assess the moderating effect of MM's work engagement on this relationship.

4. EXPECTED RESULTS AND CONTRIBUTIONS

It is expected that transformational leadership exhibited by CEOs and TMTs will positively affect organizational capabilities for implementing GenAI technologies. Furthermore, the study hypothesizes that high levels of work engagement among MM will strengthen this relationship, acting as a catalyst that connects strategic vision to operational execution. This moderating effect is likely to highlight the crucial function of middle management as an amplifying mechanism in technological change.

This research contributes to the strategic management literature by broadening the scope of the UET through a multi-echelon framework that accounts for the influence of middle management alongside top managers' transformational leadership. It also provides empirical evidence on how

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transformational leadership can enable AI technological transformation when coupled with organizational engagement. From a managerial perspective, the findings will provide actionable insights for firms seeking to align leadership efforts across hierarchical levels to accelerate the adoption of GenAI.

Keywords: Transformational Leadership, Generative AI, Upper Echelons Theory, Middle Managers, Top Managers

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GASLIGHTING OF PATIENTS-A NEW THREAT TO BUSINESS MANAGEMENT IN HEALTHCARE: AN ETHICAL PERSPECTIVE

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ABSTRACT

BACKGROUND

Medical gaslighting refers to the dismissal, doubt, or invalidation of a patient's medical concerns by healthcare professionals, leading to psychological distress, delayed diagnoses, and erosion of patient trust (Agarwal, 2023; Gabay, 2025; Vargas & Mahalingam, 2020). While this phenomenon has gained attention in media and public discourse, its academic exploration remains limited, particularly in relation to bioethics, nursing ethics and patient autonomy. We draw on the principlist model of bioethics and analyze the phenomenon of medical gaslighting according to this model (Beauchamp & Childress, 2019). The principlist model, introduced by Tom Beauchamp and James Childress in their book Principles of Biomedical Ethics, is one of the most influential frameworks in modern bioethics. It emphasizes four core ethical principles that guide decision-making in healthcare and biomedical research: Autonomy – Respecting the decision-making capacities of autonomous individuals; enabling patients to make informed choices about their own care.; Beneficence – Promoting the well-being of others; acting in the best interest of the patient.; Non-maleficence – "Do no harm"; avoiding actions that cause unnecessary harm or suffering.; Justice – Distributing benefits, risks, and costs fairly; ensuring equitable access to healthcare. This model is widely used because it offers a balanced, pluralistic approach that can be applied across diverse cultural and clinical settings. This study aims to examine medical gaslighting within hospital settings, focusing on its ethical implications through the lens of the principlist model of bioethics, and specifically by applying concepts of care ethics, relational autonomy, and beneficence.

OBJECTIVES

This research seeks to: Analyze the occurrence of medical gaslighting by nurses and its impact on hospitalized patients; Evaluate the ethical contradictions between medical gaslighting and principles of nursing care as well as bioethics, particularly beneficence and patient autonomy; and Explore strategies to mitigate medical gaslighting and foster ethical, patient-centered care.

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METHODOLOGY

A narrative review was conducted, supported by qualitative data from 14 hospitalized patients aged 30–81, who experienced lengthy hospitalizations. Each participant underwent two narrative interviews, analyzed through a bioethical framework incorporating the Fundamental Care Framework (FCF), Patient-Centered Care (PCC), bioethics and nursing ethics. The study examined patient narratives to identify instances of gaslighting, its effects on relational autonomy, and its contradictions with bioethics values.

FINDINGS

Medical gaslighting by physicians and nurses was observed in multiple forms, including the dismissal of pain complaints, refusal to order diagnostic tests, and attributing symptoms to psychosomatic causes. These behaviors undermined patient agency, delayed critical diagnoses, and eroded trust in healthcare providers. Due to medical gaslighting, the hospital is exposed to legal claims of medical negligence. Many patients reported feelings of helplessness, stigma, and reluctance to seek further care due to previous experiences of gaslighting.

The study further highlights how gaslighting contradicts bioethical principles. Furthermore, the core values of nursing—compassion, active listening, and advocacy—were often compromised in environments where efficiency and high workloads took precedence over patient engagement. The findings suggest that healthcare providers, overwhelmed by institutional pressures, may unintentionally contribute to gaslighting by prioritizing task completion over empathetic communication.

DISCUSSION

The phenomenon of medical gaslighting can be examined through the lens of the principlist model as follows: Autonomy: Medical gaslighting undermines patient autonomy by disregarding their self-reported experiences and perspectives.; Beneficence and Non-maleficence: By not taking patients' concerns seriously, clinicians may fail to provide beneficial care or, worse, cause harm through neglect or inappropriate treatment.; Justice: Certain groups, such as women or racial minorities, may be more susceptible to medical gaslighting, raising concerns about equitable treatment and systemic biases in healthcare (Gingold, 2023). The ethical ramifications of medical gaslighting are profound, particularly regarding relational autonomy (Gabay, 2025). In contrast to traditional autonomy, relational autonomy acknowledges that a patient's decision-making capacity is shaped by their interactions with healthcare providers (Gabay & Bokek-Cohen, 2024a; Stoljar & Mackenzie, 2022; Stoljar, 2024).

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Gaslighting disrupts this dynamic by invalidating patient experiences, thereby restricting their ability to make informed healthcare decisions. Furthermore, the violation of beneficence—a fundamental ethical principle that mandates acting in the patient's best interest—raises ethical concerns about professional integrity and patient rights (Gabay & Bokek-Cohen, 2024a, 2024b).

CONCLUSIONS AND RECOMMENDATIONS

Medical gaslighting represents a significant ethical failure in healthcare, contradicting fundamental nursing values and jeopardizing patient trust (Gabay & Bokek-Cohen, 2024a, 2024b). To mitigate its impact, we recommend: (a)Integrating awareness training for physicians and nurses to recognize and address medical gaslighting. (b) Encouraging healthcare institutions to implement patient-centered communication strategies, emphasizing active listening and validation of patient experiences. (c) Revising medicine and nursing curricula to include ethical dilemmas surrounding gaslighting and relational autonomy. (d) Establishing institutional policies that protect patient voices, ensuring that concerns are taken seriously and addressed systematically.

By fostering a culture of ethical attentiveness and patient-centered care, healthcare providers can reduce instances of medical gaslighting, thereby strengthening trust and improving overall patient well-being. Addressing this issue is imperative for the evolution of ethical medical and nursing practice and the promotion of just and equitable healthcare systems.

Keywords: Medical Gaslighting, Bioethics, Patient Autonomy, Nursing Ethics, Patient-Centered Care

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THE IMPACT OF BRAND COOLNESS ON COMPASSIONATE RESPONSES IN CHARITY SHOCK ADVERTISING

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ABSTRACT

Social marketing is fundamental for nonprofits to promote their causes and generate charitable donations and volunteering (Kemp, 2025). Social media has become a central pillar for not-for-profit organizations to expand their supporter base and cultivate stronger consumer-brand relationships through constant communication (Werke and Bogale, 2023). Charities tend to focus their emotional-based campaigns on negative stimuli, especially through shock advertising (Cockrill and Parsonage, 2016); yet the plausibility of such campaigns has been questioned, because they might risk the charities' reputation and market positioning (Allred and Amos, 2018). Thereafter, employing positive stimuli in advertising has garnered attention among marketers (Kemp, 2025), particularly with the emotion of compassion as a potential catalyst for philanthropy (Septianto and Tjiptono, 2019). However, the phenomenon of compassion fatigue may be contributing to the ineffectiveness of these social media advertisements (Cockrill and Parsonage, 2016). Thus, it is essential to investigate how charity shock advertising influences the emotion of compassion in two distinct charity sectors: humanitarian aid and animal welfare; as well as comprehending how the brand behind the advertising affects these constructs, by examining the impact of brand coolness in charity shock advertising and compassion.

Initially, compassion is an altruistic emotion that etymologically combines feelings of empathy and action, by motivating one to alleviate others' suffering (Kim and Kim, 2024). In the context of humanitarian aid charities, as the media is often depicting children as the faces of need (Fisher & Ma, 2014), the content is highly shared on social media, which in turn may decrease compassionate responses. In contrast, animal welfare charities have not been overexposed to social media users, and Lim *et al.* (2019) discovered that sad imagery of animals leads to positive charitable actions. So, it is postulated that humanitarian aid shocking advertisements negatively impact compassion (H1), while animal welfare shocking advertisements positively affect compassion (H2).

Furthermore, socially conscious brands often fall within the spectrum of coolness, an emotional and mentally driven brand assessment (Loureiro *et al.*, 2023). Indeed, one of the characteristics of the coolness concept within the social marketing scope is its pro-social nature, as promoting social change deviates from socio-cultural norms, hence being cool in nature (Mohiuddin *et al.*, 2016). While there are no studies exploring other-focused (altruistic) nonprofits being considered cool, hedonic brands were

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greatly impacted by brand coolness compared to utilitarian firms (Loureiro *et al.*, 2023). Given that brand perceptions can significantly influence consumers' responses to advertising (Lee *et al.*, 2020), it is pertinent to examine the role of brand coolness in shaping these insights. Hence, altruist charities may be considered cool due to their hedonic and pro-social status, suggesting that brand coolness may positively influence charity shock advertising (H3) and compassion (H4).

METHODOLOGY

Prior to publishing the structured questionnaire, a pretest with 64 participants was conducted to choose the adequate stimuli for analysis. The final images were partially manipulated by placing a different branding on the four questionnaire groups. The main study consisted of an online quantitative experiment, utilizing a 2 (charity sector: humanitarian aid vs. animal welfare) x 2 (nonprofit brand: real vs. fictional) between-subjects quantitative design. In practical terms, respondents were randomly assigned to one of four groups: two reputable charities, UNICEF and ASPCA, representing the humanitarian aid and animal welfare sectors, respectively, and two fictional counterparts. In every version, participants were exposed to both shocking and control appeals. The survey was distributed on Prolific, and it was targeted at citizens of the United States of America who were social media users and were aged between 18 and 59. Respondents were informed that their participation was voluntary and anonymous, and warned that the stimuli might evoke discomfort.

A final valid sample of 390 participants was considered for analysis. The profile of respondents demonstrated a balanced sample in terms of age and gender. The most represented age group was comprised of 138 participants (35.4%), being participants aged between 29 and 39 years old, and around 52% of participants identified as male. Also, more than 88% of participants mentioned being active on social media platforms more than once a day, aligning with the target audience of the present study.

RESULTS AND IMPLICATIONS

The analysis was divided between the two charity sectors to test the hypothesis and were evaluated through SmartPLS4. Considering the bootstrapping results, the relationship between charity shock advertising and compassion was supported for the animal welfare sector (H2), in opposition to the humanitarian aid context, which was not statistically supported, but yielded a negative path coefficient (H1). Brand coolness had a significant positive impact on charity shock advertising (H3) and compassion (H4) in both charitable sectors.

Firstly, the study's findings underscore the unpredictable impact of shock advertising by nonprofits on consumers' emotional reactions, as feeling compassion is highly dependent on the charity sector and

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brand depicted in the campaign. Secondly, the study empirically shows the rising trend of compassion fatigue for humanitarian aid charities, specifically those focused on helping children (H1), due to the constant media exposure to children in need of support. Thirdly, while reputable animal welfare charities can benefit from compassionate responses to shocking campaigns to appeal to donors (H2), small animal welfare nonprofits should not employ this communication tactic. Accordingly, the individual results from the fictional charities suggest that lesser-known charities should not use shocking tactics to gather contributions, as the effects of these brands on compassion were not predominant. Lastly, the study substantiates that brand familiarity, particularly brand coolness, directly affects shocking campaigns (H3) and the emotion of compassion (H4) in other-focused charities. Specifically, usefulness and authenticity, two characteristics of niche cool brands, appear to be the most influential dimensions for nonprofit's advertising, implying that social marketers can use these attributes to cater to donors on social media.

Overall, the study provides tools for managers and social marketers to tailor their communication strategies on social media to guarantee promotional success and positive brand associations. In contrast with humanitarian aid charities and lesser-known nonprofits which are advised against using shocking appeals, reputable animal welfare charities may use them in a proportionate manner, with the intention of not overwhelming donors, to avoid compassion fatigue in this not-for-profit sector. Additionally, when users have a positive mental and emotional representation of a brand, the likelihood of enjoying the advertising and feel more compassionate toward the victims is higher, as brand coolness positively impacted these constructs.

Further research could explore the impact of shock advertising on compassion in other social causes, as well as consider factors such as storytelling and color scheme of the social media campaigns. Also, social marketeers should further understand the impacts of brand coolness in altruistic charities, as it appears to be a promising area for broaden managerial development.

Keywords: social marketing; brand coolness; shock advertising; compassion

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MULTIDIMENSIONAL DASHBOARD FOR ASSESSING CARRYING CAPACITY ON NATURAL TRAILS: AN AI-SUPPORTED FRAMEWORK FOR REAL-TIME DECISION-MAKING

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ABSTRACT

This conceptual article presents a multidimensional decision-support framework for assessing Tourism Carrying Capacity (TCC) on natural trails, particularly in insular contexts such as Madeira Island. Unlike traditional models like LAC (Limits of Acceptable Change) or VERP (Visitor Experience and Resource Protection), which often operate in static or sectoral silos, this framework integrates real-time monitoring, subjective and objective indicators, and artificial intelligence (AI) into a dynamic, visual dashboard. This innovation addresses a critical gap in existing literature: the lack of tools that synthesize ecological, psychological, and managerial variables into actionable, real-time decisions for both authorities and trail users (Zelenka & Kacetl, 2014); (Rocha et al., 2021).

The dashboard is inspired by a flower-like visual model: each petal represents one of five capacity dimensions—physical, ecological, social, economic, and managerial—and changes color (green, yellow, red) depending on threshold alerts. The center of the dashboard displays the current Limits of Acceptable Change (LAC) index, calculated in real time based on live visitor counts and updated indicators such as trail occupancy, waste output, weather-related closures, and visitor satisfaction. The integration of AI for object detection and IoT sensors allows continuous data flow and predictive alerting (Krishnachaithanya et al., 2023); (Recalde et al., 2021).

The methodology draws from a systematic literature review and empirical case studies such as those by Cifuentes (1992), who introduced PCC and RCC capacity metrics, as well as studies implementing sensor-based monitoring like in Stołowe Mts. National Park and the RESETTING project (Rogowski, 2019); (Abreu et al., 2024).

The gap addressed is the lack of unified platforms for adaptive management—tools that not only store and visualize information but actively guide enforcement decisions and communicate threshold warnings to tourists in a way that is intelligible and engaging. Existing systems tend to be either purely scientific (e.g., GIS mapping) or reactive (e.g., trail closures), lacking a predictive layer that translates real-time visitor and environmental data into actionable insights. By merging perceptual

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and empirical data into a single decision-making interface, this framework enables a move from reactive to proactive sustainability governance.

In essence, the proposed dashboard redefines carrying capacity not as a fixed number, but as a fluctuating envelope of tolerable change—one that can be monitored, visualized, and acted upon dynamically to maintain both ecological resilience and visitor satisfaction in fragile natural areas (Mota et al., 2021); (Theocharous et al., 2019).

Keywords: Sustainable tourism; Carrying capacity; Natural trails; Safety perception; Artificial intelligence; Indicator dashboard; Destination management; Island regions; Environmental monitoring; Nature-based tourism

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CONSTRUCTING PLAYER PROFILES FOR STRATEGIC ANALYSIS IN HIGHER EDUCATION

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ABSTRACT

This paper proposes a methodology for the construction of player profiles based on strategic decisions made in simulated games, with practical application in higher education — particularly in disciplines such as tourism, management, and economics. Grounded in the theoretical foundations of game theory, decision psychology, and educational gamification, the model enables the classification of participants into four distinct behavioral profiles: Competitive, Cooperative, Adaptive, and Cautious.

Gamification in education has gained prominence as a pedagogical strategy that enhances student motivation and supports the development of transversal skills such as decision-making, critical thinking, risk management, and collaboration (Gee, 2003; Plass, Homer, & Kinzer, 2015; Hamari, Koivisto & Sarsa, 2016). Beyond its motivational appeal, game-based environments provide ideal conditions for the systematic collection of behavioral data, offering a robust analytical foundation. The identification of strategic profiles allows educators to personalize pedagogical challenges and provide individualized feedback, fostering student self-awareness and metacognitive development (Loh & Li, 2018; Slater et al., 2022).

The scientific rationale for this profiling approach is supported by prior research on educational games and decision tracking. Loh, Li, and Sheng (2016) pioneered the use of in-game interaction data to identify player behavior patterns, developing the Explorer, Fulfiller, and Quitter profiles. This work was expanded by Loh and Li (2018), who introduced the GAD profiles (Gameplay Action-Decision) to support personalized instructional pathways. Bicalho, Baffa, and Feijó (2019) applied clustering algorithms (e.g., K-means, decision trees) to categorize players using an educational adaptation of Bartle's taxonomy, demonstrating predictive reliability. Mizrahi, Laufer, and Zuckerman (2020) confirmed that cognitive-strategic styles directly influence performance in tacit coordination games. More recent studies reinforce that player profiling is a critical component for designing effective adaptive learning environments (Slater et al., 2022; Aydin, Karal & Nabiyev, 2022), including in artificial intelligence and competitive simulations (Zare et al., 2022).

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The methodology applied in this study is based on a structured questionnaire composed of 12 items (11 multiple-choice and one open-ended), designed to identify strategic behavior patterns in simulated decision-making contexts. Each question was constructed to capture key dimensions such as: individual versus collective gain orientation, responsiveness to competitors, propensity for cooperation, risk aversion, strategic value prioritization (e.g., profit vs. reputation), experience with simulations, adaptability in unpredictable situations, declared competitiveness, and self-perceived decision-making style.

Each response is mapped to one or more of the four behavioral profiles. Scoring is based on the degree of alignment between the selected option and the characteristics of each profile: 2 points for strong alignment, 1 point for partial alignment, and 0 points for non-alignment. The total score determines the participant's dominant profile. The open-ended question is used to validate or refine the result, allowing for deeper insight into subtle behavioral tendencies not captured in the multiple-choice structure.

In addition to the survey, students engaged in an interactive simulation involving three sequential pricing decisions (game rounds) between two competing hotels, inspired by the classic Prisoner's Dilemma. Each decision involved choosing between a high or low room price. The decision patterns were then compared with the player's identified profile. A final reflective question helped to further identify the Cautious profile, especially in cases where hesitation, need for additional information, or high risk aversion was observed.

The full solution was tested with higher education students and implemented within the Google Workspace ecosystem, using Google Forms for data collection, Google Sheets for automatic scoring, and Google Apps Script to send customized feedback to each participant. The system is fully automated, scalable, and compliant with General Data Protection Regulation (GDPR) standards.

This profiling model demonstrates the dual pedagogical and analytical value of strategic behavioral classification. By offering personalized and theory-based feedback, the model not only enhances learners' strategic awareness, but also equips educators with a valuable tool to tailor educational experiences to the strategic inclinations of their students. This contributes to more dynamic, responsive, and effective learning environments, better aligned with the demands of professional life in volatile and complex decision-making contexts.

Keywords: Game-based learning, player profiling, strategic decision-making, gamification, higher education, behavioral analysis, adaptive learning, educational simulations, tourism education, game theory.

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OPTIMIZING TOURISM PROMOTION SPENDING THROUGH MARKET SHARE AND GROWTH POTENTIAL ANALYSIS: A STRATEGIC FRAMEWORK

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ABSTRACT

Tourism promotion represents a significant area of public expenditure for national and regional destination management organizations (DMOs). Despite the increasing complexity of global tourism markets, promotional budgets are frequently allocated based on historical precedent or political imperatives rather than through strategic, evidence-based methodologies. As global travel patterns shift and emerging markets gain prominence, there is a growing imperative to reassess how promotional resources are allocated across source markets to maximize both impact and return on investment (ROI). This study addresses a critical gap in both research and policy: the absence of a structured framework that aligns promotional spending per tourist with current market share and projected growth potential.

The existing literature on tourism promotion identifies several methodological limitations in the evaluation of promotional effectiveness. While studies have generally found a positive correlation between promotional expenditure and tourism demand (Witt & Martin, 1987; Crouch, 1995), results often vary significantly depending on market conditions, methodological choices, and campaign-specific factors. Moreover, ROI assessments typically suffer from a lack of comparability across markets and temporal periods, thereby reducing their strategic utility (Kulendran & Divisekera, 2007). In addition, most evaluations neglect forward-looking metrics such as market growth potential, which are essential for informed long-term planning (Zhang, 2016).

To address these limitations, this study introduces a novel conceptual and analytical model informed by performance evaluation theory and adapted from financial analysis: the Tourism Promotion Efficiency-to-Growth (TPEG) Ratio. The TPEG Ratio is defined as promotional spending per tourist divided by the compound annual growth rate (CAGR) of arrivals from a given market. This metric provides a normalized measure that accounts for both current promotional efficiency and the future growth potential of each market. Lower TPEG values indicate more efficient investment in high-potential markets, whereas higher values may suggest overinvestment or market saturation.

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This ratio is embedded within a strategic market classification framework inspired by the Boston Consulting Group (BCG) matrix (Henderson, 1970), but adapted for tourism contexts using ecosystem-themed categories: Keystone Markets (high share, high growth), Anchor Markets (high share, low growth), Seed Markets (low share, high growth), and Drift Markets (low share, low growth). This refined matrix offers policymakers a data-driven tool for prioritizing promotional budgets in accordance with both empirical performance and strategic opportunity.

To operationalize the model, a five-year dataset was assembled encompassing international source markets, integrating promotional expenditure, tourist arrival statistics, and macroeconomic indicators such as GDP per capita growth and air connectivity. Key variables computed include Spending per Guest, Market Share, Return on Promotion (ROP), and the TPEG Ratio. The findings reveal a notable misalignment between budget allocations and market potential. For instance, markets receiving the highest promotional investment often exhibit low growth rates and high TPEG values, signaling inefficient resource use (Kotíková & Pavlů, 2020). In contrast, underfunded emerging markets—categorized as Seed Markets—demonstrate robust growth potential and low TPEG values, highlighting opportunities for more strategic investment.

The application of this model offers a dynamic and context-sensitive approach to tourism promotion strategy. It allows DMOs to move beyond static performance indicators and adopt adaptive strategies that reflect contemporary shifts in tourism flows and economic fundamentals. Moreover, the framework fosters transparency and accountability by enabling performance benchmarking across regions and over time.

This paper contributes to the tourism marketing literature by integrating interdisciplinary methodologies to inform strategic decision-making. It offers a conceptual advancement over conventional ROI metrics and introduces a practical tool for policymakers to optimize promotional resource allocation. By aligning strategy with both market share and growth potential, the model supports more resilient and forward-looking approaches to tourism development.

Keywords: tourism promotion, strategic marketing, TPEG ratio, market share, growth potential, investment efficiency, tourism policy

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OVERCOMING NIMBY: COMMUNITY-RELATED FACTORS INFLUENCING ACCEPTANCE OF CHEMICAL RECYCLING FACILITIES

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ABSTRACT

INTRODUCTION

A recycling plant is an industrial facility of public interest, but it has an impact on the residents of the community in which it is installed (Wang et al., 2022). Although such structures are sometimes deemed necessary for the development of a country, they can have negative effects on local communities and are often strongly opposed by local residents (Nie et al., 2020). This type of opposition is referred to as the NIMBY (Not In My BackYard) syndrome, which is defined as public resistance to the construction of certain facilities within urban areas (van der Horst, 2007; Sun et al., 2016; Uji, Prakash, and Song, 2021). Managing NIMBY syndrome is particularly relevant when it comes to the establishment of recycling plants, as it can significantly influence their acceptance. "Public acceptance" and "social license to operate", which sometimes have overlapping definitions, are the main approaches proposed in the literature for managing NIMBY syndrome (Xu et al., 2023). The relevant literature identifies three main causes of NIMBY conflicts (Sun et al., 2016): the first stems from the community, the second from the location of the recycling plant, and the third from political and socio-economic factors. Focusing on these, the research question guiding this study can be summarised as follows: *which community-related factors influence the social acceptance of recycling facilities characterised by the NIMBY syndrome?*

LITERATURE REVIEW

A review of the literature suggests that the primary variables influencing the social acceptance of a facility are: (1) perception of benefits, (2) perception of risk, and (3) public trust in institutional entities. It is important to note that these factors do not operate in isolation but rather interact with one another, either reinforcing or mitigating their effects. The perception of environmental benefits is positively associated with acceptance (Yildiz, 2019) and is influenced by environmental attitudes, perceptions of economic and environmental benefits, and a sense of belonging to the local area (Liu et al., 2017; Nie et al., 2020). The second variable, risk perception, refers to a subjective assessment based on the perceived probability and potential negative outcome of an adverse event. Risk perception is a complex construct, as it combines individual beliefs, knowledge of causes and consequences, and

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affective responses such as fear or anxiety (Arning et al., 2020). Information has been demonstrated to have a direct influence on risk perception, as it raises awareness of potential benefits and reduces concerns about possible consequences (Soland et al., 2013). However, since perception is subjective, information alone may not be sufficient to mitigate unfavourable attitudes (Liu et al., 2018). Trust is identified as the third variable affecting the social acceptance, particularly when the technology involved is complex and difficult to understand (Soland et al., 2013). In such cases, individuals tend to rely less on specific information and more on decision-makers, based on the belief that they are competent and reliable (Upreti et al., 2004). When pre-existing trust within the local community is lacking, it can be fostered through transparency, stakeholder communication (Ferry & Eckersley, 2015), and active community engagement (Liu et al., 2018).

MATERIALS AND METHOD

This study stems from a project for Ecopneus, an Italian consortium overseeing the tracking, collection, processing, and disposal of End-of-Life Tires (ELTs). It conducts an exploratory analysis of the factors enabling or hindering the social acceptance of recycling facilities. To assess public willingness to accept a chemical recycling plant for ELTs in Italy, a questionnaire was designed using a funnel structure. Comprising 25 questions across three sections—introduction (environmental awareness, perceptions about ELTs recycling), impact factors (perceived benefits, risks, costs, and trust), and demographics - it collected 300 responses via the CAWI (Computer-Assisted Web Interview) method between April 9 and May 9, 2022. The sample was miscellaneous in age, geography, gender, and education. Data analysis was performed using Jamovi: one-way ANOVA multiple tests were conducted to compare variables affecting social acceptance (e.g. environmental awareness, perception of benefits and risks, and public trust) based on community-related factors (e.g. gender, age, education…).

RESULTS IN SHORT

Results indicate that environmental awareness, perception of benefits and risks, and public trust exhibit varying degrees of influence on the social acceptance of a chemical recycling facility for ELTs depending on age, geographical origin, educational background, and occupation. However, no statistically significant differences were observed concerning gender, suggesting a relatively homogeneous level of social acceptance across this demographic variable. Concerning age, results reveal that, quite surprisingly, younger individuals exhibit lower environmental concern (statistically significant difference compared to all the other age groups - Youth (-0.26**), Adults (-0.40***), and

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Third age (-0.45***)) and higher risk perception than in the Third Age (+0.44***). However, they are more willing to engage in public discussions, showing a preference for consultation tables over Adults (+0.31**) and the Third Age (+0.35**), as well as for information desks over Adults (+0.38**) and the Third Age (+0.35**). With regard to the perception of benefits, only adults show a statistically significant difference compared to Youth (-0.20**). Geographically, Northern Italy exhibits the highest level of acceptance, with lower risk perception, as indicated by a shorter minimum acceptable distance from the plant compared to Central Italy (-0.40**) and the South & Islands (-0.40**). Central Italy is less responsive to local community engagement initiatives than Northern Italy (-0.30**) and the South & Islands (-0.38***). The South & Islands demonstrate a lower perception of benefits (-0.40**) compared to Northern Italy. Regarding education, individuals with a middle school certificate perceive the benefits of the chemical recycling plant to a lesser extent than those with a Bachelor's/Master's degree (-0.66**) or a postgraduate degree (-0.69**). Additionally, those with a high school diploma perceive lower economic and environmental risks than individuals with a Bachelor's/Master's degree (-0.23**) or a postgraduate degree (-0.38**). However, public trust remains low across all educational levels, with no statistically significant differences in the group averages. Concerning occupation, results show that the Unemployed have a less favourable environmental attitude than Employees (-0.39***), Self-employed (-0.52***) and Retired (-0.46***) while Students show a less favourable environmental attitude than Employees (-0.36***), Workers (-0.50***) and Retired (-0.45***). With respect to the perception of economic and environmental benefits, the Unemployed show a lower perception than Students (-0.65**), Employees (-0.60**) and Self-employed (-0.67**). In addition, the self-employed are less likely to accept the implant in return for economic compensation than the Unemployed (-0.52**), Employees (-0.57***) and Students (-0.57***).

CONCLUSION AND FUTURE RESEARCH

This study contributes to the literature on social acceptance and industry-community relations in managing NIMBY syndrome. The findings offer managerial insights, aiding decision-making for stakeholders. Plant operators can assess costs, benefits, and risks for site selection and operations. Policymakers can develop targeted communication strategies to highlight community benefits. Public engagement and environmental education are key to securing a social license to operate. The study's findings are not generalizable, necessitating broader research. Methodological limitations, including variance analysis, restricted comprehensive comparisons. Future research should employ SEM to enhance analytical robustness.

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Keywords: social acceptance, recycling plants, NIMBY syndrome, local communities; End-of-Life Tires (ELTs); Italy.

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TYPOLOGY OF INTERGENERATIONAL MICROFOUNDATIONS DRIVING INTRAPRENEURAIL DYNAMIC CAPABILITIES IN FAMILY BUSINESSES

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ABSTRACT

Family businesses (FB) are defined as organisations where a family holds significant control over strategic decisions and where there is an explicit intention of generational transmission (Gomes Soares et al., 2021). According to Colli and Rose (2003), these businesses are a predominant organisational form in the global economy and play a key role in the entrepreneurial ecosystem (Kelley et al., 2020). Family businesses can be distinguished by a number of specific characteristics that influence the way they operate, their governance, and their ability to innovate : family control and succession planning (Chua, Chrisman, & Sharma, 1999), emotional attachment and socio-emotional wealth (Gómez-Mejía et al, 2011), long-term orientation (Ntari & Deliwe, 2024), legacy (De Massis et al., 2016, Radu-Lefebvre et al., 2024) of the founder (Maclean et al., 2015), family legacy such as shared values and traditions (Hernandez-Perlines et al., 2021), entrepreneurial legacy (Seuneke et al., 2013). Although these characteristics favour stability, organisational identity and intergenerational continuity (Suddaby & Jaskiewicz, 2020; Burton et al., 2022), they can limit innovation and initiatives (Combs et al., 2023; Barbera et al., 2018). It is in this context that family intrapreneurship emerges: a form of innovation driven by internal members, especially the new generation (NextGen) (Canovi et al, 2023).

To renew themselves without losing their identity, FB need to develop Intrapreneurial dynamic intrapreneurial capabilities (IDC), defined here according to Eisenhardt and Martin (2000) as specific, intentional and adaptable routines, enabling an organisation to reconfigure its resources to adapt to changing environments. This contrasts with the view based on isolated skills or impersonal processes. This perspective emphasises reproducible but evolving routines, which FB must contextualise within their specific cultural and relational context. In a FB, these processes are not neutral: they depend heavily on generational balance and mutual trust (Hauck and Prügl, 2015), important characteristics or microfoundations for fostering the development of family intrapreneurship.

Microfoundations, according to Felin and Foss (2005) and Felin, Foss and Ployhart (2015), refer to the study of routines, behaviours and interactions at the individual and relational level. In an FB, this includes in particular: motivation, cognitive capacity, family values and the relational posture of the

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players. This highlights that the ability of a FB to innovate through intrapreneurship depends not on a particular generation, but on the dynamic interaction between the NextGen and the parent/founder. For example, NextGen often brings more modern human capital (education, technological experience), a spirit of disruption and a greater tolerance of risk (Allen et al., 2020; Monge, 2023). The parent, on the other hand, often plays the central role of founder, influencing the company's strategic decisions and identity. The parent can then act as a resource (mentor, emotional support) or a barrier (control, refusal of change) (Canovi et al., 2023; Bergfeld, 2022). It is these interactions that form the basis of IDC.

Although some research has mobilised the theory of dynamic capabilities in the context of family businesses (Hernandez-Perlines et al., 2019; Kariv et al, 2023), it has rarely focused on the intrapreneurial dimension of these capabilities, i.e. the internal dynamics of strategic renewal driven by family members. Moreover, most of these studies do not consider the individual and relational characteristics of family players, particularly according to the intergenerational microfoundations approach (Felin et al., 2012). Hence this research aims to understand how interactions between NextGen and parent activate - or hinder - dynamic intrapreneurial capacities, by identifying a typology based on their individual and relational profiles.

METHODOLOGY

This study is based on an inductive qualitative approach conducted on 15 cases of Canadian FB between 2020 and 2024. The data were collected through seventeen semi-structured interviews with the founders and members of the NextGen, supplemented by internal documents (activity reports, 114 videos) and external documents (specialist press). The analysis was carried out using thematic coding with NVivo, focusing on three dimensions: NextGen traits, parent posture, and impact on intrapreneurial dynamics. Based on this methodology, a typology of four intergenerational configurations is suggested, classified along two axes: alignment of intentions and parental posture (control/support).

RESULTS: TYPOLOGY OF INTERGENERATIONAL MICROFOUNDATIONS

Typology 1: Co-constructed intrapreneurship

In this configuration, the parent adopts a strategic support role. He or she lets go, listens actively and is determined to pass on the project, while recognising the legitimacy of the NextGen project. The

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latter, intrinsically motivated, mobilises its cognitive and relational capacities to build a vision aligned with family values, while asserting its strategic autonomy. The result is a fluid, shared intrapreneurship process, where the project is co-constructed, supported by a solid generational alliance.

Typology 2: Autonomous intrapreneurship under pressure

Here, the NextGen plays a driving and pioneering role in the emergence of intrapreneurship, but in a context of weak alignment with the parent. The parent has an ambivalent position: sometimes an emotional presence, but strategic withdrawal or resistance to change. The NextGen displays a strong autonomy, a desire to break new ground and a capacity for independent behaviour but comes up against a lack of recognition or support. The intrapreneurial dynamic develops unilaterally, often in conflict or frustration, which increases the relational and emotional cost.

Typology 3: Intrapreneurial discontinuity

In this configuration, the two generations fail to establish a dialogue or mutual recognition. The parent is in a position of closure, or even denial, and is anchored in a logic of static continuity. Faced with this blockage, the NextGen experiences a loss of motivation, growing isolation and difficulty in establishing its legitimacy within the family business. The intrapreneurial process is thus blocked. None of the dynamic capabilities is fully activated.

Typology 4: Identity- and affect-driven intrapreneurship

This last configuration is based on a strong emotional and empathic relationship between the parent and the NextGen, but without any strong strategic alignment. The parent's role is one of moral support and reassurance, without imposing direction or normative expectations. The NextGen, on the other hand, is mainly motivated by bonding and personal recognition, and develops projects with little strategic scope, but with a strong identity value. This type of dynamic contributes more to building a sense of belonging than to a major organisational transformation.

DISCUSSION

This research suggests an intergenerational and behavioural reading of dynamic capabilities in FB. It moves away from structural visions to show that family intrapreneurship is the product of a system of intergenerational microfoundations. Successful IDC does not depend solely on the strategic vision of

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the NextGen, but on the quality of intergenerational cooperation. By incorporating the definition of Eisenhardt and Martin (2000), the study proposes an original integration of the microfoundations perspective in the family context. From a managerial point of view, this research provides a richly illustrated typology to guide family businesses in developing their intrapreneurial strategy.

Keywords: Family business, intrapreneurship, dynamic capabilities, intergenerational, microfondation, NextGen, Parent.

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SUSTAINABLE TRANSITIONS IN FOOD WORLDS: THE ROLE OF CHEFS AND ENOGASTRONOMY PROFESSIONALS

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ABSTRACT

The 2024 "tractor protests" across Europe revealed the deep tensions surrounding the sustainable transition of food systems. Unsurprisingly, the agricultural and food value chains do show the same resistance to change that characterizes many other economic sectors and social set-ups when the redefinition of who wins and who loses is determined by pressing urgencies of climate crises (Wanvik, Haarstad, 2021).

Responsible for nearly one-third of global greenhouse gas emissions (Fao, 2024), the food sector is under mounting pressure. As noted in a recent letter by hundreds of scientists (VV.AA., 2024), farmers are now expected to feed a growing population and mitigate climate and biodiversity crises, all while grappling with volatile market dynamics. Unsurprisingly, political debates have focused heavily on primary production and the impact of the Common Agricultural Policy.

While fundamental, the focus on the inner core of the sector, and especially on the upstream phases, logics, and power relations involving actors in agriculture, food production, food distribution, might not be enough both to theoretically frame processes of change, innovation and restructuring of industries and economies and to orient impact-oriented policy making (Pereira et al., 2020). This paper argues that meaningful and systemic change cannot occur without addressing the downstream segments of the food system and especially the actors marshalling the intersection among production and consumption (Baggini, 2025; Richardson, Fernqvist, 2024; Guzanic, 2022): namely, food processing, gastronomy, and consumption. These actors, in fact, do act as brokers between a hodgepodge of audiences and clients –gourmands, regular consumers, various categories of "eaters"– and distributors and producers. In addition, the explosion and success of "haute cuisine" as a creative industry has inaugurated a novel era of influence exerted by notable gastronomy figures on consumers worldwide (Svejenova et al., 2010; Leer, 2016).

Heterogeneous literature on the role of chefs as agents of change in the transition towards more sustainable food systems has already documented cases and frameworks to better frame the role of an often-neglected set of actors in the overall discussion of value chain restructuring (Richardson and

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Fernqvist, 2024). For instance, through their visibility and their capacity to influence consumer food choices, chefs and the broader restaurant industry can significantly contribute to the transition by promoting healthier diets and raising awareness around food waste—an issue that, in 2022, amounted to 1.05 billion tonnes globally, with approximately 30% attributable to the food service sector (UNEP, 2024). By making deliberate choices in terms of procurement (favoring local, seasonal, and organic products), process management (reducing food waste, increasing energy efficiency, minimizing packaging), and gastronomic offerings (sustainable and healthy menus), the restaurant sector can play a tangible role in the transition—particularly in relation to food security, public health, and environmental protection. These initiatives are especially relevant in a context where unhealthy diets are among the primary factors contributing to obesity and overweight. According to WHO data, in 2022 more than 2 billion people globally were overweight, with approximately 890 million classified as obese—a trend increasingly affecting younger populations. This phenomenon risks surpassing the number of people suffering from undernutrition, currently estimated at around 821 million worldwide (Phelps et al., 2022).

Extant literature insists on gastronomy professionals' potential to ignite change based on three pillars: (1) the technical skills embedded in artisanal food professions, (2) the dense social and supply networks in which these actors operate, and (3) their organizational agility to innovate in products, formats, and narratives. More visible and notable gastronomy figures, in fact, are not merely preservers of tradition: they are often experimenters and cultural mediators. From chefs who valorize underutilized species and whole-animal cuisine to winemakers and "garagistes" exploring new techniques for sustainability and terroir expression, food artisans can catalyze sustainable practices and mobilize local supply chains and consumer communities around them (Miller, 2023; Firth, 2024; Balderas et al., 2025; Mattioni et al. 2024).

Through a systematic analysis of the literature, our paper produces a framework to think about the role and agency of gastronomy professionals in triggering change in food systems. In particular, it highlights and proposes how the state-of-the-art points toward that agency to be expressed at the urban and regional scales. The culinary artisanship embedded in cities and food-producing regions is well-positioned to craft new connections between geographies, knowledge systems, and sustainability objectives. Such a situation is both the result of superstar chefs embracing the "local filiere"/zero km philosophy and to craft their narratives around the value of local networks of producers and of the importance of revisiting the geographical scope of consumers choices to limit the anthropogenic impact of contemporary diets. What the literature reveals, is that the agency of chefs lies mostly in their ability to construct narratives, and ensuing business models, that render visible the hidden

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geographies of ingredients, the environmental and social costs of imported superfoods, and the labor realities of global supply chains.

While scattered and fragmented, literature in a variety of fields concurs and agrees on the nature of culinary professionals as agents of change and on the pool of they might use to interpret such function. Our paper, though, digs deep into the constraining factors and on the dimensions that still limit the scope at which chefs influence the logics of food value chains.

According to a qualitative research design, we are conducting interviews with chefs, professionals in the gastronomy industry and experts, as well as reconstructing cases of restaurants that either explicitly aim at contributing to the sustainability of food systems or proceed with old and regular practices. The aim of the study is to identify the constraints that currently limit the sheer number of activists-chefs and their efficacy in promoting food systems' transitions and transformations.

Preliminary results of our analysis show that many factors might be responsible for such limitations and might require policymaking to focus more on actions aimed at leveraging on the transformational potential of gastronomy professionals. In particular, the main limitations we document and elaborate on are:

1. Power struggles and asymmetries in distribution chains and in business models, especially when cost structure drivers are concerned;

2. Asymmetries in the construction of a shared "conscience" with larger audiences and in food literacy at scale;

3. Cultural gaps and lack of prepared human capital: while technical skills might be widespread, the competences and skills to mobilize resources, other actors are still missing and might require a redesign of the whole system of training;

4. Obstacles to constructing local coalitions of food producers, gastronomy professionals that experiment novel approaches in local context and then scale them up either through replication or "contagion" across regions and locales.

Based on the systematization of these preliminary results and their in-depth analysis and discussion, the paper will then address policymaking actions that might strengthen chefs' and gastronomy professionals in igniting and triggering food systems change.

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Keywords: Food worlds; food systems; Sustainable transition; Enogastronomy; mobilisation; systemic change; System dynamics; chefs; restaurants

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THE ROLE OF CREATIVE LEARNING IN CIRCULAR BIOECONOMY ENVIRONMENTAL AWARENESS: THE CASE STUDY OF CL4BIO AND MATH4SUSTAINABILITY PROJECTS

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ABSTRACT

INTRODUCTION

Teaching and educating are among the most exciting and challenging tasks for lecturers. Nowadays, the majority of educational methods are rigid and standardised, requiring youth to maintain a high level of concentration and to spend a lot of time seated. In response to the social distancing caused by Covid-19, education has shifted to remote e-learning, generating new challenges and demanding further efforts from students (Aboagye, 2020). One solution to this rigidity could be *Creative Learning Method* (CLM), a new and innovative educational approach that introduces creativity to increase motivation and attention from young people. A prime example of CLM is the *Case Study Competition*, which gives students the opportunity to apply their skills and knowledge to tackle challenges of a real-life case (Sobczak-Malitka and Drejerska, 2023). The Erasmus+ project "Cl4bio – Creative Learning for Boosting Bio-Economy within HEIs' Curricula" is among the first projects, which adopt Creative Learning. Specifically, the project's specific goal is to provide bioeconomy courses in an easy and inspiring way by using possibilities thinking (Craft et al., 2012; Burnard et al., 2006), a pedagogical framework based on the critic through and the multifaceted analysis of a case, and the perception of reality under different aspects and with a variety of potential solutions. Although the project focuses on bioeconomy, sustainability, agricultural challenges, its approach could be applicable across various disciplines. For instance, it has been used in "Math4Sustainability" project, funded under the programme Erasmus+. It aims to promote the active participation of teachers as agents of change towards green and sustainable practices, demonstrating how environmental sustainability can be addressed through different school disciplines and curricula that relate to STEAM (Science, Technology, Engineering, Arts, and Mathematics). By bridging current research on environmental sustainability and recreational maths, *Math4Sustainability* is developing hands-on exhibitions to bridge these areas. This offers new avenues for understanding how maths, as a fundamental part of STEAM, can contribute to environmental education. Following recommendations

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on integrating socio-scientific questions into science education, the project encourages alternative forms of participation for the students in line with Youth Participation Strategy (2018), 'participation which extensively utilises digital tools and spaces', and explores environmental dilemmas through classroom pop-up exhibitions, fostering open discussions (European Education and Culture Executive Agency, 2022).

This case study reveals how pedagogical and methodological approach provides opportunities for integrating environmental sustainability through exhibitions that can serve as educational resources in classrooms. As also reported by Wong et al. (2015), exhibitions play a crucial role in environmental education by providing a platform to raise awareness, educate the public, and inspire action toward environmental conservation and sustainability.

METHODOLOGY

For promoting creative learning, Cl4bio project proposes the possibility thinking methodological approach (Symeonidou et al., 2025), that aligns with the "European Sustainability Competence Framework" GreenComp (Bianchi et al., 2022) and requires re-imagining and creating paths and new possibilities. It trails the following core aspects:

- Imaginative/Creative Exploration: students are encouraged to visualize solutions asking questions "What if" and "What else can be". Specifically, they are encouraged to visualize impossible solutions and try to make them possible;

- Problem-based Learning: students are encouraged to foster critical thinking for resolving real-world challenges;

- Resilience Building: students learn to be determined.

For adopting this creative learning methodology in *Math4Sustainability*, the University of Foggia team involved in the project has developed a serious game aimed to create a "sustainable city" to help students learn about environmental education and sustainability through a playful and inspiring activity, rather than traditional classroom lessons. In this game, students answer questions and dilemmas from a set of 100 "Sustainability Questions" about STEAM, mixed with sustainability and environmental issue, and place sustainable "city tiles" on a grid to build the "sustainable city". By playing the game, students are faced with real-life cases and are encouraged to find the best solutions in a creative and participatory way. In addition, Math4Sustainability implemented the *Green Living*

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Lab, to engage secondary school teachers of any specialization per country to develop the game in an experimentation process on how democratic dialogue and environmental sustainability can be realized through STEAM as exhibitions. Within the *Green Living Labs*, science museums, environmental science professionals, and teachers were engaged in discussion, co-creation, and prototyping of game as exhibit.

RESULTS

The realization of the *Math4Sustainability* game has contributed to the interaction of different actors for the co-creation and implementation of the *Green Living Lab*, presenting different advantages compared to digital or classical games. Being all game' elements realised manually, using recycled material (e.g. cardboard or paper sheets), the game requires physical involvement of the students, although digital games can present many mental exercises, they fail to provide physical exercise. Moreover, given that digital technology still costs a lot of money and not all schools have the ability and financial resources to afford digital equipment purchases, adopting this analogue game with distraction-free environment, live-actions, role-playing and cards, the digital divide among students is avoided. Lastly, as also reported by Minotou et al. (2023), when evaluating the role of exhibitions for environmental education and awareness, students playing the game will ameliorate their skills and will be able to develop interpersonal competencies like critical thinking, problem-solving, negotiation and teamwork, and acquire knowledge of EU goals. On the other hand, participants of the Green Living Lab had the opportunity to collaborate and open up new pathways for using environmentally sustainable practices in museums and school education.

LIMITATIONS

Further investigation is necessary because the *Math4Sustainability* game is still in a pilot phase, and needs to ensure that teachers' role is well positioned to verify that students are engaged and motivated while also developing their growth mindset. Furthermore, the above-described projects are addressed to different targets of students. Specifically, *Cl4Bio* aims to enhance the educational approach for university students and to increase their skills for facing real-life cases, whereas *Math4Sustainability* is addressed to high school students. Even though the potential of the *CL4Bio* training material adaptation to a different contest, a fine tuning of the creative learning methodology must be set up in order to address high school students properly and make them involved in STEAM disciplines.

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FUTURE RESEARCH

Starting from these limitations, one future step could be to scale-up this approach, testing the ***Math4Sustainability*** game with different ages of students, supported by diverse STEAM disciplines teachers to expose them to a series of challenges and real-world environmental situations using the creative learning. In this way, students can effectively be part of circular-bioeconomy-environmental awareness with systematic and innovative character and extroversion.

Keywords: Creative learning; education; Cl4bio; Math4Sustainability; Erasmus+; exhibitions; serious game; STEAM; skills.

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IS GAMIFICATION PROMOTING CONSUMERS' FOOD SAFETY? A RAPID REVIEW

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ABSTRACT

Gamification is a phenomenon which is growing significantly together with the spread of digital technologies. It refers to the implementation of game-like elements and mechanics into non-game contexts to engage users and encourage specific behaviors (Latino et al., 2023). Gamification uses the inherent motivational power of games to refresh content, incentivize learning and promote desired behaviors (Bassanelli et al., 2022).

The core of an effective gamification is a well-designed reward system, which is crucial for increasing user interaction and achieving specific behavioral outcomes (Sharma et al., 2024). The successful construction of a reward system relies on understanding the motivations of the target audience, establishing measurable goals and providing timely feedback on performance. Examples of these reward systems are the badge systems, i.e. prominent tools which offer users visual recognition for achievements and motivation arising from a sense of accomplishment and status.

Another key component of gamification is narrative storytelling, used to enhance emotional and cognitive engagement by framing activities within a compelling plot with relatable characters and clear milestones.

Finally, within the framework of gamification collaborative dynamics are also important, involving team-based challenges and shared goals, which foster cooperation and sense of community among participants.

All these components allow gamification to address significant societal challenges, providing a powerful and versatile toolkit for driving behavioral change, transforming routine tasks into engaging experiences and motivating individuals toward positive societal shifts.

The main objective of the study is to analyze the consumers' adoption of gamification for food safety.

A literature search was carried out on Scopus and Web of Science databases using both keywords "food" and "gamification", applying the PRISMA approach. 69 scientific articles were extracted and considered eligible for the review. Other relevant documents and reports were identified by consulting gray literature and institutional websites.

The application of gamification to food safety has received little attention, revealing significant research gaps. Indeed, gamification within the food sector is still in its early stages and is often

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confined to specific domains, such as healthy dietary management (Ögel Aydin and Argan, 2021), food waste management (Santos et al., 2025) or environmental sustainability (Pettifor et al., 2024). For instance, food gamification apps highlight environmental impact and are used as a tool for reducing carbon emissions.

Pioneering research concerning the potential application of gamification in the food safety domain is only now beginning to emerge. Rodrigues et al. (2023) successfully developed an educational gamification strategy to improve food safety practices among family farmers in Brazil, demonstrating its applicability in less structured, community-based contexts.

While this study underlines the significant potential of gamification, it is still an isolated example applied to specific food safety scenarios. Despite 70% of population in the EU considers food safety to be a relevant topic (European Food Safety Authority, 2022), the scientific literature lacks a comprehensive and systematic approach to leveraging game mechanics for food safety.

Further research efforts should focus on investigating consumers' perspectives through a data-driven approach. This approach enables policymakers to move beyond theoretical assumptions and directly assess how consumers perceive the potential impact of gamification on their food safety behaviors. The desired outcome is an empirically based design of effective public incentives that encourage responsible consumer behavior, thereby mitigating the risk of ineffective policies.

Keywords: Consumers' behavior; Responsible consumption and production; Game mechanics; Public policies; Behavioral Economics

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ITALIAN HIGH-QUALITY WINES: A VALUE CHAIN ANALYSIS

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ABSTRACT

The agrifood sector is one of the most important in the Italian economy, generating 31,8 % of its GDP (Federalimentare, 2023), and providing labor to 17% of the Italian labor force (Istat, 2017). The agrifood sector is also considered one of the engines of the Italian exports, generating 8,1 % of annual Italian exports (Federalimentare, 2023).

There are products that are considered examples of the agrifood "Made in Italy", such as wines, olive oil, pasta, cheeses, and ham. The agrifood sector has performed very well in the last times, representing an excellent example of Italian food culture worldwide. In this paper, the focus will be on the high-quality wines value chain, that has performed extremely well in recent decades, both in terms of profitability and success on the domestic and export markets.

One of the important triggers for the recognition of the different types and quality of wines and their identity, both in the domestic and the international markets, was the introduction and adoption by the Italian government in 1963 of the controlled appellation system "Regulation to protect appellation of production origin of wine and wine grape juice" which defined: (i) approval of controlled appellations by designating the boundary of production regions, (ii) foundation of the associations of producers of grapes and wines to protect wine quality and (iii) establishment of the controlled appellations committees (Consortiums). Two categories of this classification apply to quality wines: DOC (Denominazione di Origine Controllata, in Italian, Controlled Designation of Origin) and DOCG (Denominazione di Origine Controllata e Garantita, in Italian, Controlled Designation of Origin Guaranteed), the latter introduced in 1980 for the highest quality wines (Federdoc, 2024).

The support for this classification and certification is that the winemakers operating in a particular area owe their success primarily to the quality of their products and the inseparable link between these products and their terroir, i.e. the particular geographical area and environment that give their grapes and wines their distinctive features (Vaudour, 2002; Conti et al., 2024).

This research analyzes each of the stakeholders in one of the most important and recognized Italian agrifood value chains (Porter, 1985, 2001; Davis & Goldberg, 1957; German et al., 2020): the DOC and DOCG wine value chain, to identify its stakeholders and roles.

The grape production area in 2023 was estimated in 675,000 hectares, dropping from 792,000 hectares in the year 2000. The average area per grape grower grew from 1 to 2,8 hectare per grower, showing a low level of concentration but growing over time. It is important to remark that the average size of grape

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production is higher in areas with vineyards producing DOC and DOCG wines. Domestic consumption of wine was 37 liters/person per year (ISMEA, 2024). There are ca. 33,000 wineries in Italy, many of them producing a small volume of wine. This is especially the case of wineries producing high-quality wines, that normally are small or medium size, most of them family owned, often for many generations. According to data from Mediobanca Research Area, in 2022 65.8% of wineries were under family control.

In the last five years the average national production of wine in Italy was 47 million hectoliters, with an export of 22 million hectoliters, placing Italy as the first producer and exporter of wine in the world. In the last five decades, there was a national and international process towards higher quality wines. An example of that is that the area dedicated to DOC and DOCG wines in Italy in the year 2000 was approximately 250,000 hectares, increasing to 400,000 hectares in the year 2021, with and impressive growth of 60% in just 20 years, demonstrating a determination towards quality. This is particularly the case of the international market, that is driven by the high-quality wines, generating for the first time a total export value of over 8 billion Euros in 2024. Exports are increasing in value regardless of the volume, that is variable. The Italian Northern regions are oriented towards high-quality wine production. Italian Northern wineries are normally privately own, family run, and with a high degree of value chain integration (grape-growing, winemaking, bottling, marketing and packaging). There is an environment of socio-economic mutual growth among the different stakeholders in the high-quality wine value chain. Figure 1 describes the value chain of the Italian high-quality wines: the paper enlightens the main phases, and the main stakeholders involved in each phase, analyzing the institutional context by focusing on the quality standards.

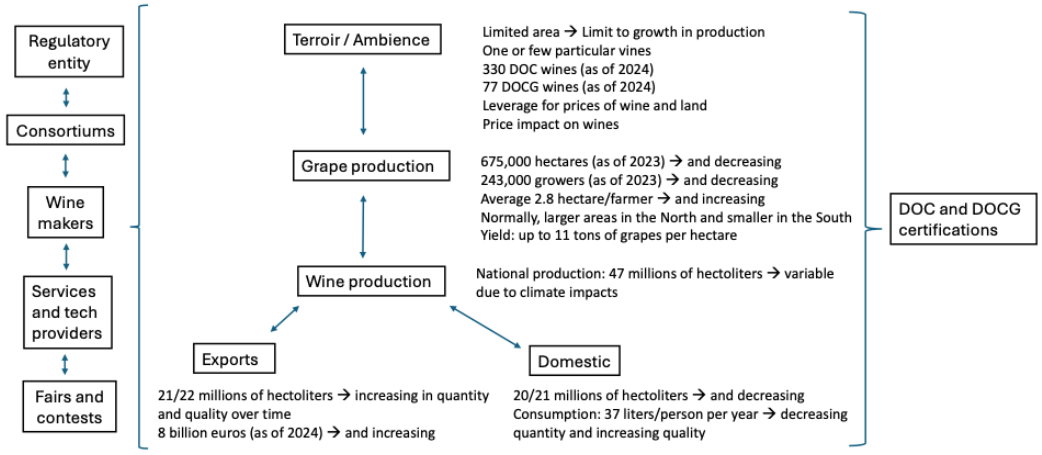


Figure 1: Framework of the main production and market phases of wine in Italy. Source: our elaboration

The key stakeholders identified in the Italian high-quality wines value chain are: (i) the consortiums of wine quality and the certification institution (Valoritalia, the Control Body authorized by the Ministry

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of Agriculture); (ii) wine fairs, such as Vinitaly; (iii) educational institutions for the research activities; (iv) providers of complementary products in production and marketing; and (v) the enotourism sector, providing services such as visits to the wineries, wine tasting, etc. and mainly focused on the value rings of marketing and sales activities of the value chain. These businesses networks serve as support for the relatively small companies operating in the high-quality wine sector, sustaining the whole value proposition.

Implications for scholars: the paper integrates the extant literature on high-quality wines, clearly identifying the sources of advantages of Italian DOC and DOCG wines. Implications for practitioners: the paper provides a multidimensional strategic framework of analysis to support the main stakeholders within the Italian high-quality wine ecosystem in adopting sustainable and regenerative practices for a higher value co-creation. Eventually, the paper will provide suggestions for future research paths.

Keywords: Wine business, Italian Agrifood sector, High-Quality Wines, Value Chain, Made in Italy.

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THE ILLUSION OF CHOICE: PARALLELS BETWEEN CORPORATE AND POLITICAL MARKET STRATEGIES

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ABSTRACT

Market competition serves as a fundamental pillar of economic efficiency, facilitating innovation, reducing prices, and enhancing the diversity of consumer options (Grullon, Larkin & Michaely, 2019). However, the growing concentration of markets, characterized by the dominance of a limited number of firms across entire industries, threatens to diminish these advantages. This issue is particularly evident within the alcohol industry, wherein a select few transnational corporations exert control over production, distribution, and marketing, thereby creating a façade of consumer choice while simultaneously suppressing competitive dynamics (Jernigan & Ross, 2020). This study explores three core theses. First, market concentration reinforces financial and political power asymmetries, allowing dominant firms to influence regulatory frameworks, suppress competition, and expand their market power through aggressive advertising and lobbying (Saidi & Streitz, 2021). Second, from a psychological perspective, the illusion of choice in highly concentrated markets misleads consumers into believing they have autonomy over their purchasing decisions, despite most brands being owned by the same corporations (Langer, 1975; Klusowski, Small & Simmons, 2021). Third, high levels of market concentration in the alcohol industry have profound socio-economic and public health consequences, limiting policy interventions and reducing protections for consumers (Movendi International, 2020; Babor et al., 2010).

EMPIRICAL ANALYSIS: THE ALCOHOL MARKET CASE STUDY

In order to rigorously examine these assertions, the present study conducts an empirical analysis of the alcohol market. Data from the industry reveals that the global alcohol market, valued at over $1.5 trillion in 2017, is primarily dominated by a small cohort of corporations, with the leading five producers—Anheuser-Busch InBev, Heineken, Diageo, Pernod Ricard, and Molson Coors—accounting for more than 50% of the global beer market and a substantial segment of the spirits market (Jernigan & Ross, 2020; Euromonitor International, 2019). The expenditures on advertising further exemplify this dominance. Anheuser-Busch InBev alone allocated in excess of $7 billion for marketing in 2022, overshadowing the cumulative budgets of its smaller rivals (Jernigan & Ross,

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2020). This financial pre-eminence allows market leaders to manipulate consumer preferences and perpetuate their dominance, thereby erecting formidable barriers to entry for independent producers. Furthermore, the influence of policy is paramount in perpetuating market concentration. Prominent alcohol corporations partake in extensive lobbying efforts, particularly within the United States and the European Union, aimed at obstructing the implementation of more stringent regulations concerning alcohol advertising and taxation (Jernigan, 2012; Mialon et al., 2016). As a result, self-regulatory practices within the industry prevail, frequently prioritizing corporate interests at the expense of public health considerations (Babor et al., 2010).

PARALLELS BETWEEN CORPORATE AND POLITICAL MARKET STRATEGIES

The strategies employed by corporations to consolidate market power—namely advertising, branding, and lobbying—are increasingly manifesting within the political domain. Political entities and interest groups utilize advanced marketing methodologies to fabricate the illusion of electoral choice while simultaneously preserving the existing status quo. Analogous to how corporate conglomerates possess multiple competing brands to imply diversity within the marketplace, political elites frequently orchestrate policy trajectories across various parties, thereby restricting meaningful distinctions among leading candidates (Chomsky, 1999; Gilens & Page, 2014). Lobbying activities further reinforce this illusion. In a manner akin to corporate behemoths swaying regulatory outcomes, influential interest groups shape legislative priorities to safeguard entrenched political and economic power frameworks (Drutman, 2015). Empirical investigations suggest that policy outcomes within Western democracies predominantly mirror the interests of economic elites and corporate lobbying entities rather than the preferences of the broader populace (Gilens & Page, 2014). This implies that in both consumer and political markets, the notion of choice is often a mere illusion perpetuated through strategic information manipulation, advertising, and financial leverage.

PUBLIC POLICY AND REGULATORY IMPLICATIONS

Given the substantial impact of market concentration and political lobbying, public policy plays a vital role in mitigating their negative effects. Several policy measures can help restore competitive market dynamics and protect both consumer and democratic integrity:

Stronger Antitrust Enforcement – Regulators must scrutinize mergers and acquisitions within the alcohol industry and beyond to prevent excessive concentration (Grullon, Larkin & Michaely, 2019);

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Corporate and Political Transparency – Mandating clear disclosures on corporate ownership of brands and political campaign funding can enable consumers and voters to make informed decisions (Babor et al., 2010; Drutman, 2015); **Stricter Advertising Regulations** – Governments should impose stricter limits on both corporate and political marketing to prevent undue influence on public perception (Mialon et al., 2016); **Lobbying Reform** – Increased regulation of lobbying activities can reduce the ability of corporations and elite groups to disproportionately influence policy decisions (Gilens & Page, 2014).

Absent effective policy interventions, market concentration is likely to persist in constraining authentic consumer choice, distorting competitive landscapes, and undermining democratic processes. This study underscores the imperative for a regulatory framework that reconciles corporate influence with the welfare of consumers and voters in order to foster a genuinely competitive and democratic system.

Keywords: Market concentration, consumer choice, political choice, competition, illusion of control, alcohol industry, corporate dominance, lobbying, economic inequality.

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EVALUATING THE MEDIATION ROLE OF OPERATION ORIENTATION IN THE RELATIONSHIP BETWEEN AI CAPABILITY AND ORGANIZATIONAL PERFORMANCE

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ABSTRACT

The main purpose of this study is to examine the impact of AI capability on organizational performance via mediation of operation orientation. The data analysis was done by SmartPLS 4 software and included 195 managers from Israeli companies that operate in international markets. The main findings show that AI capability affects both operation orientation and organizational performance. Additionally, the findings reveal that operation orientation serves as a partial mediator in the relationship between AI capability and organizational performance.

INTRODUCTION

In recent years, artificial intelligence (AI) has become a critical capability for many organizations. It impacts companies in various aspects related to their business operations and strategic decision-making. The rapid advancement of AI technologies has transformed the way businesses operate, offering new avenues for efficiency, automation, and innovation. AI capability refers to an organization's ability to effectively deploy and integrate AI tools to gain competitive advantage. While many studies have highlighted the direct impact of AI on organizational performance (OP), the role of operation orientation (OPO) as a mediator in this relationship remains relatively unexplored. So, this study aims to address this gap by examining how AI capability impacts organizational performance through operation orientation.

In addition, this study tries to answer a main research question which is whether AI capability and OPO can enhance OP ?. Following the above, the main contribution of this study is to advance the research literature by identifying AI capability and OPO as drivers of OP. Considerable research has documented the positive influence of these characteristics to OP. Hence, understanding how to manage and improve these characteristics is important both managerially and theoretically.

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BACKGROUND AND HYPOTHESES

AI capability

Artificial intelligence (AI) capability is defined as the ability to identify, interpret, make inferences, and learn from data to achieve organizational and societal objectives (Mikalef & Gupta, 2021) that are impossible to achieve using traditional methods (Schmidt et al., 2020). Different AI capabilities support organizations daily, such as automated routine activities, decision-making support, and communication capabilities (Mytrofanova et al., 2024; Schmidt et al., 2020). AI systems can generate knowledge and understand patterns from Big Data, enhancing organizational business value improvement and increasing competitive advantage (Enholm et al., 2022; Schrettenbrunnner, 2020). For example, IBM developed Watson—an AI system that provides answers to natural language questions in various organizational areas such as marketing, management, administration, finance, food, agriculture (Wamba-Taguimdje et al., 2020), and healthcare (Faheem & Dutta, 2023; Kohn et al., 2014).

Organizational performance

Organizational performance (OP) can be described as organizations' outcomes that arise from implementing its capabilities and operation orientation. OP can be defined as the degree to which companies achieve their business objectives (Lee & Choi, 2003). In this study, OP exhibits several organizational consequences such as short time-to-market, a wide range of products/services offered to customers, many new products/services under development, and a high success rate of new products/services (Levi-Bliech et al., 2018). OPO reflects an organization's commitment to improving operational efficiency and business processes, and serves as a crucial link that translates AI capability into performance improvements. Thus, we can assume that:

H_1: AI capability positively affects OP.

Operation orientation

Operation orientation (OPO) refers to managerial activities related to operation management. The main characteristics of operation orientation are cost, product quality, delivery, flexibility, compliance with customers' needs, and satisfaction (Shou et al., 2019). Elevating operation orientation improves organizational performance (Hult et al., 2008). Adding AI capabilities can improve OPO characteristics since AI supports operational management decision-making, automated routine

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activities, and improved communication and collaboration (Mytrofanova et al., 2024; Schmidt et al., 2020), which translates into better organizational performance. Thus, we can assume that:

H_2: AI capability positively affects OPO.

H_3: OPO positively affects OP.

RESULTS

The results of the hypothesis tests show that in *direct effects* all hypotheses were found to be significant ($p < .001$). So, *H1* to *H3* were supported. With respect to the *specific indirect effect*, the findings show that the path AI → OPO → OP was found to be significant ($p < .001$).

DISCUSSION AND CONCLUSIONS

This study aims to examine the impact of two organizational characteristics such AI capability and OPO on OP. The findings show that both AI capabılıty and OPO positively and directly affect OP. Comparing the beta coefficients of AI capabılıty and OPO (0.45 and 0.54, respectively) show that the impact of OPO on OP is stronger than the impact of AI capability on OP. So, managers who strive to increase their OP should strengthen their AI capabılıty. By leveraging AI capability, managers can simplify and optimize processes, improve decision-making, and advance overall efficiency which eventually may enhance OP.

Additionally, regarding the mediation role of OPO in the relationship between AI capability and OP, the findings show that OPO has a partial mediation role in this relationship. So, managers who desire to improve their OP need to integrate both AI capability and OPO in order to attain better OP and finally achieve competitive advantage.

Keywords: AI Capability, Operation Orientation, Organizational performance, Mediation

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EVALUATING THE ROLE OF DIGITAL TECHNOLOGY IN MITIGATING FOOD WASTE IN AGRICULTURAL MANAGEMENT

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ABSTRACT

INTRODUCTION

Food loss and waste (FLW) represents a significant inefficiency in global food systems draining natural resources and intensifying environmental harm. Annually, about one-third of all food produced, roughly 1.3 billion tonnes, is lost or wasted along the supply chain, accounting for an estimated 8–10% of global greenhouse gas emissions and squandering critical inputs like water, land, and labor (FAO, 2019; Corsini et al., 2024; Fatorachian et al., 2025). Digital technologies in agricultural management, such as Internet of Things (IoT), Machine Learning (ML), Decision Support Systems (DSS), and Blockchain Technology (BCT), yield substantial financial and environmental benefits by reducing FLW, improving operational efficiency, and enhancing supply chain responsiveness (Damavandi et al., 2025; Ding et al., 2025). IoTs can cut waste on field by over 60%, also saving on input costs and increasing usable yield volumes. DSSs enable better alignment of supply with demand, reducing overproduction and improving profitability (Chauhan, 2020; Bedoya-Perales & Dal'Magro, 2021). BCT further enhances efficiency by accelerating issue resolution, reducing fraud/spoilage, and lowering recall-related losses, all of which strengthen trust and can command price premiums in transparency-sensitive markets.

While digital solutions have been widely studied in the agri-food supply chain—primarily for improving process efficiency, enhancing consumer relationships, and generating additional income—far less attention has been devoted to their specific role in mitigating FLW (Adamashvili et al., ; Silvestri et al.,). This study examines how digital technologies can reduce food Waste in Agricultural Management. Building on prior research (e.g., Bux, 2024; Corsini et al., 2024; Padthar et al., 2024; Fatorachian et al., 2025; Damavandi et al., 2025), this study evaluates the efficacy of digital interventions at multiple supply chain stages and identifies strategic pathways to scale their adoption and maximizing their impact.

METHODOLOGY

This study employs a mixed-methods case-study design with two primary objectives: (a) measure the reduction in food waste directly attributable to specific digital technologies, and (b) unpack the causal chain from increased visibility to better decisions and concrete actions. We will collect secondary

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quantitative data, to track waste events and intervention usage, alongside qualitative data to capture governance, decision protocols, and contextual factors. Analysis will include comparisons of digital and non-digital periods or sites to estimate impact, with pathway and mediation analysis to reveal how visibility enabled by technology leads to decisions that produce waste reduction, and which contextual enablers or constraints shape that process.

EXPECTED RESULTS AND DISCUSSION

It is expected that the study will show how targeted digital technologies substantially reduce FLW across the agricultural value chain, yielding lower loss rates, sharper forecasting, quicker anomaly response, and greater diversion of near-expiry products. These waste reduction outcomes are anticipated to simulate real-world disruptions, enhance system resilience, and support the development of scalable, context-sensitive recommendations.

CONCLUSIONS AND IMPLICATIONS

Effective deployment of digital technologies to cut FLW requires real-time visibility, interoperable data platforms, and staff capacity to act on predictive insights. When paired with aligned governance, contractual innovation, and stakeholder collaboration, digital solutions enable a shift from reactive disposal to proactive management. Managers should integrate IoT sensor feeds with demand forecasts and inventory data, embed waste-reduction metrics into operations, and engage downstream actors through consumer-facing nudges (e.g., smart labels) to influence behavior. Maintaining data quality and using simulations (digital twins) builds resilience, while transparent monitoring and public reporting drive accountability. At the policy level, incentives for data-sharing consortia, support for smallholder access to digital tools, harmonized cross-border waste regulations, and public-private partnerships for infrastructure and digital literacy can lower adoption barriers and amplify systemic impact.

Keywords: Food waste, agriculture management, digital technology, supply chain.

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BRIDGING HAPPINESS AND ORGANIZATIONAL WELL-BEING: THE DEVELOPMENT AND VALIDATION OF THE GASP MODEL

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ABSTRACT

Happiness is increasingly recognized as a fundamental factor influencing individual and organizational performance. Research in positive psychology (Diener, 2000; Lyubomirsky et al., 2005) has highlighted its role in fostering resilience, engagement, and productivity. A growing body of literature also emphasizes the impact of workplace happiness on employee retention, motivation, and overall business success (Harter et al., 2003; Fisher, 2010; Argyle, 2013; Warr & Nielsen, 2018). However, existing studies often conceptualize happiness in fragmented ways, lacking a comprehensive model that integrates both individual and organizational dimensions (Fisher, 2020). Additionally, while previous research has examined the effects of happiness on various organizational outcomes (Judge et al., 2001; Taris & Schaufeli, 2015), limited studies have explored the interplay between individual happiness and organizational well-being, particularly through a structured framework that connects them conceptually and empirically (Salas-Vallina et al., 2018).

This gap is particularly relevant because a fragmented understanding of happiness can lead to ineffective interventions, where organizations focus on isolated aspects (e.g., job satisfaction) without considering their broader implications on well-being and performance. Furthermore, without a structured framework that empirically links individual and organizational happiness, companies may struggle to implement sustainable well-being initiatives that align both personal and corporate objectives (Warr, 2021). By addressing these gaps, organizations can better design policies that foster long-term engagement, productivity, and employee satisfaction. This study aims to fill these gaps by introducing and validating the GASP model, a multidimensional framework that operationalizes happiness through four fundamental pillars, applicable at both the individual and organizational levels. By developing and validating new measures, and by assessing the relationship between these constructs, this research contributes to a more holistic understanding of happiness in the workplace.

The GASP model posits that happiness is not a static state but a lifestyle choice that can be cultivated through intentional practices. Unlike previous frameworks that primarily focus on either hedonic or eudaimonic dimensions of well-being (Ryan & Deci, 2001; Seligman, 2011), GASP integrates both

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perspectives, emphasizing the role of awareness, goal-setting, and social connectedness. It provides a dual perspective: first, at the individual level, GASP identifies four interrelated pillars [Godersela (enjoying life); Accogliere (embracing experiences); Sognare (Dreaming and goal setting); Persone (Relationships and connection)] that shape personal happiness, recognizing that well-being emerges from a balanced combination of pleasure, resilience, and purpose. The model emphasizes that cultivating happiness requires both an acceptance of life's challenges and the proactive pursuit of meaningful goals; second, at the organizational level, GASP translates these dimensions into actionable managerial principles that foster a healthy work culture, improve employee satisfaction, and enhance collective performance [Godersela (Recognizing Successes); Accogliere (Learning from Failures); Sognare (Creating a Shared Vision); Persone (Building Strong Teams)]. Organizations that implement these principles can create environments where employees thrive both personally and professionally.

RESEARCH OBJECTIVES

This study has four primary objectives:

1. To validate the psychometric properties of the GASP scales through an exploratory factor analysis (EFA).

2. To establish a reliable measurement of happiness integrating both individual and organizational perspectives.

3. To examine the relationships between GASP individual scores, organizational GASP scores, and overall happiness.

4. Ultimately, to further strengthen the bridge between the management of the psychological side of the people working within organizations and more traditional management strategies.

METHODOLOGY

Data will be collected from employees in Italian companies participating in training sessions on the GASP model. The survey will include items measuring the four GASP dimensions, a general happiness scale, and additional validated constructs for comparison. The items were formulated based on a theoretical analysis of each pillar, integrating insights from existing literature and validated psychological and organizational measures (Podsakoff et al., 1990; Diener et al., 2009; Vogus &

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Sutcliffe, 2007). To ensure content validity, the questions were developed by mapping GASP dimensions to established frameworks such as the Self-Determination Theory (Deci & Ryan, 2000) and the Job Demands-Resources Model (Bakker & Demerouti, 2017). An exploratory factor analysis (EFA) will be conducted in IBM SPSS to determine the underlying structure of the proposed scales (Fabrigar et al., 1999). Factor extraction will follow the Principal Axis Factoring method, as recommended when variables are not strictly normally distributed (Costello & Osborne, 2005). Cronbach's alpha will be used to assess internal consistency (Nunnally & Bernstein, 1994), and confirmatory factor analysis (CFA) in AMOS will be employed to validate the identified factors (Brown, 2015). Construct validity will be evaluated through correlations with established happiness and organizational well-being measures (Hinkin, 1998). The study will also conduct measurement invariance tests to ensure that the GASP model functions equivalently across different demographic groups (Cheung & Rensvold, 2002).

EXPECTED CONTRIBUTIONS

From a theoretical perspective, this study advances happiness research by offering a structured framework that bridges individual and organizational well-being. Unlike previous models, GASP integrates positive psychology principles with operational strategies, providing a holistic approach to happiness measurement, providing a valid and interdisciplinary bridge between traditional management and psychology. Additionally, this study addresses a key gap in the literature by empirically testing the relationship between individual happiness and organizational well-being, offering insights into how personal well-being contributes to broader workplace dynamics. From a practical standpoint, organizations can use the validated GASP framework to assess and enhance workplace happiness, thereby improving employee satisfaction, engagement, and overall performance. The findings will support HR professionals and business leaders in designing interventions that promote well-being at multiple levels, aligning personal fulfillment with organizational success.

In conclusion, the GASP model represents a novel contribution to happiness studies, emphasizing its actionable and measurable aspects. By validating this framework, we aim to provide both academics and practitioners with a robust tool to foster sustainable well-being at both individual and organizational levels. Further research will explore the longitudinal impact of GASP-based interventions in corporate settings.

Keywords: organizational happiness; organizational well-being; positive psychology; exploratory factor analysis.

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INVESTIGATING INTERNSHIP ONBOARDING IN HOSPITALITY ESTABLISHMENTS: IMPACT ON ORGANISATIONAL ATTRACTIVENESS

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ABSTRACT

The purpose of this quantitative study is to examine how the onboarding practices of students' internship organisations influence their willingness to seek future employment with the organisation or recommend it as a place to work.

Five years on from the COVID-19 pandemic there is still a major talent shortage in the hospitality industry. One way to address the talent shortage is through student internships which have long played a key role in hospitality education programs (Collins and Pearlmann, 2023). Smith and Green (2021) found that organisations invested in internships as a way to build a talent pipeline for future full-time roles. From a student perspective, internships provide them with a direct and realistic view of what it is like to work in a particular organisation which in turn may influence organisational attractiveness (Sekiguchi *et al*., 2022). Consequently, creating quality internship experiences is important to an organisation's talent acquisition strategy both directly and indirectly as interns may be more willing to join the organisation after graduation (Neelam *et al*., 2018) and/or provide positive word-of-mouth to others seeking employment (Breitsohl and Ruhle, 2016). As socialisation of newcomers shapes their initial experiences (Neelam *et al*., 2018), onboarding takes on particular significance (Klein *et al*. 2015). Studies have shown onboarding impacts factors such as commitment, engagement and retention (Pico *et al*., 2024). The research problem of this study is that, despite the well-documented role of onboarding in enhancing organisational outcomes, little is known about how internship-specific onboarding practices influence interns' perceptions of organisational attractiveness and their willingness to seek future employment or recommend the organisation to other jobseekers.

This study addresses a key literature gap by shifting the focus from general internship experiences and satisfaction (Mensah et al., 2023) to the specific impact of onboarding on newcomer perceptions of the organisation (Díaz-Muñoz and Andrés-Reina, 2024), and in examining temporary employment relationships which are crucial yet understudied (Kupczyk and Kubicka, 2018). By applying Klein and Heuser's (2008) Inform-Welcome-Guide (IWG) onboarding framework and analysing intern perceptions, this study aims to identify which onboarding practices have the strongest impact on organisational attractiveness and word-of-mouth recommendations.

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This study employs a quantitative research approach to examine the relationship between internship onboarding practices, interns' willingness to seek future employment with the organisation, and their likelihood to recommend the organisation through word-of-mouth. A survey-based design is used to collect standardised responses, enabling statistical analysis. Convenience and snowball sampling are employed, where final-year undergraduate students at several Swiss hospitality schools who have completed a mandatory internship will receive the survey questionnaire. Data will be collected through an electronic survey, incorporating validated scales from existing literature, including Klein *et al.*'s (2015) Inform-Welcome-Guide (IWG) categories for onboarding practices, Highhouse *et al.*'s (2003) organisational attractiveness measure, and Breitsohl and Ruhle's (2016) employee word-of-mouth scale. The study will utilise correlational analysis to examine the relationships between onboarding practices, interns' willingness to seek future employment with the organisation, and their likelihood to recommend the organisation to others. This analytical method is chosen for its ability to identify statistical associations between variables, providing insights into which onboarding practices are most strongly linked to interns' perceptions and experiences. By adopting correlational analysis, this study provides meaningful findings that can inform both academic research and industry practices in hospitality talent acquisition.

This research makes an original theoretical contribution by extending onboarding theory to the context of temporary employment relationships, specifically internships. While onboarding research has primarily focused on full-time employees (e.g. Klein *et al.,* 2015), this study explores how short-term onboarding experiences shape long-term organisational perceptions and employer branding in the hospitality sector. It also extends the literature examining relationships between onboarding practices and newcomers' perceptions of the company itself, a research avenue which has been underexplored to date (Díaz-Muñoz and Andrés-Reina, 2024). The study also adds to the quantitative research on onboarding as previous studies have focused more on qualitative research methods (Pinco et al., 2024). By integrating internship onboarding with measurement of organisational attractiveness (Highhouse *et al.,* 2003), this study develops a new perspective on how structured onboarding can function as an early-stage employer branding mechanism, influencing interns' career decisions and industry reputation. Given the limited resources organisations may have to invest in internship onboarding, examining the perceptions of students in relation to specific onboarding practices and organizational attractiveness will allow HR representatives to focus their efforts more effectively on practices which contribute to students' willingness to return after graduation. For higher education establishments, a greater understanding of student perceptions of their onboarding will help strengthen partnerships with industry in designing a well-structured internship program which can meet the needs of both students and hospitality establishments.

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Keywords: Hospitality, Internship, Onboarding, Organisational Attractiveness, Word-of-Mouth

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DEVELOPMENT OF OUZO TOURISM IN LESVOS, GREECE, AS A NEW FORM OF SUSTAINABLE TOURISM

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ABSTRACT

According to recent studies, tourists express interest in visiting production sites that characterize a region, wanting to learn about gastronomic products, production methods, history of materials and local culture (Nicolosi et al, 2016). Connecting sustainable tourism development with the local alcoholic beverages of a region can create unique experiences for visitors while promoting sustainability and the preservation of local heritage. Especially when alcoholic beverages have cultural and historical significance and are produced in traditional and ecological ways, they can be used as a tool to enhance the tourism product, protect the environment, strengthen the local economy and promote sustainable tourism development in the region. A typical example is beer tourism, which has become an important opportunity for many countries to develop a new form of sustainable tourism (Gajic et al, 2021).

The present research seeks to enrich the large number of existing studies that look into the development of wine tourism and wine routes as well as their contribution to attracting visitors to rural areas and their tourism development. (Hall and Mitchell, 2000; Getz and Brown, 2006). It introduces the concept of "traditional alcohol beverage tourism," which includes "ouzo tourism" can be defined as visiting ouzo production sites, festivals, events, and performances, where the tasting of ouzo and experiencing the characteristics of ouzo regions are the main motivating factors for visitors. The importance of ouzo as a tourism product was explored through the creation of ouzo trails - cultural routes for tourists and visitors to the island. A successful "ouzo trails" can promote local development and strengthen the local economy by connecting neighboring areas and offering similar or complementary activities, services, and products. This can be achieved if these offerings fit seamlessly into the existing reality of these areas. It also introduces the concept and dimensions of the ouzo experience and evaluates the positive impact of the food and drink experience on other alternative forms of tourism such as walking and cultural tourism. It contributes to filling the research gap, which has been identified in the literature, by introducing the concept of ouzo tourism and by proposing the creation of ouzo routes in the parts of Greece producing this local alcoholic beverage. It focuses on recording and understanding the perceptions of Lesvos' ouzo producers on the prospects and possibilities of linking ouzo production with the tourism development of the island. The results obtained from this research will work to the benefit of both producers and local tourism organizations,

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by highlighting a product as a unique tourist attraction or as a complementary part of the cultural tourism of a region.

To collect the data, interviews were conducted with the thirteen Lesvos' ouzo producers using a semi-structured questionnaire. Of the total number of respondents, 62% were men and 38% women, with an age distribution of 53% in the 25-44 age group and 47% in the 45-64 age group. Regarding education in tourism, only 23% of respondents stated that they had relevant education. Concerning the participation of the respondents' enterprises in tourism activities, three of them participate in the annual ouzo festival held in Lesvos and a visitable ouzo museum operates in the premises of one of the companies. The SWOT analysis that was carried out highlighted the attitudes of the producers regarding the development of the new alternative tourism model. The most important findings are summarized in Table 1.

Table 1: Main Findings of SWOT Analysis

Strengths: the traditional ouzo production techniques, the authentic gastronomic experiences it offers and the tourist image of the island.	Weaknesses: the absence of a legislative framework to protect the uniqueness of ouzo, the difficulties of tourists accessing the island and the high financial risk due to increased operating costs.
Opportunities: the expansion of cultural and gastronomic tourism, the creation of ouzo tourism and the creation of ouzo trails	Threats: the tax and bureaucratic obstacles, the limited participation of the majority of producers in the planning of the island's tourism development and the absence of state aid and policies.

In conclusion, the development of ouzo tourism on the island of Lesvos will be an excellent opportunity to strengthen the local economy and promote sustainable tourism in the region. Ouzo has deep roots in Lesvos's cultural heritage and can attract visitors by offering a unique experience that combines taste, tradition, and local production. Finally we may say that **"**traditional alcoholic beverage tourism", like "ouzo tourism", can be an important pillar of sustainable tourism development of a region, incorporating the principles of sustainability at every stage of production and tourism experience. Raising visitor awareness, protecting the environment and strengthening the local economy are key elements for achieving a strong and sustainable tourism strategy.

Keywords: traditional alcoholic beverages, ouzo tourism, sustainable tourism development, Lesvos, Greece

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GENETIC ALGORITHM–BASED COMBINATION OF MULTILAYER PERCEPTRON AND FEED-FORWARD NEURAL NETWORK MODELS FOR FORECASTING THE US UNEMPLOYMENT RATE

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ABSTRACT

In this work, we propose a new forecasting approach for the Unemployment rate in the United States based on a combination of different forecasts of Multilayer Perceptron and a Feed-Forward Neural Network based on a genetic algorithm to optimize the forecasting performances. The data was retrieved by the FRED Federal Reserve Economic Data for the period 1948-2025 as monthly observations over time. The research aimed to identify a best forecasting approach to predict monthly US unemployment. In order to forecast, we have explicitly used two inputs: an ensemble multilayer perceptron (MLP) that allows us to capture the nonlinear patterns (Kourentzes, 2023). Second, we have constructed a feed-forward neural network with twelve lagged inputs, which explicitly models autoregressive dynamics and the seasonal dependencies in the considered data (Venables and Ripley, 2002). The results was combined by using a genetic algorithm (Scrucca, 2013) aimed to optimize the parameters used in the combination. The results showed that the predictions using the first and the second approaches were fine, yet the results of the combination of the forecasts allowed for improvement in the final results (Timmermann 2006, Drago & Massa 2019)- The effect of choosing two models allows for reduction of the risk to choose a single model, which can be biased. Genetic algorithms seem to be a good choice in finding the relevant parameters to use in the combination. The results were compared and validated by using the MAPE for each model.

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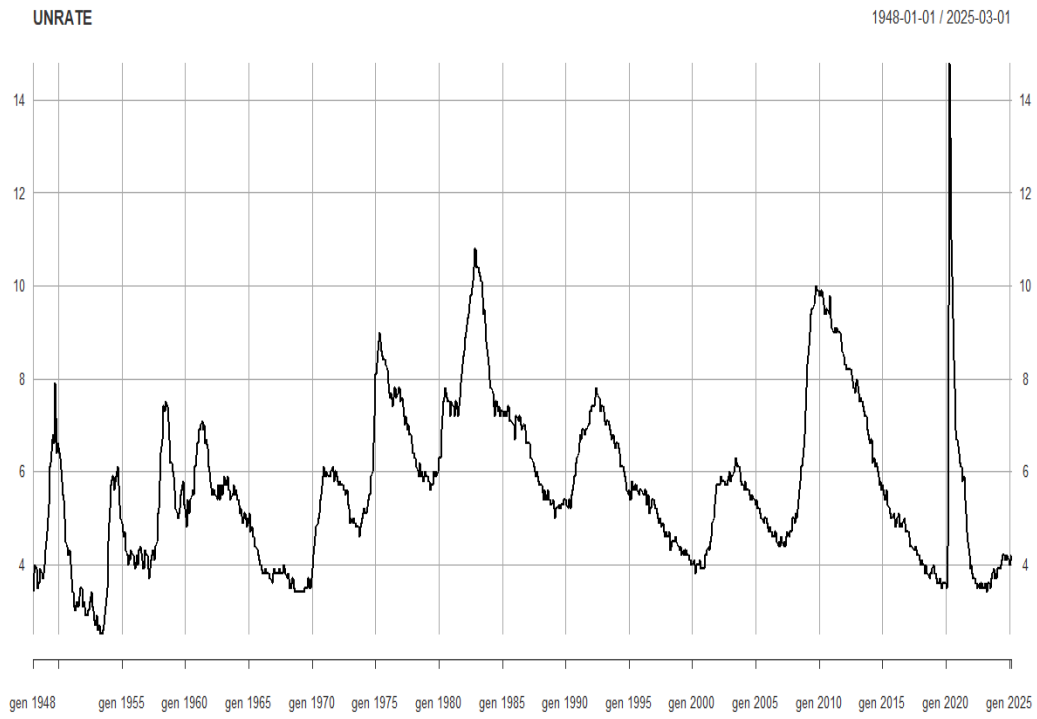


Figure 1. The Unemployment Rate in US 1948-2025

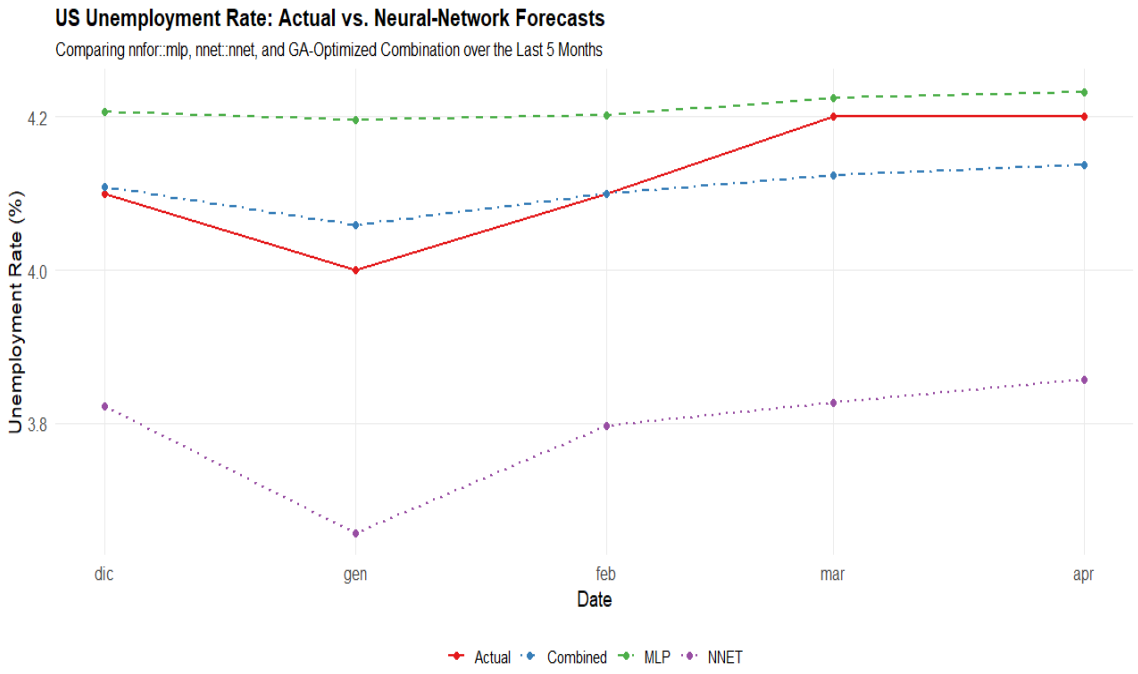


Figure 2. US Uneployment Rate: Actual vs. Neural Network Forecasts

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Keywords: Unemployment, United States, Forecasting, Combination Forecasts, Machine Learning, Neural Networks, Genetic Algorithms

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ASSESSING ECONOMIC-DATA OPENNESS READINESS IN EUROPE VIA A NEW DENSITY-BASED COMPOSITE INDICATOR

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ABSTRACT

Economic resilience is also critically dependent on the existence of data that is published promptly and at the same time used for policy in a way that can be improved and better implemented (OECD, 2021). In this sense, the role of open data cannot be underestimated (see e.g., Manyika et al. 2013; Altayar, 2018). There are many dimensions of the relevance of open data that can be considered. In this sense, open data can create a virtuous cycle in economic development and policy making, enabling better decisions to be made transparently (Janssen et al., 2012). These data typologies enable the promotion of innovation and better collaboration between the actors involved in the process, but the process is not automatic. In this work, the relevant research objective is to measure the intervention capacity of open data. So this paper proposes a new density-based composite indicator for the openness of economic data in Europe. The density-based composite indicator is based on Drago (2023). It generalizes the approach of constructing interval-based composite indicators (see Gatto & Drago 2020) so that possible subjective choices can be taken into account when constructing the composite indicators to increase the results' robustness and the final indicator's economic interpretability. The results based on a new dataset based on year 2020 data (European Commission 2020a and 2020b) show that Estonia, Denmark, Spain, Poland, and Ireland have a better propensity for openness of economic data and are therefore more able to take advantage of open data in this respect.

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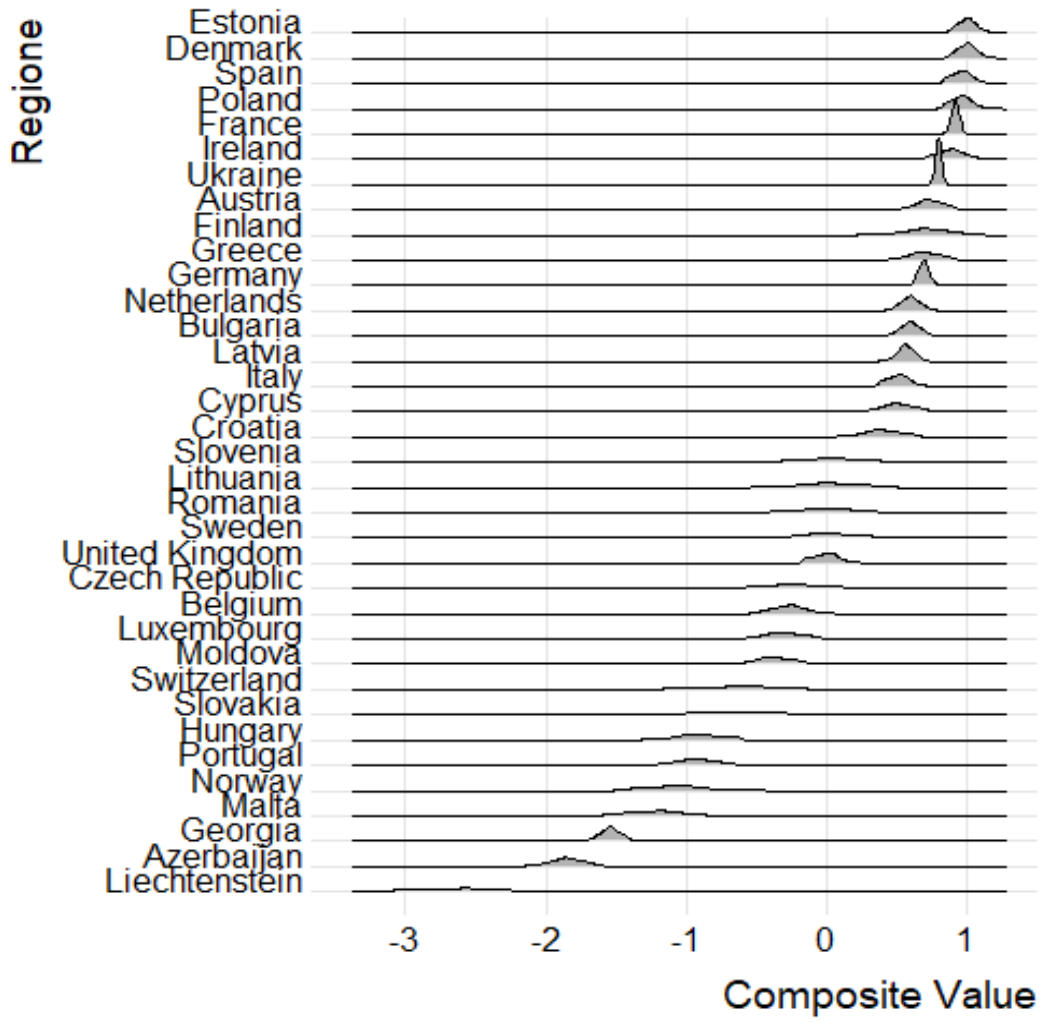


Figure 1. Ranking Economic-Data Openness Readiness in Europe via a Density-Based Composite Indicator (year 2020)

Keywords: Open Data, Data, Technology, Openness, Readiness, Composite Indicators, Density Based Composite Indicators

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THE COLLABORATION OF HUMAN INTELLIGENCE - ARTIFICIAL INTELLIGENCE (HI-AI) IN SOLVING STRATEGIC MARKETING PLANNING PROBLEMS

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ABSTRACT

The agricultural machinery sector is projected to increase from $221.3 billion in 2024 to $235.67 billion in 2025 (Farm Machinery and Equipment Market Report, 2025) playing a vital role in meeting the food demands of a growing global population. Business to Business (B2B) industry in this sector relies on effective strategic marketing planning between manufacturers and dealers to maintain strong relationships, with strategic marketing problem-solving being at the very core of this interaction (Svensson et al., 2023). Notably, AI technologies are transforming traditional problem-solving processes by leveraging their strengths to improve planning outcomes (Stone et al., 2020).

The narrative literature review explores the evolving landscape of strategic marketing problem-solving and decision-making, emphasizing that problem-solving is considered the more relevant concept than decision-making when addressing complex challenges. In the process of solving these complex problems, professionals must make numerous timely and effective decisions, often breaking the problem down into smaller, more manageable choices (Yurtseven et al., 2021). Accordingly, a Strategic Problem-Solving Conceptual Framework (SPSCF) is introduced, which decomposes a complex problem - defined by a main problem statement - into groups of Decision Units (DUs). Each DU represents a decision-making process aimed at solving a specific sub-problem statement. By addressing all DUs, the main problem statement is ultimately resolved.

The review then critically examines existing problem-solving models, identifying their limitations in solving complex situations (Manso et al., 2024) and concluding that utilizing new technologies (AI) can address many of these limitations.

The literature review, furthermore, identifies key challenges in developing a successful strategic marketing plan (McDonald & Wilson, 2016). This research demonstrates how the SPSCF, with its DU approach, can be adapted to overcome the challenges of strategic marketing plans.

As AI plays a crucial role in enhancing decision-making while HI remains involved, the review examines the role of AI-HI collaboration in strategic marketing (Huang & Rust, 2021), demonstrating how balanced and trusted teaming can lead to more effective solutions for solving DUs (Hao et al., 2024). However, the use of AI presents various ethical challenges. Therefore, the review explores key

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concerns, including ethical AI deployment (Islam et al., 2024), fairness and trust (Su et al., 2023) in the context of AI-driven strategic marketing problem-solving.

At this stage and based on observed research gaps in literature, this study addresses two central research questions 1- What is the most effective collaboration and teaming pattern between AI and HI for solving strategic marketing planning problems (Erlei et al., 2024; Huang & Rust, 2022; Raisch & Fomina, 2023)? 2- What are the ethical considerations surrounding the application of AI in solving strategic marketing planning problems (Huang et al., 2025; Islam et al., 2024; Su et al., 2023)?

Considering the Collaborative Artificial Intelligence Framework by Huang & Rust (2022) as a guiding model, effective AI-HI collaboration is driven by the integration of multiple forms of AI intelligence - Mechanical AI, Thinking AI, and Feeling AI. Building on this foundation, a new conceptual framework is developed, introducing 'Ethical AI' as an additional dimension to the original model. This updated Conceptual Ethical AI-HI Collaboration Framework (CECF), as the main contribution to knowledge, is integrated into the Strategic Problem-Solving Conceptual Framework (SPSCF) to address its Decision Units (DUs) by optimizing the teaming between AI and HI within an ethical context. The original framework suggests that effective collaboration is achieved by recognizing the respective strengths of AI and HI, leveraging lower-level AI to enhance higher-level HI, and advancing HI as AI automates simpler tasks. This foundation provides a robust basis for AI-HI collaboration in Strategic Marketing Planning; however, the addition of the 'Ethical AI' dimension ensures that AI applications align with ethical considerations, enhancing responsible decision-making.

To validate the CECF, a qualitative case study research method will be applied in the real-life context of agricultural machinery B2B industry from an interpretivism epistemological stance, making it a domain-specific conceptual framework, tailored to this marketing domain. This approach is particularly effective for exploring complex phenomena that cannot be fully understood through other research methods.

The research will adopt a purposive sampling strategy, conducting semi-structured interviews with approximately 30 experts in strategic marketing, AI, and AI ethics. Thematic analysis, supported by MAXQDA software, reveals diverse perspectives on collaboration patterns, recurring ethical tensions, and the role of human oversight. To evaluate the CECF, the study will draw on the evaluation techniques outlined by Fragiadakis et al. (2024), ensuring that the framework meets established standards for effective AI-HI collaboration.

The expected outcomes of this study will contribute, not only to refining marketing strategies through a deeper understanding of Ethical AI–HI collaboration patterns in this field, but also to the broader academic discourse on AI–HI collaboration by offering a validated framework for future research and practical guidance for organizations.

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Keywords: AI - HI - Collaboration - Trust – decision-making – problem-solving

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UNDERSTANDING FALSE ACCOUNTING PRACTICES IN NONPROFIT ORGANIZATIONS: PREVENTION AND DETECTION

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ABSTRACT

This paper investigates fraudulent accounting practices in nonprofit organizations (NPOs), focusing on their causes, manifestations, and impacts. It aims to enhance understanding of fraud risks specific to NPOs and propose effective strategies for detection and prevention to protect organizational resources and maintain public trust. By analyzing the factors leading to financial misconduct, this research seeks to inform better practices and governance to ensure the integrity of nonprofit financial management.

This study employs a content analysis approach to examine fraudulent accounting practices in nonprofit organizations (NPOs), focusing on financial reports, audit outcomes, and policy documents. By analyzing a range of publicly available and internal documents from various NPOs, the research identifies common patterns of financial misreporting and fraudulent behavior, as well as the organizational factors that enable these practices. Additionally, the study utilizes documentary analysis to assess the effectiveness of existing governance frameworks, internal controls, and regulatory mechanisms in detecting and preventing fraud. The research questions addressed in this study are: What types of fraudulent accounting practices are most prevalent in NPOs? Which organizational factors contribute to a higher risk of fraud in NPOs? How effective are current governance and control measures in preventing fraudulent behavior in nonprofit organizations? This methodology allows for a comprehensive understanding of the structural and procedural weaknesses in NPOs that may lead to fraudulent activities, while also evaluating the regulatory frameworks aimed at mitigating such risks.

The study identifies common types of fraudulent accounting practices in NPOs, such as billing fraud, vendor fraud, and employee embezzlement. Smaller nonprofits are particularly vulnerable due to limited oversight and reliance on trust-based relationships. Median fraud losses in nonprofits range from $70,000 to $85,000, with severe reputational damage often outpacing financial losses. Key enablers of fraud include internal control weaknesses, insufficient segregation of duties, and inadequate board oversight. The presence of whistleblower policies and external audits has been

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found to significantly reduce fraud risks. Emerging threats include cyber-fraud targeting nonprofit financial systems. A holistic fraud prevention framework, incorporating ethical culture, governance reforms, and technology, is essential for addressing both traditional and emerging risks.

This paper is the first to integrate multi-level factors—individual, organizational, industry, and country-level—into a comprehensive fraud prevention approach tailored specifically for the nonprofit sector. By combining forensic accounting insights with governance and ethical considerations, it advances prior research and offers a framework for combating fraud in NPOs. The study addresses both traditional financial fraud schemes and emerging risks such as cybercrime, providing a robust model for nonprofits to mitigate fraud and preserve stakeholder trust.

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Declaration of interest statement

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Keywords: NPOs, false accounting, fraudulent financial reporting, accounting fraud, misrepresentation of accounts.

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PUBLIC VALUE CREATION IN SUSTAINABLE TOURISM: MULTIPLE CASE STUDY OF CULTURAL ORGANISATIONS

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ABSTRACT

This study examines how sustainable tourism can generate public value in cultural organisations while maximising benefits for host communities, ecosystems, and visitors. It identifies key obstacles to achieving true sustainability and proposes strategies for multi-stakeholder governance. The research investigates the interrelationships between public value creation, institutional governance, and sustainable tourism outcomes in cultural attractions, while analysing how strategic management approaches influence economic sustainability and social impact.

The research employs a mixed-methods approach combining longitudinal financial analysis (2017-2022). First, secondary quantitative data on visitor flows and regional concentration in the Italian museum sector are analysed for cultural tourism dynamics. Second, the research question explores: "How do cultural organisations in tourism destinations create public value while balancing financial sustainability?". Financial data from multiple case studies was analysed across six fiscal years, examining revenue streams, EBITDA performance, and visitor engagement metrics. Moore's strategic triangle framework was applied to evaluate the alignment between operational capabilities, legitimacy environments, and public value propositions in sustainable tourism contexts.

The analysis reveals significant fluctuations in institutional performance during the study period, with revenues ranging from €7.17 million (2020) to €12.32 million (2019), demonstrating both vulnerability and resilience to external disruptions. EBITDA margins improved from -1% (2017) to consistently positive figures (20-29%) in subsequent years, indicating enhanced operational efficiency despite volatile visitor numbers. The institution's multi-functional approach-combining interactive science exhibitions, business innovation centers, and educational programming-demonstrates how cultural organisations can diversify public value creation beyond traditional tourism offerings. Between 2011 and 2019 the number of visitors to state museums, monuments, archaeological sites, and heritage complexes in Italy grew by 33%, from 41,223,000 to 54,846,000 annual visits; after a pandemic-induced slump in 2020, visits rebounded by 27% in 2021. Visitor distribution remains highly uneven: in 2021, Lazio alone accounted for 32.1% of total visits, followed by Campania (24.9%) and Tuscany (15.7%),

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indicating persistent over-concentration in a few regions. Results indicate that sustainable tourism development in cultural organisations requires balancing environmental considerations with social inclusion and economic viability, with particular attention to stakeholder engagement across public, private, and community sectors.

This research advances public value discourse by integrating Moore's managerial approach with Bozeman's policy-oriented public values perspective, specifically in sustainable tourism contexts. The empirical analysis of cultural tourism data offers a longitudinal perspective on visitor trends as an indicator of sustainable tourism performance in Mediterranean tourism destinations.

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Declaration of interest statement

The author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Keywords: Cultural organisations, Digitalization, Emotions, Culture Accounting, Tourism Management.

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ACCOUNTING DISCLOSURE IN CHURCHES AND MOSQUES: A COMPARATIVE PERSPECTIVE

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ABSTRACT

This study aims to examine the practices and determinants of accounting disclosure in religious organisations, focusing specifically on Islamic and Christian churches. It seeks to understand how these organisations approach financial transparency, public trust and accountability within their distinct religious and cultural contexts. However, prior literature on religious accounting is limited. We conduct a comparative literature review to identify why and how churches and mosques report internally and externally.

We extract findings on financial reporting content (e.g. narrative vs numerical), disclosure depth, and reporting style, governance models (e.g. priesthood vs board), and socio-legal context (e.g. national accounting standards for religious organisations). Our research question is: *What factors explain similarities and differences in accounting disclosures of religious organisations?*

Religious faith traditions influence reporting norms. For example, Islamic teachings emphasise accountability to God and community, which underpins mosque disclosures. Ramadhan (2024) finds that mosques frame financial reports as a trust, and that "strong accountability will increase donations and public confidence", enabling better community programs. Indeed, transparency in mosque accounts – often achieved through simple, clear statements – is key to congregational trust. As one study notes, mosques maintain accountability through "*simplicity of… financial statements*" and synergy between mosque leaders, worshippers and religious organisations. Likewise, internal controls and reporting procedures are stressed: Jamaliah Said et al. (2013) report that robust controls (recording receipts, reconciling funds, etc.) in Malaysian mosques "*enhance donors' confidence*" in mosque finances. In Islam, the dual accountability model is explicit – administrators are answerable to both the congregation and God. By contrast, Christian church accounting often evolves under hierarchical norms. Classic studies (Laughlin 1990, Booth 1993) describe church accountability as governed by formal principal-agent contracts. In practice, church financial disclosures may be more detailed, reflecting denominational regulations and stewardship theology, though congregational trust remains important. Overall, both contexts emphasise stewardship and honesty, but mosques

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tend to use narrative or summary disclosures rooted in shariah principles, whereas churches often employ statutory accounting frameworks.

This comparative analysis is novel in examining Christian and Islamic worship organisations' reporting practices. By focusing strictly on institutional churches and mosques, the study isolates religion-specific influences on financial reporting. It highlights how theology interacts with governance and context (national laws, auditing requirements) to shape disclosure. This study suggests new theory: religious accounting is an "organizationally situated" practice where faith values and power structures determine reporting scopeeprints.usm.myeprints.usm.my. Such insights can guide auditors, donors and policymakers in improving accountability in faith institutions.

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The author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Keywords: Accounting, Religious Organisations, Churches, .

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UNLEVERED VOLATILITY DECOMPOSITION AND RESILIENCE INDEX PUZZLE

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ABSTRACT

Several authors have identified intrinsic business risk and degree of operating leverage as drivers of firm's unlevered risk (see among others: Blazenko, 1996; Griffin and Dugan, 2003; Mandelker and Petersen, 1994; Renzi *et al.*, 2017).

Intrinsic business risk concerns the volatility of sales revenues (thus volatility related to demand and unit selling prices), induced by business choices and/or environmental factors (Ross *et al.*, 2002). The intensity with which intrinsic business risk acts on the volatility of operating results depends on the rigidity of operating costs and, therefore, on the structural profile of the firm. As fixed costs increase, in fact, the elasticity of EBIT (Earnings Before Interest and Taxes, i.e., operating income) to sales revenues increases.

The above logic works well in a static setting where unit contribution margin, fixed costs and net investment tend to be constant. In other words, the decomposition of unlevered volatility as a function of the intrinsic business risk and the potential operating leverage (given by 1 + Earnings Before Interest and Taxes/Fixed Costs) allows us to capture only the effects of the shocks deriving from market demand volatility.

Abandoning the assumption of a constant contribution margin per unit, operating fixed costs (*CF*) and net investments (*NI*), the unlevered risk depends, primarily, on the volatility of the following ratios:

$$\theta = \frac{CM}{NI}; \quad \mu = \frac{FC}{NI}$$

The ratio θ acts positively on operating profitability (*ROI*), because it measures profitability in terms of total contribution margin (*CM*), given by sales revenues (*V*) – variable costs (*VC*); the ratio μ acts negatively on operating profitability, because it is a measure of negative effect on *ROI* coming from operating fixed costs. In fact, the *ROI* is given by ratio between *EBIT* (Earnings Before Interest and Taxes) and *NI*, so it equals the spread $\theta - \mu$.

Secondly, the effect of the volatility of the above ratios (↝↝and ↝) on unlevered specific risk is negatively affected by the correlation between them. Specifically, the unlevered volatility of the *j-th* firm can be decomposed as follows (Renzi *et al.*, 2017):

$$\sigma_{j_{(u)}} = \sqrt{\sum_{i=1}^{n} p_i\left(ROI_{j(i)} - \widetilde{ROI}_j\right)} = \sqrt{\sigma_{\theta j}^2 + \sigma_{\mu j}^2 - 2\sigma_{\theta j} \cdot \sigma_{\mu j} \cdot \rho_{\theta j,\mu j}} = \sqrt{\sigma_{\theta j}^2 + \sigma_{\mu j}^2 - 2\sigma_{\theta j,\mu j}}$$

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Where: σ_{uj} = Unlevered volatility (standard deviation of *ROI*); $\widetilde{ROI}$ = average expected *ROI*; p_i = probability of *i-th* scenario; $\sigma_{\theta j}^2$ = Variance of θj; $\sigma_{\mu j}^2$ = Variance of μj; $\sigma_{\theta j}$ = Standard deviation of θj; $\sigma_{\mu j}$ = Standard deviation of μj; $\rho_{\theta j,\mu j}$ = Correlation coefficient between θj and μj; $\sigma_{\theta j,\mu j}$ = covariance between θj and μj.

Thanks to the above equation it is possible to conceptualize a resilience index, the meaning of which is to assess the firm's ability to be resilient in the face of potential instability in its performance drivers caused by endogenous or exogenous factors. Basically, for each value of θj and μj volatility, the higher the correlation between them, the more the *j-th* firm is resilient in the face of external shocks (caused, for instance, by the volatility of demand, market price, macro-variables and so on), and by shocks related to the real internal structure. In this vein, the resilience index (RI) is given by:

$$RI_j = \frac{2\sigma_{\theta j} \cdot \sigma_{\mu j} \cdot \rho_{\theta j,\mu j}}{\sigma_{j(u)}^2} = \frac{2\sigma_{\theta j,\mu j}}{\sigma_{j(u)}^2}$$

It could be useful to compare RI_j value with the degree of resilience related to a given set of comparable firms. It entails modifying RI_j as follows:

$$RI_j^{'} = 1 - \frac{RI_s}{RI_j} = 1 - \frac{2\sigma_{\theta s,\mu s}}{\sigma_{s(u)}^2} \cdot \frac{\sigma_{j(u)}^2}{2\sigma_{\theta j,\mu j}}$$

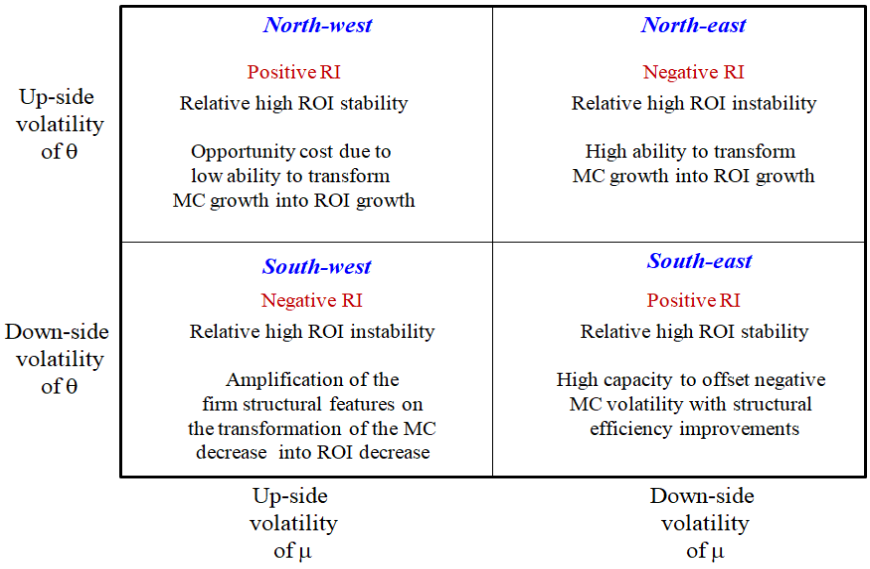
Where RI_s is the notation of the average resilience index related to the industry (or a subset of it) to which the *j-th* firm belongs.

A positive resilience index highlights the *j-th* firm's capacity to offset the internal structural volatility and contribution margin volatility, both parameterized on the capital employed. This kind of compensation partially stabilizes the unlevered profitability in conditions of internal and/or environmental instability. In general, the adjustment of fixed costs to the trend of the contribution margin is positively influenced by the flexibility of internal resources and negatively by the level of sunk costs; the adjustment of contribution margin to the trend of the fixed costs is strongly linked to the possibility of transferring the volatility of prices per unit and sales volumes, as well as cost per unit, to internal and external stakeholders (Renzi, Taragoni, Vagnani, 2024).

In the case of a positive correlation between θ and μ, on the one hand, the firm's exposure to unlevered risk decreases, on the other hand, it might decrease the up-side volatility exploitation in terms of unlevered profitability improvement; in the opposite case, i.e., a negative correlation between θ and μ, the firm is more exposed to the down-side volatility but has greater exploiting margins of up-side volatility. In this regard, the up-side volatility of *ROI* is positively correlated with the dynamics of the ratio θ, while the dynamic of the ratio μ is positively correlated with the down-side volatility of *ROI*. We call these tradeoffs the resilience index puzzle. In this regard, we propose a theoretical matrix divided in four regions, where: the horizontal axis concerns the up-side and down-side volatility of μ; the vertical one the up-side and down-side volatility of θ (Figure 1).

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Figure 1 - Resilience index puzzle



Keywords: unlevered profitability, decomposition of unlevered volatility, resilience index.

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BALANCING PRAGMATIC AND HEDONIC MOTIVATIONS: A FRAMEWORK FOR EVALUATING DIGITAL INTERFACES

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ABSTRACT

This paper builds on Rafaeli and Vilnai-Yavetz's (2004) tripartite model of evaluation, which highlights usability, aesthetics, and symbolism as key dimensions of interactive digital products. While usability addresses instrumental aspects such as efficiency and ease of use, aesthetics and symbolism influence pre-use perceptions, emotional engagement, and the creation of identity and meaning for users. To address gaps in the current understanding of these dimensions, this paper investigates their interplay and proposes a structured evaluation framework tailored to the functional and hedonic motivations underlying user interaction with digital products. The framework builds on prior research, which emphasized context-specific evaluation. Eytam et al. (2017) demonstrated that the evaluation of washing machines—a primarily pragmatic product—should focus on usability, classical aesthetics, and pragmatic symbolism.

Conversely, Tractinsky and Zmiri (2006) evaluated hedonic products, such as digital skins, incorporating usability, expressive aesthetics, and product symbolism (see Eytam, 2023) into their evaluation model. However, these studies have largely examined pragmatic and hedonic products in isolation. This paper bridges that gap by proposing a unified framework for hybrid products, which are designed to satisfy both pragmatic and hedonic motivations. Hybrid products combine both pragmatic and hedonic attributes. For example, smartwatches seamlessly blend functionality with aesthetics, serving as tools for productivity and communication while simultaneously acting as fashion statements and status symbols (Wang and Hsu, 2020). This dual nature presents unique challenges for evaluation, requiring an approach that accounts for their multifaceted design and usage. The empirical analysis suggests that the best-fitting evaluation model for hybrid products should incorporate hedonic attributes at higher weights, demonstrating that their hedonic aspects extend beyond personal enjoyment to represent identity and societal values.

METHOD AND RESULTS

The study employed a mixed-methods approach to evaluate the interplay between usability, aesthetics, and symbolism in digital interfaces. A carefully designed survey was conducted with three

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categories of interactive products (i.e., washing machines, remote controls, and smartwatches) to reflect varying levels of pragmatic and hedonic motivations. The study recruited 144 participants from diverse backgrounds, ensuring a balanced representation of age, gender, and technology familiarity. Participants rated usability, aesthetics, pragmatic symbolism, and user symbolism using a 7-point Likert scale. Structural equation modeling (SEM) was utilized to analyze the relationships between these dimensions, supported by descriptive statistics and correlation analyses.

The results revealed that usability, aesthetics, and symbolism were significant dimensions influencing the evaluation of all products. Aesthetics and symbolism were especially salient in evaluations of hybrid products, which were influenced by hedonic considerations to a greater extent. SEM analysis indicated strong positive correlations between expressive aesthetics and user symbolism when the motivation to use was largely hedonic ($r = 0.72$, $p < 0.01$) and between classical aesthetics and pragmatic symbolism when the motivation to use was largely pragmatic ($r = 0.68$, $p < 0.01$). Descriptive statistics showed that participants valued expressive aesthetics for its novelty and creativity, while user symbolism emerged as a critical factor in reflecting identity and social status. These findings underscore the importance of tailoring evaluation models to the specific motivations driving product use, particularly for hybrid products.

CONTRIBUTIONS AND IMPLICATIONS

This paper makes three key contributions. First, it introduces a contextual evaluation framework that aligns assessment dimensions with product function and user motivation. This framework provides a novel methodology for balancing the importance of hedonic and pragmatic attributes in hybrid products. Second, it empirically validates this framework using smartwatches as a case study, highlighting the nuanced interplay between pragmatic and hedonic motivations. Finally, it provides actionable insights for designers and researchers in human-computer interaction (HCI), emphasizing the importance of tailoring evaluation measures to reflect the pragmatic and hedonic motivations driving product use.

The implications of this research extend beyond smartwatches to encompass a wide range of interactive digital products. For instance, hybrid products in areas such as wearable healthcare technology or augmented reality could benefit from this framework. By aligning design and evaluation practices with user motivation, designers can create interfaces that not only meet functional needs but also resonate with hedonic motivations. Such alignment has the potential to enhance user satisfaction, engagement, and product adoption, ultimately contributing to the success of digital

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products in competitive markets. Future research could apply this framework to other hybrid products, such as augmented reality devices or wearable technology, to validate its generalizability across contexts. Additionally, cross-cultural studies and longitudinal analyses could provide deeper insights into how user motivations and evaluations evolve over time.

Keywords: Human Computer Interaction (HCI), User Experience (UX), pragmatic motivations, hedonic motivations, usability, aesthetics, symbolism

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HOW DO HOTEL BRANDS EXPAND INTO INTERNATIONAL MARKETS? – A CASE STUDY OF AN INTERNATIONAL BRAND

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ABSTRACT

INTRODUCTION

The hospitality industry is nowadays facing challenging times, since there are constantly appearing new competitors in the market, forcing hotels to pursue new strategies that might allow them to survive in a more demanding market. Internationalization is often the path to follow since this strategy allows them to expand into foreign markets, and simultaneously benefit from the exploitation of scale economies. In this context, this research aims to get a comprehensive perspective on the main reasons for a hotel brand to follow an internationalization strategy (IS), which barriers this process entails and which modes of entry are available.

THEORETICAL FRAMEWORK

The hotel industry is considered to be one of the sectors with most impact and influence on the Portuguese economy, and its remarkable growth over the years reinforces the importance of investing even more in its development.

According to Buhalis and Leung (2018), hotel activities involve several actors that create a hotel ecosystem: those who have direct relationships with the hotel and those who have an indirect connection.

Ghauri et al., (2021), state that the global economy is changing, and for this reason, firms must adapt to the new realities, from sustainable development to climate change and new technologies. Therefore, internationalization is seen as a strategy, and an answer to these adversities.

Johanson & Vahlne (1977) define internationalization as a process in which, progressively, there is a growing involvement in the international market. Adding that economically, the characteristics of the process have an impact on the pace of a company's internationalization. This movement is seen as the exit of companies from their domestic markets to others.

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Internationalization allows for a greater range of markets, in addition to obtaining economies of scale (Bamiatzi et al., 2023). From another point of view, Fang (2023) argues that internationalization also generates more costs due to the need to make high investments, and entails other risks, such as politics, culture or the exchange rates of the other country. Fang (2023) also adds that, in the long run, this process can lead a company to success or failure.

Gamble et al. (2019) refer five reasons why a firm decides to operate outside its market: access to new consumers which may result in increased revenue and profit, access to lower costs due to the economies of scale, accumulation of experience and increased purchasing power, exploitation of resources and capabilities that are difficult to access or more expensive in the domestic market, exploitation of core competencies and consequently, increased profits and competitive advantage over competitors, and access to resources and capabilities located in the foreign market made easy.

Hollensen (2019) categorizes the obstacles faced by firms at the beginning of the internationalization process by trade risks, related to exchange rates, delays, losses and challenges in receiving payments, market risks, such as distance, competition, and cultural and linguistic differences, and political risks, like government restrictions, export policies, high tariffs, lack of incentives, civil strife, revolutions and wars.

According to Gamble et al. (2019), there are five distinct models that allow firms to enter the foreign market: the export strategy (the least expensive), the licensing which implies an agreement between two or more parties, the franchising which is often used by service and retail firms, joint-ventures which is an alliance involving equity, originated when two or more firms collaborate to create a new one, and strategic alliances which are non-equity firms and can be assumed as partnership or network agreements, that do not require the creation of a new firm.

METHODOLOGY

Considering the goals of the research, a qualitative methodology was adopted to help the description of the situations or processes presented, and thus gain new insights to better assess the effectiveness of some processes or practices (Roberts, 2002).

Once qualitative research presents a generic nature, it was used a case study of an international brand to help the researcher to focus and get a deeper understanding of the phenomena, despite the need to collect a great volume of data (Zukin & Braslow, 2011). According to Eisenhardt (1989), a case study results in the collection of data through interviews, files, questionnaires and observations, in which

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the evidence can be qualitative through words, or quantitative, through numbers, hence the use of the case study methodology. Three semi-structured interviews were conducted to people from top and middle management to collect data, since it allows the inclusion of new questions to the script during the interview, in addition to documentary analysis (Patton & Cochran, 2007). Data collected was subject to content analysis, which consists of a thorough and systematic examination of a specific set of materials, which aims to identify patterns, themes or prejudices (Leedy & Ormrod, 1990).

FINDINGS AND DISCUSSION

This research aimed at analysing the main internationalization strategies within the hotel sector, the different modes of entry into international markets, and the main obstacles. Therefore, it was possible to identify the collaboration with international brands through partnerships and franchising. Both strategies allow the maximization of resources and the access to (new) opportunities, and the development of human resources at a global level, through the mobility of employees betweeb different locations, thus contributing to the improvement of the operations' quality. Other modes of entry like rentals, acquisitions, joint-ventures, relationships and networks of contacts were also identified.

Economic, geographic and transitional factors are among the main reasons why hotels seek to explore foreign markets. Economies of scale, increased revenue, access to new markets and risk diversitification were pointed out as being the economic factors which influence internationalization strategies. A strategic location offering proximity to resources and consumers and allowing access to key markets are among the geographic factors mentioned. Market opportunities and increasing demand may force hotel management to respond to market changes and hold new opportunities to internationalize and be present in markets of interest. Furthermore, a firm with objectives which reflect the ambition of growing and the willingness to achieve goals might explain international expansion, reflected in the search for increased visibility and strengthening of the brand in the global market.

The main barriers encountered during the process were lack of knowledge about the target market, about the potential partners and local investors, which made it difficult to establish strategic alliances and a reliable network of contacts; absence of appropriate tools and resources to analyze the market and implement strategies, which hindered the adaptation process and an efficient implementation of international operations; uncontrollable external factors, such as political instability and economic crisis; cultural and language barriers between the country of origin and the target market, which

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hindered communication, negotiation and management; inadequate structure meaning lack of qualified professionals and lack of technological and basic operational infrastructure, making it difficult the strategy implementation.

CONCLUSIONS

This research aims to contribute to the existing knowledge about internationalization strategies in the hospitality and tourism sectors, considering the competitiveness of the industry today.

The need to overcome the limitations of the domestic market, the presence in various markets increasing global projection and recognition, market diversification, reducing the dependence on a single domestic market are among the reasons to adopt internationalization strategies.

This study revealed that internationalization strategies are important and can provide significant opportunities of growth, but they do not automatically guarantee a firm's success. As such, success depends on a number of factors like a solid foundation of operations, strategic decisions made over time, effective project choice and management, cultural understanding and the ability to adapt and deal with unforeseen events.

Future research should include other firms from the hospitality industry and more semi-structured interviews should be done to have a broader perspective and a more enriched research.

However, preserving the essence of the firm, while adapting to local markets, is an important consideration and advice for the future.

Keywords: Hospitality; Internationalization; Markets; Strategy; Strategic Management.

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REFRAMING STRATEGIC GAMIFICATION ADOPTION: A MULTI-STAKEHOLDER PERSPECTIVE

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ABSTRACT

INTRODUCTION

Gamification as an organizational tool to enhance employee engagement and strategic alignment is highly context-specific and shaped by diverse stakeholder interactions. This study adopts a multi-stakeholder view to explore how gamification is adopted and implemented in organizational settings. Drawing 31 interviews with gamification experts (e.g., industry and consultants) and practitioners, it identifies three adoption models - autocratic, democratic, and bottom-up, each reflecting different stakeholder dynamics. The study contributes to the understanding of gamification not merely as a motivational tool, but as a strategic and managerial process shaped by organizational structures and stakeholder involvement.

PURPOSE, AIM AND OBJECTIVES

This study deepens knowledge on how gamification processes within organizations moving beyond individual level to consider multi-stakeholder dynamics. It explores how external and internal actors, particularly MMs, influence gamification initiatives in organizations. Specifically, the research investigates how gamification is adopted and implemented in organizations, the roles MMs and other stakeholders play, and how they influence the alignment between gamification initiatives and organizational objectives.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Strategic alignment theory stresses the need for aligning organizational objectives with operational actions (Avison et al., 2004), with MMs mediating between top management and frontline teams (Plietzsch et al., 2021). When initiatives are perceived as misaligned or imposed top-down, MMs may resist or hinder implementation (Splitter et al., 2021). Positive outcomes depend on well-designed gamified experiences (Hamari & Koivisto, 2015), aligned with diverse motivations and cultural contexts (Tondello & Nacke, 2020); transparency and voluntary participation are crucial to avoid

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resistance (Kim & Werbach, 2016). Although research on gamification from a user-centric perspective is well established, little is known about how decision-making dynamics, and external and internal stakeholders shape gamification (Koivisto & Hamari, 2019), a gap this study addresses.

METHODOLOGY AND METHODS

Data were collected through semi-structured interviews of 31 gamification designers, consultants, and organizational managers involved in gamification, reaching saturation after 30 interviews. Thematic analysis (Braun & Clarke, 2006) identified three themes: (1) adoption models; (2) roles of MMs; and (3) enablers and constraints. Analytical rigor was reinforced through team coding, iterative comparison, and peer debriefing (Nowell et al., 2017)

MAIN FINDINGS AND CONTRIBUTIONS

This study identifies three organizational gamification adoption models: autocratic, democratic, and bottom-up. In autocratic models, top management leads adoption with little involvement from MMs, enabling fast implementation but limiting local adaptation. Democratic models involve MMs in co-design, promoting alignment between strategic aims and operational realities. Bottom-up models are initiated by MMs but often face challenges in scaling and securing executive support.The study highlights MMs' roles as initiators, facilitators, translators, and passive implementers, and identifies key enablers of gamification effectiveness such as personalisation, iterative communication, and cultural alignment. It exposes barriers like lack of local adaptation and top-down imposition, extending previous work on gamification failures (Seaborn & Fels, 2015).

ORIGINALITY AND VALUE

This study's originality lies in adopting a multi-stakeholder perspective, moving beyond user-centric views. By identifying and characterizing adoption models, it reveals how internal stakeholder dynamics, particularly the agency of MMs (Plietzsch et al., 2021), influence gamification processes. It contributes to strategic alignment research (Avison et al., 2004) and offers practical insights, encouraging organizations to align gamification with cultural contexts and promote participatory adoption strategies. It extends the research on co-creation in gamification (Huotari & Hamari, 2017) to strategic management contexts.

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RESEARCH LIMITATIONS

Data are based on self-reported perceptions, which introduce subjectivity. Additionally, the cross-sectional nature of the study restricts the ability to assess how adoption models and stakeholder roles evolve over time.

Keywords: Gamification adoption models, Middle Managers, Stakeholders' roles, Enablers and Constraints

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STIMULATING SUSTAINABILITY EDUCATION IN MARKETING STUDENTS THROUGH ACTIVE AND CREATIVE LEARNING

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ABSTRACT

The academic literature recognizes the crucial role of Higher Education Institutions (HEIs) in promoting sustainable development (Chaleta et al., 2021; Ramos Torres, 2021; Serafini et al., 2022; Zamora-Polo & Sánchez-Martín, 2019). HEIs must equip future professionals with the necessary skills to address sustainability challenges (García-Feijoo et al., 2020), given that students are their central actors (Filho et al., 2024). To this end, HEIs and teachers have increasingly integrated the Sustainable Development Goals (SDGs) into curricula to enhance students' awareness and competencies in sustainability (Kopnina, 2020; Leal Filho, 2021).

Sustainability education in higher education seeks to cultivate change agents capable of tackling complex environmental challenges (Ramchunder et al., 2021). However, due to its multifaceted nature, traditional content-focused teaching methods may prove ineffective (Cottafava et al., 2019). Instead, integrating active, participatory, and experiential learning within real-world contexts fosters deeper understanding and meaningful engagement (Ramchunder et al., 2021).

To address learning challenges in sustainability education, pedagogical methodologies such as project-based and problem-based learning are recommended, as they promote active engagement through real-world problem-solving and decision-making tasks (Leal Filho et al., 2016). Furthermore, sustainability education benefits from diverse innovative pedagogical approaches, including active learning, formative analytics, research-based learning, transformative learning, and collaborative learning. All these methods enhance student engagement and positively impact learning performance (Lian et al., 2024).

This study aims to present an innovative pedagogical approach in higher education by integrating sustainability education with active and creative learning methodologies.

Recognizing the importance of engaging students and fostering their interest in sustainability, a pedagogical practice was implemented at the University of Aveiro during the 2023/2024 academic year. This initiative involved third-year students enrolled in the Marketing and Business Planning course within the Marketing degree program. The primary objective was to raise students' awareness of sustainability, inspiring them to incorporate sustainability principles into their future professional actions and behaviors, thereby contributing to a more sustainable world.

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To achieve this objective, students conducted in-depth interviews with a convenience sample to assess participants' knowledge of the SDGs and their perceptions and attitudes toward sustainable development. After analyzing the interview responses, students identified key trends in sustainability awareness and engagement. The findings revealed:

1. Varied levels of sustainability awareness: While some participants were entirely unfamiliar with the SDGs, others had only a vague understanding, and a minority demonstrated deeper knowledge of specific goals.
2. Diverse perspectives on responsibility for sustainability efforts: Participants expressed differing opinions on whether sustainability should be primarily driven by individuals, businesses, or governments.

The final discussion by students highlighted specific sustainability-aligned behaviors among participants, as well as areas where knowledge about the SDGs and engagement remained limited. Some concerns and challenges related to sustainability education were addressed in the reflections.

This pedagogical approach significantly enhanced students' understanding of sustainable development and critical thinking skills. The findings suggest that integrating creative methodologies and direct stakeholder engagement into SDG-focused education effectively develops key sustainability competencies. By fostering real-world discussions through interviews, this approach not only improved students' research and analytical skills but also deepened their reflection on sustainability challenges and individual responsibilities in achieving the SDGs. These results align with existing literature, which asserts that integrating active and participatory learning within real-world contexts fosters deeper understanding and meaningful engagement (e.g., Lian et al., 2024; Ramchunder et al., 2021).

The study's preliminary findings highlight the effectiveness of combining creative and research-based learning in sustainability education. Students not only reported increased awareness and understanding of the SDGs but also demonstrated greater motivation to apply sustainable principles in their future professional contexts. By engaging in real-world interactions and qualitative analysis, students developed essential competencies such as critical thinking, stakeholder empathy, and communication skills. These outcomes underscore the value of embedding active, participatory methodologies into sustainability curricula. As a contribution to the field, this study provides a replicable pedagogical framework that may be adapted across disciplines to foster deeper student engagement and actionable sustainability learning outcomes. Further iterations of this approach may refine its impact and broaden its applicability across higher education settings.

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By showcasing a practical example of innovative pedagogy, this study advances the discussion on effective teaching approaches and skills development in sustainability education. Additionally, it offers potential for replication and further methodological enhancement in other educational contexts.

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Keywords: Active Learning, Creative Learning, Marketing, Student Engagement, Sustainability Education.

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THE EVOLUTION OF FINANCIAL MARKETS: KEY TRENDS AND THE FUTURE OF FINANCE EDUCATION

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ABSTRACT

INTRODUCTION

The turbulent environment and shortening economic cycles are influencing the evolution of financial markets, while also forcing changes in financial education. The topics covered concern two coexisting phenomena: (1) hidden inflation in Japan, with particular emphasis on the phenomenon of shrinkflation, which is a strategy used by manufacturers to reduce the size of products while maintaining their prices at the same level (2) financialisation, which involves increasing the scale of financial operations and phenomena, multiplying value for owners in isolation from production activities, and thus, to simplify, it can be said that 'money generates money'. Both phenomena have centuries-old historical roots, but are perceived as enabling the generation of value for owners in the modern world, and are relatively little recognised and disseminated in education

PURPOSE

The aim of the research is to identify the evolution of the financial market, with particular emphasis on shinkration and financialisation in the context of conceptualising the development of financial education.

HYPOTHESIS

The increasing pace of change in the environment (turbulence, shorter economic cycles) and the multitude of shocks on the market are causing owners to seek value through, among other things, the use of shrinkflation strategies and the process of financialisation. These changes require an innovative, conceptual approach to financial education.

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RESEARCH METHODOLOGY

The primary method used in the study is literature review, taking into account the keywords 'financial markets', 'turbulent environment', 'economic cycles', 'shocks', 'financialisation', "shrinkflation" and 'finance education'. The work is based on resources from the following databases: Elsevier, Springer Link, Web of Science, Scopus and others. The number of citations of articles and their substantive content were taken into account.

RESULTS

In the new era of financialisation, households finance their own spending growth by taking on private debt rather than public debt (Pellandini-Simányi, 2020). For example, before the 19th century, clothes and furniture retained their value over time, allowing them to function simultaneously as consumer goods and as a form of savings. People bought them with their long-term resale value in mind (McCracken, 1988; Nenadic, 1994) cited in (Borch 2021). This can be seen as an example of the penetration of financial logic into the non-financial sphere, whereas today a purely hedonistic or aesthetic approach prevails for these goods (Pellandini-Simányi, 2020). The most commonly cited definition of financialisation is that which refers to the growing role of financial motives, financial markets, financial entities and financial institutions in the functioning of the national and international economy (Epstein, 2005). Today, financialisation affects financial markets and securities trading (with varying levels of risk), but it is also visible in commodity markets (raw materials, agricultural products, etc.). The process of financialisation is also visible in the land market, in particular agricultural land, including the maintenance of land without production, large-scale purchases (Clapp 2014); the purchase of land for the construction of roads, shops, schools, etc., and the economic development of peripheral regions (Langford, Smith, Lawrence 2020). In the case of financialisation in commodity markets involving precious metals (silver, gold, diamonds, platinum, etc.) or oil deposits, a negative phenomenon of land financialisation, known as predatory financialisation, is visible. This is expressed, for example, in the development of land without environmental protection or the predatory extraction of raw materials (Garcia-Arias, Cibils, Costantino, Fernandes, Fernández-Huerga 2021).

While financialisation has been a known phenomenon for at least several centuries, shrinkflation is a relatively new economic category. In this situation, it is not yet clearly defined. For example, Janssen and Kassinger (2025) define shrinkflation as: 'a phenomenon consisting in a reduction in the size of products while maintaining or slightly increasing their prices'. Milan and Singh (2024) characterise

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shrinkflation as: 'a method of subtly reducing the size or quantity of packaging while maintaining the price'. When considering the phenomenon of shrinkflation, doubts arise as to whether these two approaches can be equated. It should also be emphasised that the above definitions of shrinkflation do not take into account issues such as changes in the composition or quality of products, which are considered to be a common manifestation of hidden inflation

CONCLUSIONS

Shrinkflation has become a tool for maintaining competitiveness and responding to rising production costs. Despite its popularity, it has received mixed reviews from consumers. Transparent communication about price changes should be a more effective strategy for building consumer trust in the long term. Financialisation, on the other hand, has become ubiquitous at the macro, meso and microeconomic levels, manifesting itself in many forms (multiplying value for owners through global financial operations; multiplying the wealth of households that take risks and invest their spare cash). Both phenomena coexist and their effects are ubiquitous.

LIMITATIONS

The research was conducted based on a limited number of literature sources and requires further analysis. The research mainly concerns the markets of the European Union, North America, Latin America and Japan and cannot be generalised.

Keywords: Financial markets, turbulent environment, economic cycles, shocks financialisation, shrinkflation, finance educations

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WOMEN IN E-SPORTS: CHALLENGES AND OPPORTUNITIES FOR GENDER DIVERSITY

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ABSTRACT

AIM AND RESEARCH QUESTIONS

The aim of this study is to examine the impact of E-Sports from the perspective of gender diversity, social inclusion and resilience on female society. E-Sports have been growing and becoming deeply professionalized with experts struggling to integrate them into society; it will therefore be necessary to understand the reasons why women are underrepresented in E-Sports and which can be supported tools for them.

THEORETICAL BACKGROUND AND LITERATURE REVIEW

According to a literature review, in the E-Sports industry women represent a lower proportion of participants, fans, and leaders. Despite this, in recent years, the number of female players has increased. However, this growth hasn't necessarily led to equitable representation in the professional and competitive E-Sports sector. In terms of gender issues related to sexism and exclusion (Ruvalcaba, et al., 2018; Ratan, et al., 2015; Taylor, 2012), the culture surrounding competitive video gaming has been characterized as toxic, particularly toward women often manifests in the form of verbal abuse and marginalization (Orme, 2021). Women writing about their own experiences and the experiences of other women routinely instances where gender-based toxicity has lasting impacts beyond the scope of the game where that toxicity was encountered (Cote, 2020; Vossen, 2018) and, unchecked, the trajectory of this toxicity can cause lasting damage to players and game communities. Despite the toxicity confronting women in E-Sports, many of them consider themselves video game enthusiasts; however, many do not identify as part of the mainstream competitive video gaming community (Orme, 2021). For this reason, it becomes essential to explore not only the concept of inclusivity but also resilience among women engaged in E-Sports. In this context, resilience refers to the ability of female gamers to overcome obstacles and continue to fight for a lack of representation in a male-dominated industry. The lack of female representation in a surprising considering that female gamers perform equally as well in competitive video games (Shen, et al., 2016) and have a near equal interest (Paaßen, et al., 2017) relative to their male counterparts.

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RESEARCH DESIGN, METHODOLOGY AND DATA ANALYSIS

Moving from the recent study (Balakina, et al., 2022) in which several female gamers were interviewed, it has been observed that a common motivation for them to overcome all barriers has been their dedication to competitive gaming. However, women continue to face barriers, such as a lack of support from other female and rigid gender social expectations. Therefore, we contribute to address this gap, by interviewing some key women players in the Italian E-Sports industry to better shed light on this phenomenon, by remarking what are the main issues for women to affirm themselves.

RESULTS/FINDINGS AND DISCUSSION

There are various problems that women face in the gaming industry. First, there are no role models that women can identify with, as E-Sports is heavily dominated by men. This does not only concern all players, but also other areas, such as management and managerial roles in associations. Also, women fear not being judged on their worth, but on their gender; in this way, however, because of the stereotype of women and girls not being interested in video games, the gaming sector does not consider them as a target group (Owayo, s.d.). Overall, females face a challenging environment and barriers that likely inhibit their engagement with E-Sports. This is fundamentally problematic as individuals need visible representation to help them see themselves represented and realize they belong. This supports why many females, despite being active gamers, do not identify as such (Paaßen et al., 2017). Greater results/findings are not yet available at the time of submission of the abstract, but we are guaranteeing that we will have the results at the time of the conference. Personal interviews and questionnaires will be carried out with professional figures about the topic of the abstract.

CONCLUSION, CONTRIBUTION AND IMPLICATION

To foster identification with an activity, leaders within the E-Sports industry should recognize the importance of providing platforms that empower females in E-Sports. In future, visible female representation at the professional levels of E-Sports will help encourage women to see themselves not only as players but also indirectly foster their involvement in related positions. Furthermore, efforts to promote inclusiveness and resilience among women in E-Sports are crucial to promoting a fair and diverse industry. The long-term goal should be for women and men to play together, without sex having any relevance (Owayo, s.d.). By addressing these obstacles and by providing support to

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women players, we can work towards a future in which gender equality is fully achieved in the world of E-Sports.

Keywords: gender; esports; women; resilience; social inclusion; diversity; gamers; female; gaming industry; male-dominated.

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PSYCHOLOGICAL CAPITAL IN FAMILY BUSINESSES: UNVEILING ITS IMPACT ON EMPLOYEE RETENTION AND WELL-BEING

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ABSTRACT

Family-owned businesses dominate Germany's private sector, accounting for 90% of all companies (Garnitz *et al.*, 2023; Hauer and Ahrens, 2002). Furthermore, large family businesses exert a greater influence on domestic employment than publicly traded corporations listed in the German stock exchange, i.e., DAX (Hauer and Ahrens, 2022), underlining the importance of family businesses in the German labor market.

The shortage of skilled workers in Germany is not limited to individual industries or regions, but is a nationwide challenge, also affecting family businesses and leading to a very high level of effort in filling vacancies (Garnitz *et al.*, 2023). Given the substantial costs of recruitment, organizations must prioritize retaining their highly qualified workforce (Fitzenberger *et al.*, 2024; Walwei, 2023). A crucial factor in achieving this objective is fostering a positive work attitude and a strong sense of well-being among employees (Müller, 2024). Psychological capital (PsyCap), a construct derived from positive psychology, has been associated in previous studies with both, a positive work attitude and enhanced employee well-being (Kun and Gadanecz, 2022). This is of paramount importance as psychological strain – otherwise – negatively affects job satisfaction (Lohrmann and Tirrel, 2025).

There are already findings on the effects of PsyCap in different countries like India, China, and Ecuador (Lanchimba *et al.*, 2024; Narayanasami *et al.*, 2024; Ren *et al.*, 2024). These studies uncovered that PsyCap reduces turnover intentions and absenteeism and positively affects employee retention and satisfaction (Farroukh *et al.*, 2023; Narayanasami *et al.*, 2024; Shah *et al.*, 2019). Significant differences exist between the work cultures of India, China, Ecuador, and Germany (Hofstede, 2023). Germany is strongly individualistic, since personal responsibility and personal goal achievement are more important than group orientation (Hofstede, 2023). Moreover, Germany, in comparison to the other countries, has a high level of uncertainty avoidance (Hofstede, 2023). However, research on PsyCap, its antecedents and potential effects in Germany is lacking (Tjimuku and Atiku, 2024). Due to significant differences in work culture, the existing findings from Far Eastern cultural spheres can only be transferred to Germany to a very limited extent (Arora, 2020). Furthermore, there is an open

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call for research on PsyCap in other cultural contexts (Lanchimba *et al*., 2024; Mahipalan and Garg, 2024; Narayanasami *et al*., 2024). Therefore, our study aims to examine the influence of PsyCap on employee-related indicators in German family businesses.

Thus, the following research question is raised:

RQ: How does PsyCap affect employee-related indicators in German family businesses?

To answer the research question and to close the aforementioned open calls, a conceptual framework will be developed based on Bandura's social-cognitive theory (2001) and Hobfoll's conservation-of-resources theory (1989). Based on an extensive literature review, hypotheses will be derived and analyzed using a covariance-based structural equation model. This approach analyzes to what extent the proposed theoretical model can reproduce the covariance matrix for the observed sample dataset in order to support or reject the hypotheses (Hair *et al*., 2021).

PsyCap has a positive effect on employee retention while negative effects are uncovered in association to absenteeism and intentions to leave in China, India and Ecuador (Dudasova *et al*., 2024; Ibrahim and Hussein, 2024; Narayanasami *et al*., 2024; Sen *et al*., 2024). As Germany is strongly individualistic, the self-efficacy and resilience might be more important. Thus, a positive effect of PsyCap on employee retention is expected. The high level of uncertainty avoidance could inhibit optimism and hope. This aspect might hinder the positive impact of PsyCap on employee retention.

This study contributes to knowledge by providing new insights into the role of PsyCap in German family businesses and its impact on retaining skilled employees in a highly competitive labor market.

Keywords: psychological capital, PsyCap, emotional intelligence, employee retention, retention management, turnover intentions, absenteeism, SEM, family business, Germany, culture, mental health

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REPORTING FINANCIAL AND NON-FINANCIAL PERFORMANCE IN PUBLIC NURSING HOMES

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ABSTRACT

PURPOSE OF THE PAPER

Faced by mounting financial pressures, growing demands for better services, heightened accountability and sustainability expectations, and rapid technological transformations (Agostino *et al.*, 2023; Di Giulio and Vecchi, 2023; Garlatti *et al.*, 2023), the public sector has adopted ever more accrual accounting over the past two decades, enabling more effective and sustainable cost and management accounting practices (Cohen, 2022; Hyndman *et al.*, 2018). Accrual accounting, combined with advanced cost analysis and digital technologies, allows organizations to automate processes, streamline decision-making, improve transparency, and address sustainability issues in performance management and reporting (Cooper *et al.*, 2019; Heise and Gros, 2024; Manes Rossi *et al.*, 2020; Tiron-Tudor *et al.*, 2024). Although these implementations are not without issues (Gosselin and Journeault, 2022), they can be critical in addressing challenges such as regulatory demands for public services, while fostering efficiency, financial sustainability, and sustainability issues (Wagner and Fain, 2017).

This paper addresses the intersection of accrual accounting, sustainability, and technology in public financial management, focusing on regulating public services. The specific purpose is to offer further insight into which elements should characterise non-financial and sustainability reporting for public authorities to appreciate key issues in regulated markets where accounting practices can benefit from both cost accounting and digital tools. This contribution addresses the research need for in-depth analysis of accountability tools within regulatory governance (Garlatti and Pezzani, 2000; Wagner and Fain, 2017), aligning with the agenda to explore the implications of accounting changes and user-oriented reporting in fostering inclusive and resilient public services (Barbera *et al.*, 2024; Bisogno *et al.*, 2024; Grossi *et al.*, 2023).

RESEARCH METHODOLOGY

This paper focuses on the Italian public care sector and in particular on nursing homes. Italy is an interesting case for investigating the development of public accounting, because it has been depicted as a hesitant adopter of accrual accounting (Hyndman *et al.*, 2018), so much that the accrual reform

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introduced in 2009-2011 has attracted scepticism and opposition (Iacuzzi, 2021). Furthermore, the social and healthcare sectors are important intervention areas, because of the social role they play given demographic and social trends and in terms of public spending (ISTAT, 2024a, b). Moreover, nursing homes operate in a quasi-market context with accounting information also suitable for cost accounting frameworks (Garlatti and Pauluzzo, 2024).

Since the 2001 constitutional reforms, public care and health services are regulated at regional level. In the Friuli Venezia Giulia (FVG) Region, after much lingering, Regional Law 22/2019 and Regional Law 13/2021 modified Regional Law 2003 established that by 2023 public nursing homes, mostly "Aziende pubbliche di Servizi alla Persona" (ASPs, public care service organizations), should implement accrual and cost accounting systems.

Following six years of research to support the revision and innovation of the FVG financing system for elderly services, this paper presents the results of a study aimed at disclosing financial and non-financial information useful to define fee reference standards and a sustainable regional financing system for high quality elderly care.

MAIN FINDINGS AND IMPLICATIONS

Initial findings highlight the shift from compliance-based to performance-oriented regulation, driven by financial and non-financial reporting. Cost and accrual-based framework aim at infusing efficiency, responsibility and result orientation within the complex public regulatory realm. Nursing homes can use more accounting data to translate non-financial information and rely on financial and sustainability management systems as fundamental accountability and performance measurement tools to document their performance.

Results contribute to ongoing debate on how accounting reforms can support inclusive, resilient, and sustainable public services in the face of complex fiscal, demographic, and technological challenges (Grossi et al., 2023; Barbera et al., 2024). By providing grounded insights into the evolving role of accounting in regulating complex public services, the research offers practical and theoretical contributions for scholars, policymakers, and practitioners interested in the intersection of public management, sustainability, and digital transformation.

Keywords: Accrual, Accounting, Digitalization, Efficiency, Performance, Sustainability, Technology

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GAMIFICATION ENHANCES THE CUSTOMER ENGAGEMENT: A THEORETICAL FRAMEWORK

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ABSTRACT

Although gamification is a recent topic, it has become increasingly popular in various contexts. The first definition of gamification appeared in 2011 and continues to be the most widely used by researchers (e.g., Huotari and Hamari, 2012; Nobre and Ferreira, 2017; Bauer *et al.*, 2020). Gamification refers to using game design elements in non-game contexts to motivate and increase activity and retention in digital design and marketing activities (Deterding, 2011).

Huotari and Hamari (2012) and Hammedi *et al.* (2017), for example, claim that gamification is a tool that integrates the service process of the gaming experience that aids and enhances the creation of the overall value of the user experience. User experience can be considered as customer experience (CX), which, according to Bagdare and Jain (2013) and Godovykh and Tasci (2020), is defined as a customer's cognitive, affective, sensory, and behavioral responses throughout the consumption process.

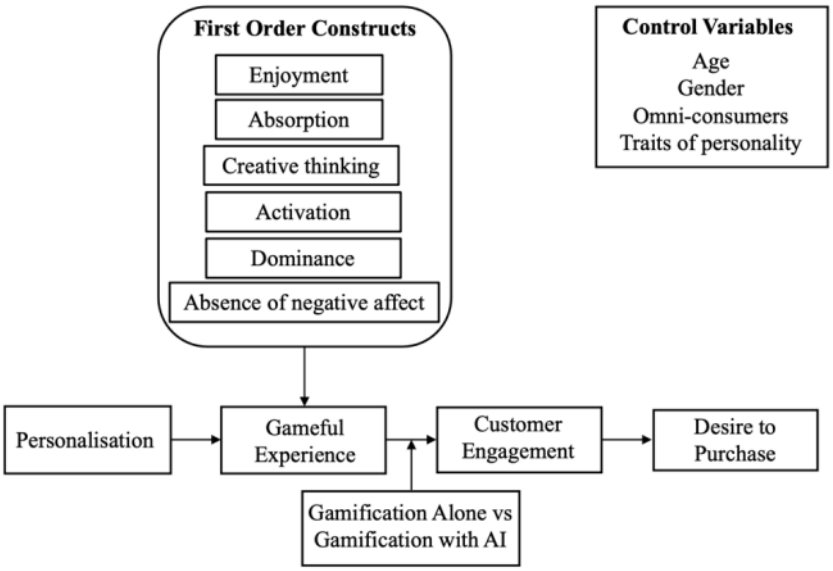
Consequently, the experience becomes more flowing, increasing utilitarian and hedonic perceptions. According to Rialti *et al.* (2022), gamification has characteristics such as fun and storytelling that benefit the flow of the customer experience and is therefore capable of changing their behavior and their responses to technology.

Recent phenomena such as personalization, which aim to make customer experiences more personal, can make the experience of using platforms more attractive and benevolent because they are more oriented towards customers' hedonic and utilitarian emotions. Consequently, with this impact on customers' emotions, personalized platforms such as gamification can lead users to buy products and improve their relationship with brands. Another phenomenon that continues to develop is artificial intelligence (AI). AI can make user experiences more pleasant and engaging by programming algorithms capable of learning. Furthermore, when personalization is combined with AI, it can improve the use of gamification, consequently impacting customer emotions and, in turn, improving the gamified experience.

Based on the different definitions of gamification and considering more recent phenomena this article aims to provide empirical information on the impact of gamification and AI on the customer experience to improve customer engagement. To respond to the aim of this article, this empirical research presents a theoretical framework (see Figure 1).

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Figure 1. Theoretical Framework



Source: author's elaboration

In this empirical study, we expect to conduct two experiments: the first with consumers using a gamified mobile application in the context of an FMCG retailer in a laboratory environment, and the second experiment involves using the gamified app with AI in the same context and environment. Both experiments have a control group of consumers who use the mobile app without gamification and AI. We aim to collect data through questionnaires administered to consumers after the experiment. A 5-point Likert scale will be used to measure agreement or disagreement among gamification users. The statistical data will then be analyzed using R software.

The expected finding of this empirical study is, firstly, to contribute to the topic of gamification by incorporating AI and personalization into gamified mobile platforms. It is anticipated that personalization will have a positive impact on the gamified experience, making it more user-driven and engaging than a generalized experience. It is expected that customers who use the gamified mobile application will exhibit greater engagement with the brand compared to those who use the mobile application without gamification. Furthermore, it is anticipated that with the second experiment, consumers will use the gamified mobile app with AI and exhibit higher engagement than those who use the gamified application without AI.

Regarding implications, it is expected that this empirical study will contribute to the topic of gamification by incorporating personalisation and AI as game elements, providing future avenues for further research. It is also expected that the findings of this study will contribute to marketing managers using personalised gamification as a marketing tool to boost user engagement with the brand.

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Keywords: Gamification, Customer Experience, Customer Engagement, Gameful Experience, Gamified Experience, Retail, Marketing, Personalisation

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BOARD CULTURAL DIVERSITY AS A MODERATOR OF CORPORATE GOVERNANCE ATTRIBUTES AND ESG DISCLOSURE: EVIDENCE FROM EU FIRMS

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ABSTRACT

Over the last decade, environmental sustainability has become a key priority in academic research and regulatory frameworks. Firms are increasingly called to integrate environmental objectives into their strategic decisions, driven by rising stakeholder pressure and the growing demand for environmental, social, and governance (ESG) disclosure (Zaid and Issa, 2023; Amel-Zadeh and Serafeim, 2018). Literature has widely addressed the effect of corporate governance attributes on ESG disclosure. In particular, the impact of board structural (Kamaludin et al., 2022; Lavin and Montecinos-Pearce, 2021; Lagasio and Cucari, 2019) and demographic characteristics (Cheung and Lai, 2023; Martínez-Ferrero et al., 2021; Amorelli, and García-Sánchez, 2020) on ESG disclosure. In this context, the interaction of corporate governance attributes in shaping ESG disclosure remains underexplored (Gavana et al., 2025; Nguyen and Nguyen, 2023; Misangyi and Acharya, 2014).

This paper investigates how board cultural diversity moderates the relationship between board characteristics and ESG disclosure, focusing on a sample of 234 non-financial listed firms operating in the European Union over the period 2014–2021. Specifically, we examine board structural attributes (CEO duality, independence, size) and demographic characteristics (gender diversity) and analyze their interaction with cultural diversity at the board level.

Our results show that board cultural diversity has a different moderating effect on the association between specific board characteristics and the level of ESG disclosure, and the significance of this effect varies depending on the ESG disclosure pillar considered. In particular, board cultural diversity enhances the positive effect of board size and gender diversity on overall ESG disclosure. When disaggregating the analysis by ESG components, we find that cultural diversity strengthens the positive influence of CEO duality and gender diversity on social disclosure but weakens the positive impact of board independence and board size. For environmental disclosure, board cultural diversity only amplifies the positive effect of board size. In contrast, no significant moderating effect emerges for governance disclosure, suggesting that board cultural diversity primarily enhances the influence of

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board characteristics on ESG disclosure in dimensions that reflect the interests of stakeholders other than shareholders. These findings suggest that board cultural diversity plays a multifaceted and differentiated role, complementing certain board attributes in fostering non-financial disclosure, particularly in the social dimension, but potentially creating tensions or substitution effects in other areas (Husted and Sousa-Filho, 2019).

Our study contributes to the literature by adopting a holistic approach that considers governance attributes as part of an interdependent system. It reveals that board characteristics may complement or substitute for one another in shaping a firm's ESG disclosure. This perspective helps address the inconsistencies found in prior studies regarding the relationship between individual board characteristics and ESG disclosure level, thereby filling a relevant gap in the literature. From a practical standpoint, we offer insights for policymakers and companies: when designing board composition and replacement strategies, possible interactions between structural and demographic characteristics of the board should be considered to amplify ESG transparency and responsiveness to a broad range of stakeholder needs. In particular, in the presence of powerful CEOs, board cultural diversity can enhance the CEO's sensitivity to the expectations of stakeholders beyond shareholders, resulting in increased social disclosure. Furthermore, expanding the representation of foreign directors within larger boards may represent an effective mechanism to foster greater levels of environmental disclosure.

Keywords: ESG disclosure, Board cultural diversity, Board characteristics, Corporate governance

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DIVERSITY AND INCLUSION PRINCIPLES AS PRECURSOR OF CIRCULAR ECONOMY

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ABSTRACT

In recent years, the circular economy (CE) has emerged as a key strategy for promoting sustainability, offering an alternative to the traditional linear economic model (Geissdoerfer et al., 2017). This shift is driven by the growing urgency to reduce environmental impact and improve resource efficiency. By prioritising closed-loop systems, CE minimises waste while encouraging innovation and sustainable business practices (Mazzucchelli et al., 2022).

While discussions on sustainability have often centred on environmental concerns, the social dimension, encompassing human rights, diversity, and inclusion, has received less attention (van Aaken et al., 2013; Monteiro et al., 2023). However, the role of diversity and inclusion in advancing sustainability is increasingly acknowledged (Saleem et al., 2021; Amiri et al., 2022). An inclusive corporate culture fosters innovation and resilience, both essential for CE strategies that require systemic change and cross-sector collaboration (Enciso-Alfaro and García-Sánchez, 2024). Leadership diversity, particularly gender representation on corporate boards, has been related to greater transparency, stronger stakeholder engagement, and more ethical decision-making, aligning with CE principles (Enciso-Alfaro and García-Sánchez, 2024b). Additionally, external influences, such as mandatory and soft law regulations play a crucial role in promoting social responsibility within businesses. By encouraging voluntary ethical practices, these mechanisms help companies align their strategies with broader sustainability goals and circular economy principles (Islam and McPhail, 2011). Despite these findings, the relationship between the environmental and social dimensions of sustainability remains underexplored, particularly regarding the influence of diversity and inclusion in advancing a circular economy (Rubino and Mastrorocco, 2025). Therefore, this study aims to explore the interplay between social and environmental dimensions of sustainability by investigating how internal and external drivers of diversity, inclusion and responsible governance contribute to the adoption of circular economy strategies. In particular, this research examines the role of inclusive workplace practices, adherence to international sustainability standards, compliance with soft law instruments, and gender diversity in corporate leadership as potential enablers of CE implementation. Therefore, the following hypotheses are formulated:

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H1: Respect for diversity and inclusion in the workplace has a positive impact on the adoption of CE strategies.

H2: The adoption of international standards has a positive impact on the adoption of CE strategies.

H3: Compliance with the OECD Guidelines for Multinational Enterprises has a positive impact on the adoption of CE strategies.

H4: Board gender diversity has a positive impact on the adoption of CE strategies.

To test the proposed hypotheses, this study uses a quantitative approach based on secondary data retrieved from the LSEG Workspace database covering the period 2017 to 2022. The sample includes 468 companies listed in the STOXX Europe 600 Index, which represents a broad cross-section of European companies. Due to data availability, the final dataset forms an unbalanced panel consisting of 1,899 firm-year observations.

The dependent variable is the Circular Economy Score (CE Score), which captures the extent to which companies adopt CE-related practices. It is calculated as the unweighted average of eight dichotomous indicators, each reflecting a specific circular strategy, such as waste reduction initiatives, energy and water efficiency measures and the use of eco- friendly product design (Enciso-Alfaro & García-Sánchez, 2024b; Rubino & Mastrorocco, 2024; Palea et al., 2023).

Key independent variables include the Diversity and Inclusion Score (DIR Score), a composite measure ranging from 0 to 100 and assesses organisational practices related to diversity, inclusion, human resource development and related controversies (Monteiro et al., 2023; Saha et al., 2024; Suciu et al., 2020). The ILOUN Score, also scaled from 0 to 100, assesses the alignment of companies with the ILO conventions and the UN Declaration of Human Rights (Mastrorocco et al., 2024). Compliance with the OECD Guidelines for Multinational Enterprises is measured by a binary indicator, while board gender diversity is measured as the proportion of women on the board (Agustina & Barokah, 2024; Enciso-Alfaro & García-Sánchez, 2024b; Yarram & Adapa, 2023).

To increase the robustness of the model, several control variables are included: ESG score (0–100) as a proxy for overall sustainability performance, board size, return on assets (ROA), market capitalisation (log-transformed) and company size (log of total assets) (Rubino et al., 2024; Lim et al., 2023; Yarram & Adapa, 2023). Since the CE score is a censored variable that is limited between 0 and 100, the Tobit model is used for the estimation, which is well suited for this type of dependent variable (Enciso-Alfaro & García-Sánchez, 2024a; García-Sánchez et al., 2024).

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The results of the Tobit regression analysis provide significant insights into the interplay between the social and environmental dimensions of sustainability. In particular, the results confirm a positive and statistically significant relationship between organisational commitment to diversity and inclusion and the adoption of circular economy (CE) strategies. This finding supports the first hypothesis and aligns with previous literature suggesting that a diverse and inclusive work environment fosters innovation, openness to new ideas and more transparent decision-making (Lim et al., 2023; Saha et al., 2024; Suciu et al., 2020; Leroy et al., 2022; Chizaryfard et al., 2021).

The analysis also provides empirical support for the second hypothesis, indicating that companies that are more compliant with international human rights standards are more likely to engage in CE practices. This finding underlines the growing recognition that social responsibility can act as a catalyst for environmental sustainability even in the absence of binding regulations (Islam & McPhail, 2011).This result underpins the argument that ethical considerations related to the promotion of human rights are intrinsically linked to environmentally responsible strategies, as respecting human dignity is now seen as a way to protect the rights of future generations (Monteiro et al., 2023; Mastrorocco et al., 2024; Thomas et al., 2022).

The third hypothesis is also supported by the data, as firms that adhere to the OECD Guidelines for Multinational Enterprises are more likely to adopt CE strategies. Although these guidelines are non-binding, their normative influence appears to shape corporate behaviour by promoting transparency, accountability and alignment with global sustainability objectives (van Zanten & van Tulder, 2018; Vinković, 2013). This finding highlights the regulatory significance of soft law instruments in shaping corporate sustainability practices reinforcing prior scholarship that recognises their capacity to foster voluntary yet meaningful organisational change in the absence of binding legal obligations (Islam & McPhail, 2011).

In contrast, the fourth hypothesis is not supported by the results. Contrary to expectations, board gender diversity does not appear to have a significant impact on the adoption of CE strategies. Previous studies have linked female representation on corporate boards to enhanced sustainability performance (Enciso-Alfaro & García-Sánchez, 2024a, 2024b; García-Sánchez et al., 2024). However, the present findings are more closely with research suggesting that, in some contexts, board gender diversity serves a symbolic or legitimising function rather than reflecting a genuine commitment to organisational transformation (Amran et al., 2014; Prado-Lorenzo & García-Sánchez, 2010). The mere presence of gender diversity therefore does not appear sufficient to encourage CE commitment, unless it is accompanied by deeper structural or cultural changes.

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To summarise, the study fills a gap in the literature and emphasises the growing importance of integrating social and environmental dimensions in sustainability frameworks. The results show that corporate commitment to D&I and voluntary compliance with international social and environmental standards positively and significantly influence the adoption of CE. This supports previous literature that emphasizes the interdependence of ethical behaviour and environmental responsibility (Eccles et al., 2014; Murphy, 2012; Semet, 2020). However, the presence of women on corporate boards does not emerge as a significant determinant of CE behaviour, reflecting previous studies that question the effectiveness of gender diversity alone in promoting sustainability outcomes (Amran et al., 2014; Prado-Lorenzo & García-Sánchez, 2010).

By highlighting D&I as a fundamental enabler of the shift from linear to circular models, the study contributes to the discourse on sustainable development, particularly by recognising diversity as a core human right and as a lever for innovation and improved decision-making (Mies & Gold, 2021). The findings suggest that socially inclusive practices not only enhance corporate ethics but also foster the conditions necessary for effective environmental transitions.

From a practical perspective, the study offers actionable insights for both business leaders and policy makers. Managers are encouraged to integrate social equity with environmental strategies to improve the implementation of CE, while policymakers are advised to promote non-binding frameworks that incentivise authentic respect for diversity and inclusion.

Nonetheless, the study also presents some limitations. It focuses exclusively on large, listed European firms, which may limit its generalisability to other regions or to SMEs. Furthermore, it only examines selected dimensions of D&I, leaving room for future research to explore broader factors such as cultural diversity, inclusion of people with disabilities and gender pay equity.

Overall, the study reinforces the critical interplay between social and environmental sustainability and calls for more inclusive and context-sensitive approaches in future research.

Keywords: diversity and inclusion, board gender diversity, circular economy, environmental sustainability, social sustainability.

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FINANCIAL LITERACY: A SHIELD AGAINST FRAUD AND A DRIVER OF PAYMENT EFFICIENCY

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ABSTRACT

RATIONALE

Financial inclusion is essential for sustainable economic development and collective well-being. In the digital economy, financial literacy has become essential not only for personal finance management but also for promoting economic stability and resilience (Lusardi, 2019; Grohmann & Menkhoff, 2017). As digital technologies transform financial institutions, comprehending the impact of financial knowledge on behaviour is essential, especially concerning emerging instruments such as Central Bank Digital Currencies (CBDCs).

This research investigates the relationship between financial literacy, exposure to digital financial fraud, and attitudes toward the digital euro. Introduced by the European Central Bank, the digital euro is designed to complement traditional currency, enhance payment efficiency, and strengthen strategic autonomy within the euro area (Korhonen, 2022; Brunnermeier & Landau, 2023). However, its success largely depends on public awareness, trust, adoption readiness, and the robustness of technological infrastructure.

The primary objective of this study is to examine how perceptions of the digital euro—particularly regarding its efficiency, security, and usefulness in cross-border transactions—are shaped by individuals' levels of financial literacy and experiences with digital fraud. Exposure to fraud is assessed through both direct experience and perceived vulnerability, while financial literacy is measured by the understanding of financial principles and risk awareness.

This research addresses three key questions:

1. How does a high level of financial literacy influence individuals' knowledge and trust in the digital euro?
2. What is the relationship between perceived security in digital payments and the willingness to engage in educational initiatives related to the digital euro?
3. How does a reduced concern about digital fraud affect the perception of technical risks associated with adopting the digital euro?

Prior studies (Lusardi, 2019; Grohmann & Menkhoff, 2017; Engels et al., 2021; DeLiema et al., 2020) have demonstrated that greater financial literacy improves responsible financial behaviour and fraud prevention. Public trust is also essential for the implementation of the digital euro, which is intended to

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strengthen Europe's payment system and supplement cash (Korhonen, 2022; Brunnermeier & Landau, 2023).

Financial education is becoming more and more important as digital payment systems and private alternatives like cryptocurrencies and stablecoins emerge quickly (Wewege et al., 2020; Yadav et al., 2023). Improved financial literacy can resolve security and privacy issues, boost public confidence, and promote informed usage of the digital euro (Horváth, 2023).

METHODOLOGY

Data were collected in Italy between May and October 2024 via a computer-assisted web interview (CAWI) distributed through social media platforms, yielding 502 complete responses. The 38-question survey covered demographic characteristics, financial literacy, digital payment usage, perceptions of the digital euro, and experiences with financial fraud. It assessed both objective financial knowledge and subjective attitudes toward digital financial tools. Data analysis employed Probit and Ordered Probit models to explore correlations and sub-population differences in attitudes and behaviors.

FINDINGS

Preliminary analyses (Figure 1) show that higher financial literacy (FinEdu) significantly increases awareness and trust in the digital euro, influencing both knowledge and willingness to engage in educational initiatives. A stronger perception of digital payment security (Digitalsafes) similarly boosts interest in educational programs. Conversely, reduced concern about digital fraud (NOFFraud) correlates with lower perceived technical risks. These findings highlight the role of financial literacy, security perception, and fraud concerns in shaping attitudes toward the digital euro.

Topic	Key Variable(s)	Effect	Significance
Effect of financial literacy on awareness of the digital euro	FinEdu	Positive effect on knowledge of the digital euro	$p < 0.05$
Financial literacy and perceived security on willingness to participate in education	FinEdu, Digitalsafes	Positive effect on willingness to attend educational initiatives	$p < 0.05$
Effect of reduced concern about fraud on perceived technical risks	NOFFraud	Negative effect on perceived technical risks	$p < 0.05$

Figure 1. Main empirical findings

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DISCUSSION

The analysis offers practical insights for both financial institutions and regulatory bodies. For financial institutions, the results can guide the refinement of financial literacy campaigns by making them more targeted and effective in preventing fraud. Additionally, institutions can use this information to design programs that promote the adoption of digital payment systems, including the digital euro, by addressing barriers related to limited financial knowledge. For regulatory bodies, the study underscores the importance of policies that support greater financial education as a means of protecting consumers and enhancing the efficient use of emerging digital tools such as CBDCs. Ultimately, the research contributes to a more efficient and inclusive financial ecosystem in the euro area by highlighting the critical role of financial literacy in safeguarding against fraud and encouraging technological innovation.

Keywords: financial literacy, fraud prevention, payment efficiency, digital euro, consumer protection

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DOPTING SOFT LOGIC TO ENHANCE AN ADIZES TOOL: A COMPREHENSIVE APPROACH TO REPRESENT THE EVALUATION OF MANAGEMENT STYLES

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ABSTRACT

Management styles play a critical role in the functioning and success of organizations, particularly in navigating complex social dynamics. The management style evaluations practically reflect management skills. Managers with a limited set of skills are unlikely to lead their teams to success (Bellé, 2014; Levy, 2017). Management styles may be defined as: "the principles that underline the methods, abilities, and techniques managers use in handling situations and expressing leadership within an organization. Generally speaking, managerial styles are polarised between autocratic and permissive, although each style has its subtleties" (HRZONE, 2024).

Management skills assessment has become increasingly complex in today's digital age, as these skills are multi-dimensional and require a nuanced approach. The research focuses on the Adizes management style evaluation method, a widely recognized tool that evaluates four distinct managerial styles: Producer, Administrator, Entrepreneur, and Integrator (Adizes, 2016). Adizes emphasized that the right blend of these styles is essential for fostering organizational stability and innovation. Each style is referred to as a dimension, and beyond evaluating each dimension independently, it is crucial to consider the tension and balance between them, as they often exist in inverse proportions. To address this complexity, the study proposes a methodology based on Soft Logic, a mathematical theory approach designed to accommodate ambiguity and multi-dimensional analysis, specifically when different dimensions may represent conflicting traits. Therefore, this approach is particularly suited to the assessment of managerial skills.

While pure mathematics can be deterministic, life is usually not. The difference lies not only in the probabilistic nature of most events but also in their vogue behavior. For example, in many cases, we cannot clearly state that one candidate for a managerial job is better than the other because each has its own merits. To address these real-life situations, Soft Logic theory was developed and introduced (Klein & Maimon, 2021). The soft Logic approach differs from classical mathematics in a central principle: The zero number is no longer a singular value but may have infinite values - introducing a

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new term: soft zero. Soft zero is noted as 0^{-}, and its range of values is received by multiplying it with a classical mathematics scalar. Now, a soft number comprises two parts: a real part, which is a classical mathematics number, and a soft part, which is a soft zero number. In the implementation of soft Logic to the Adizes Management Style assessment, the real part of the soft number represents the rank of each management type (dimension), and the soft part represents the tension between the dimensions (when Soft Logic theory was extended to linear algebra – to support multi-dimensional models). Unlike traditional assessments focusing on isolated behaviors, the proposed method highlights the dynamic interplay between these styles. By incorporating Soft Logic, the framework provides a more flexible and comprehensive evaluation, capturing both dominant traits and the tensions between them.

The methodology was tested in an empirical study with 40 participants playing managerial roles in diverse ranks of leading traditional industries and high-tech organizations. Figure 1 depicts a two-dimensional XY plot that visualizes the values of all participant's weighted types rank means and weighted tensions means (random noise was applied to the results due to ethical considerations). Each dot on the graph represents a specific participant. The weighted type rank mean (X-axis) indicates the participant's overall level of management skills according to the four Adizes types (Producer, Administrator, Entrepreneur, and Integrator). The weighted tension mean (Y-axis) indicates the overall tension between the ranks of the types for a specific participant, thus quantifying the degree of internal conflict or inconsistency between the type's ranks.

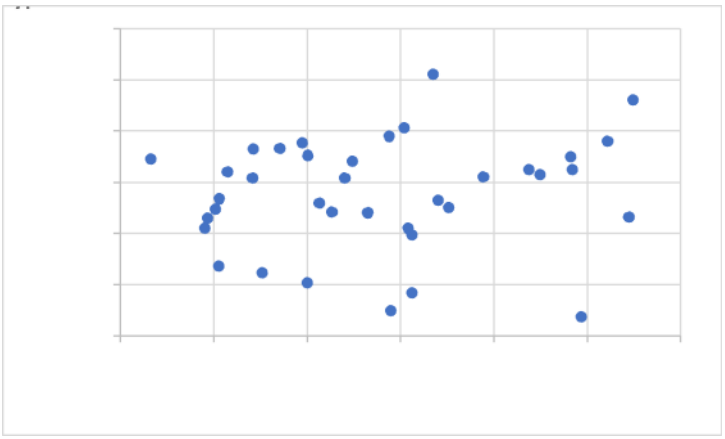


Figure 1: The full picture of the participants' management style ranks

While this presentation is accurate, a significant amount of data was lost when the multi-dimensional model was collapsed into two scalars (the X and the Y values in Figure 1). This missing information may be crucial to the assessment of managerial skills due to the importance of the "right blend "of

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styles. By applying the proposed methodology and presenting the information with Soft Logic, all the data on each individual is preserved. Moreover, while existing assessment tools often evaluate managerial styles in isolation, this approach enables a more in-depth representation of the tensions and interplay between the different styles within a specific individual, offering a framework that provides a comprehensive approach to the evaluation task of managerial styles. That way, more informed decision-making can be made in areas such as recruitment, leadership development, and team composition. Although developed with the Adizes tool, the methodology can be adapted to other managerial assessment tools and potentially extended to other multi-dimensional domains.

Keywords: Management Styles; Leadership; Adizes questionnaire; Soft Logic; Skills Evaluation; Decision-Making.

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THE INFLUENCE OF TARIFF CHANGES ON INTERNATIONAL MARKET PERFORMANCE.

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ABSTRACT

The purpose of this quantitative study is to examine the influence of two dynamic capabilities—global mindset (Torkelli et al., 2018) and market orientation (Butkouskaya et al., 2024) — on market performance (Torkelli et al., 2018) of multinational enterprises, with the perceived impact of tariff changes serving as a moderating variable.

Underpinned by the Dynamic Capability Theory (Teece et al., 1997), which conceptualises how decision-makers sense, seize, and transform organisational resources to adapt to changing environments (Baishya et al., 2025), studies have shown that market orientation influences the market performance of SMEs (Butkouskaya et al., 2024). The study of Torkelli et al. (2018) finds that a global mindset predicts international performance.

Tariff modifications hold substantial importance due to their direct influence on international trade dynamics and economic interrelations (Handley & Limão, 2017). By adjusting tariffs, governments can affect the pricing of imported and exported commodities, thereby inducing changes in consumer behavior and production patterns (Amiti et al., 2019). Academic literature robustly supports the view that tariff modifications are of substantial importance due to their direct and indirect effects on international trade, economic relationships, and the strategic operations of global companies, particularly through their influence on multinational supply chains (Handley et al., 2024).

This study addresses a knowledge gap by formulating the hypothesis that market performance of multinational enterprises is influenced by global mindset and market orientation capabilities, with their effectiveness moderated by environmental conditions, including tariff-related pressures (Fajgelbaum et al., 2020). This study employs a quantitative research approach to examine the relationship between the influence of market orientation and global mindset as independent variables and international performance as the dependent variable, with the perceived impact of tariff changes as a moderating construct. A survey-based design is used to collect standardised responses and enable statistical analysis based on prior work provided by Wilden et al. (2013). By applying Structural Equation Modeling (SEM) and the bootstrapping method, this study aims to analyse complex and

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partially unknown elements. Data will be collected through an electronic survey, incorporating validated scales from existing questionnaires. Each item reflects the perceived impact of early-2025 U.S. tariff increases announced by the Trump administration, with supporting peer-reviewed sources. This analytical method is chosen for its ability to identify statistical relations between variables, providing insights into the perceived impact that tariff changes have on the two dynamic capabilities, global mindset and market orientation, influencing international performance. By adopting correlational analysis, this study provides meaningful findings that can inform both academic research and industry practices in multinational enterprises.

This research makes an original contribution by delivering an enhanced understanding of dynamic capabilities and provides novel empirical evidence supporting the theoretical frameworks proposed by Butkouskaya et al. (2024) and Torkelli et al. (2018). The study's practical implications are particularly relevant for decision makers operating in multinational enterprises, and it provides novel insights that support the importance of fostering a global mindset and market orientation to navigate tariff changes and enhance market performance.

Keywords: Dynamic capabilities, market orientation, global mindset, international performance, tariff changes

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IMPLEMENTING SUSTAINABILITY PRINCIPLES IN THE ORGANISATION AND DELIVERY OF MEGA SPORTING EVENTS (MSES): THE CASE OF UEFA EURO 2024

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ABSTRACT

In the era of climate changes, growing social inequalities and increasing demands for management transparency, ESG (Environmental, Social, Governance) principles have become a fundamental part of organisational strategies worldwide. Sport, as a field with global reach and significant social impact, cannot remain indifferent to these challenges. Consequently, environmental, social and governance (ESG) principles, along with the growing legal obligations associated with them, are becoming a key factor in shaping responsible behavior among all participants in the sports ecosystem. Implementing ESG strategies in sports not only contributes to sustainable development but also enhances the reputation of organisations, attracts sponsors and strengthens relationships with fans and local communities. The integration of ESG principles in Mega Sporting Events (MSEs) is no longer optional — it is a strategic imperative ***(Muller, 2020) (Parent & Smith-Swan, 2013) (David, January 2023)***. By prioritizing sustainable operations, ethical governance, and social inclusivity, MSEs can set a powerful precedent for responsible business conduct beyond the sports industry.

UEFA, as the governing body of European football, has taken a leading role in advocating for sustainable event management. In particular, the paper aims to analyse the UEFA European Football Championship, the third-largest sporting event worldwide after the Olympic Games and the FIFA World Cup, which has been hosted by Germany in 2024. The UEFA Euro 2024 ESG Report serves as a case study of a holistic approach to integrating environmental and social responsibility principles into the organisation of large-scale sporting .

This paper critically examines UEFA Euro 2024's ESG strategy, evaluating its achievements, challenges, and long-term impact ***(UEFA, 2024)***. Based on documentary and thematic analysis, this research emphasises the importance of ESG initiatives in promoting sustainable business practices. The goal is to demonstrate that following a specific ESG (Environmental, Social, and Governance) strategy, the event can become sustainable. Sustainability has been a fundamental, cross-sectional topic defining UEFA Euro 2024's bidding process, organisational setup, and decision-making. In 2021,

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UEFA and the German Football Association presented an Event Social Responsibility strategy with a proposed plan of activities. Through the targeted investments and measures outlined in this strategy, the ambition is to contribute to the tournament's legacy in full alignment with the Sustainable Development Goals ***(United Nations, n.d.).***

The paper will analyse the key points of UEFA Euro 2024's Environmental, Social, and Governance (ESG) strategy to create a conceptual model for measuring the impact of various topics (e.g., smart mobility, waste management, accessibility, non-smoking policy, etc.) on spectators and fans. This study evaluates the environmental, social, and governance (ESG) dimensions of the tournament, concentrating on key areas such as environmental sustainability, social inclusivity, economic impact, governance practices, and stakeholder engagement ***(Trendafilova, et al., 2014)***. From an environmental perspective, UEFA Euro 2024 aimed to minimize its carbon footprint by incorporating green initiatives throughout all stages of the tournament. This includes energy-efficient stadium operations, sustainable transportation solutions for both fans and teams, and waste reduction strategies ***(Dolf & Teehan, 2015)***. The decision to use existing infrastructure rather than build new stadiums reflects an environmentally conscious approach, minimising construction emissions and encouraging responsible use of resources. The paper also explores UEFA's partnerships with environmental organisations and the role of cutting-edge technology in monitoring the environmental impact throughout the event.

The social component of the ESG framework looks at how UEFA Euro 2024 promotes inclusivity and community engagement. Germany has positioned itself as a host nation committed to ensuring accessibility for all, from enhancing stadium access for individuals with disabilities to creating fan zones that cater to diverse demographics. The social dimension also extends to labour practices, as UEFA and its partners strive to ensure fair working conditions for all individuals involved in the event's preparation and execution.

Governance is the third pillar, evaluating how UEFA and its partners have structured decision-making processes, risk management, and transparency in organising the event. Strong governance practices are critical to ensuring accountability and ethical decision-making, particularly in large-scale operations involving diverse stakeholders.

This study argues that UEFA Euro 2024 represents a significant milestone in the integration of ESG strategies in international sports. By embedding sustainability principles in every phase of the tournament, from bidding and planning to execution and post-event legacy, UEFA demonstrates how

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MSEs can align with global sustainability goals such as the United Nations Sustainable Development Goals (SDGs).

The research highlights best practices and areas for improvement in UEFA's ESG implementation and provides actionable recommendations for future events. Findings suggest that a comprehensive ESG approach in sports management not only enhances environmental and social outcomes but also delivers significant economic and reputational benefits.

UEFA Euro 2024 sets an important precedent for integrating ESG frameworks into major sporting events. The insights from this study offer a roadmap for international sports federations, event organizers, and policymakers to develop sustainable, socially responsible, and ethically governed sporting events. As the world moves towards a greener and more inclusive future, the role of sports as a driver of positive change becomes increasingly vital ***(Babiak & Trendafilova, 2011)***.

This analysis presents a comprehensive evaluation of UEFA Euro 2024's ESG strategy, aiming to contribute to the broader discussion on sustainability in sports and inspire future innovations in the field.

Keywords: ESG, Sport Event, Football, UEFA Euro 2024

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ESG CONTROVERSIES AND PERFORMANCE IN THE S&P 500: THE MODERATING EFFECT OF CSR STRATEGY

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ABSTRACT

In recent years, companies have come under increasing scrutiny for their Environmental, Social, and Governance (ESG) practices. Stakeholders, including investors, consumers, and regulators, are paying closer attention to how companies manage ESG-related risks and responsibilities. Two key concepts have gained prominence in this context: ESG Controversies (ESGC) and Corporate Social Responsibility Strategy (CSRS). ESGC arise when a company's actions violate sustainability and ethical standards, leading to reputational damage and financial risks (Aouadi and Marsat 2018; Shakil 2021). In contrast, a CSR Strategy reflects a company's proactive approach to integrating environmental and social concerns into its business model, enhancing sustainability and stakeholder trust (Issa and Bensalem 2023). While ESGC can harm corporate legitimacy and profitability (Li et al. 2019), a strong CSR Strategy can mitigate these effects by improving corporate reputation, reducing risk, and attracting investors (Cambrea et al. 2024).

The growing importance of ESGC and CSRS in today's business landscape is driven by increasing regulatory pressure, intensified public awareness, and the financial sector's prioritization of responsible investment (Mendiratta et al. 2023a). Investors are increasingly incorporating ESG elements into their decision-making, as companies involved in ESGC often face financial penalties, legal risks, and reputational damage, leading to declines in shareholder value (Kölbel et al. 2017; Elamer and Boulhaga 2024). On the other hand, companies that proactively implement CSRS tend to benefit from improved stakeholder relationships, enhanced brand loyalty, and reduced perceived risk and financing costs (Cheng et al. 2014; El Ghoul et al. 2011; Kramer and Porter 2006).

While previous studies have examined the consequences of ESGC, the results remain inconclusive, with some suggesting that ESGC reduces corporate performance due to stakeholder backlash, increased financial risk, and reduced legitimacy (Aouadi and Marsat 2018; Kölbel et al. 2017; Mendiratta et al. 2023b). Others suggest that certain controversies, if managed strategically, can trigger

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improvements in governance structures or stakeholder engagement, potentially leading to positive financial outcomes (DasGupta 2022; Nirino et al. 2022; Treepongkaruna et al. 2024). This divergence suggests that the relationship between ESGC and financial performance may not be linear. Recent literature has begun to suggest a non-linear trajectory (Nuber et al. 2020; Trumpp and Guenther 2017). Additionally, empirical studies remain scarce and little attention has been given to the moderating role of CSRS in this context. A robust CSRS could mitigate the negative effects of ESGC or, conversely, enhance the positive effects of ESGC on performance (Elamer and Boulhaga 2024; DasGupta 2022). Therefore, based on the gaps identified in the literature, the objective of this study is threefold. First, it seeks to investigate the possibility that ESGC impacts performance in a non-linear (inverted U-shaped) manner. Second, it examines whether the company's CSRS has a direct impact on performance. Finally, it explores whether CSRS moderates the previously mentioned non-linear relationship, i.e., mitigating negative effects or amplifying potential positive outcomes.

This study is based on a sample of 357 companies listed on the S&P 500 index, selected using data from the Refinitiv database for the period 2014 to 2023. The main results reveal a non-linear (inverted U-shaped) relationship between ESGC and performance, indicating that companies with fewer controversies tend to obtain better returns. It was also found that CSRS has a direct positive effect on performance, reinforcing the importance of sustainable practices in creating economic-financial value. Furthermore, CSRS acts as a moderator, amplifying the positive impact of low ESGC levels on performance. This study can provide relevant contributions to the literature, companies, managers and regulators. Firstly, for academics and researchers, deepening their understanding of the non-linear nature of the relationship between ESGC and performance, challenging traditional linear approaches and reinforcing the strategic role of CSRS. Second, for companies, the results show that minimizing ESGC is essential to improve performance, especially when combined with a clear CSRS. CSRS should be seen as a strategic tool, not just an ethical obligation, as it reinforces the positive effects of a strong ESG reputation. Third, for regulators, the findings underscore the importance of promoting structured and standardized ESG disclosures that encourage greater accountability and comparability across companies.

Keywords: ESG Controversies; CSR Strategy; Corporate Performance; S&P 500; GMM

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THE CARBON BORDER ADJUSTMENT MECHANISM: DECODING CRITICISMS AND PROPOSALS FOR IMPROVEMENT. A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

INTRODUCTION

Climate change caused by anthropogenic greenhouse gas (GHG) emissions is among the greatest threats to our planet (Bux *et al.*, 2024; Felbermayr *et al.*, 2024). One of the most important steps is the European Green Deal (EGD) adopted by the European Union (EU) on December 11, 2019, which ambitiously aims to achieve net-zero greenhouse gas emissions by 2050 (European Commission, 2019; Fiore *et al.*, 2022). To this end, the EU has implemented various policy tools, one of these is the Carbon Border Adjustment Mechanism (CBAM), which became operational on October 1, 2023, with a transition phase that will be followed by a full implementation phase on January 1, 2026 (European Commission, 2025; Simões, 2023). A key component of the Fit for 55 legislative package, CBAM is designed to impose a carbon price on six energy-intensive sectors (aluminium, cement, electricity, fertilisers, steel, and hydrogen) from non-EU countries whose embedded emissions have not been taxed, or are taxed at a lower level than those under the Emissions Trading System (Bellora and Fontagné, 2023; European Council, 2025; Sabyrbekov and Overland, 2024). These measures could be expanded to other sectors and industries in the future (Ćosić *et al.*, 2025). CBAM aims to prevent the risk of carbon leakage, which occurs when companies relocate production to countries with less stringent climate policies to avoid carbon costs, to protect environmentally friendly domestic industries and to arrange other countries to participate in climate change mitigation efforts (European Council, 2025; IPCC, 2014; Simões, 2023).

CBAM has been widely debated, drawing both praise and criticism from policymakers and academics since it came onto the agenda. Proponents highlight CBAM's effectiveness in mitigating carbon leakage in Europe, its contribution to global emissions reductions, and its positive impact on outward greenfield investment (Li *et al.*, 2025; Liu *et al.*, 2025; Sabyrbekov and Overland, 2024). Conversely, critics raise concerns about its long-term efficacy, suggesting that it may lead to trade tensions, merely shift emissions rather than genuinely reduce them, and potentially harm especially developing countries (Bayer and Schaffer, 2024; Chen *et al.*, 2025; Corvino, 2025; Das and Bandyopadhyay, 2025; Kwame Sundaram, 2024; Lim *et al.*, 2021; Morchid *et al.*, 2024; Sun *et al.*, 2024).

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Despite this ongoing controversy, there has been limited systematic analysis of these criticisms. This study addresses this gap by conducting a Systematic Literature Review (SLR) of CBAM recent literature from 2019 to 2025. The research aims to identify the main themes of criticism, assess and examine which concerns appear most frequently and the solutions proposed in the literature. The objective is to provide recommendations to policymakers to enhance the effectiveness of CBAM as a tool for achieving climate policy goals.

METHODOLOGY

This study makes use of a SLR, a quantitative methodology that enables the collection and examination of the most important studies in a particular field, while also providing an opportunity for explicit, transparent, and reproducible analysis (Snyder, 2019). The SLR was conducted on Scopus and Web of Science since they are considered as reliable collectors of standardized, reputable and high-quality research (Rana *et al.*, 2022). In order to create a consistent database, the concept of 'Carbon Border Adjustment Mechanism' has been selected as a keyword related to the topic. The inclusion criteria for the review were publication year (2019-2025), article language (English) and peer-reviewed academic articles. Moreover, official sources by EU and international organizations were also utilized to comprehend the regulatory framework. Other types of documents, such as book chapters, book reviews, conference proceedings, magazines, editorials, and interviews, were excluded from the scope of the review.

RESULTS

The SLR analysis of 219 articles (Scopus:127 and Web of Science: 92) revealed that most criticisms focus on the economic consequences of CBAM, specifically trade-related concerns such as protectionism, potential violations of World Trade Organization (WTO) rules, and negative impacts on developing countries due to restrictions on free trade and increased tariffs. Critics also question the mechanism’s effectiveness in mitigating carbon leakage.

Despite these criticisms, the findings suggest that CBAM can be a viable tool for achieving the objectives of the EGD. Its effectiveness could be further enhanced if the concerns raised are acknowledged and acted upon.

In this context, this study recommends the following key actions to EU policymakers in order to address the criticisms of CBAM and make it more effective:

1- Increasing and diversifying green investment funds, and facilitate access to these funds for non-EU countries.

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2- Promoting the use of digitalization and new technologies (such as blockchain) to reduce the complexity of trade and border regulations.
3- Providing guidance and training for the adaptation processes of small businesses, particularly those involved in carbon-intensive exports, starting with developed countries.
4- Ensuring international cooperation by using diplomatic channels more effectively.
5- Ensuring full transparency and flawless communication.
6- Aligning it as much as possible with the WTO.
7- Considering the specific characteristics of each country.

LIMITATIONS

The limitations of this study could be summarized by the literature gap arising from the content of the articles accessed. The majority of studies have focused on the more advanced developing countries and developed countries, with an emphasis on economic aspects. Both the impact of CBAM on least developed countries and its social effects have not been sufficiently studied, particularly considering its full implementation on January 1, 2026. This situation makes it difficult for the study to reach a comprehensive and clearer conclusion.

FUTURE RESEARCH

This study could contribute not only to filling the gaps in the literature but also to advancing the objective of the current study discussed in the previous sections. Although, based on the limitations mentioned above, a possible next step could be conducting a new study that highlights the potential social impacts of CBAM using a broader time frame and diversified keywords. Moreover, the findings of this research may provide valuable insights for policymakers in addressing the negative critiques of CBAM.

Keywords: European Green Deal, Carbon Border Adjustment Mechanism, Sustainability, Greenhouse Gases (GHG), Systematic Literature Review.

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THE ECONOMIC RAMIFICATIONS OF POPULATION AGEING IN THE CONTEXT OF LABOUR MARKET FUNCTIONALITY

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ABSTRACT

RESEARCH GAP AND PURPOSE

It has been observed by numerous researchers that the economic impact of population ageing is significant and frequently contradictory. Nevertheless, there is a paucity of in-depth analysis that addresses the question of what impact this change in population structure has on the functioning of the labour market. It is important to study the impact of ageing on countries facing labour shortages, as the labour force is a key indicator of the labour market (Mačiulytė-Šniukienė et al., 2019). Utilising Lithuania as a case study, a nation where the gravity of the ageing challenge is especially pronounced (Bouman et al., 2015; OECD, 2024; Aidukaite & Blaziene, 2022), this study seeks to draw broader conclusions that are applicable to other developed economies experiencing rapid population ageing. The primary focus of the present study is on the labour market implications in Lithuania, with specific attention given to the impact of ageing on selected labour market indicators, and potential policy interventions for mitigating this impact by enhancing the labour market (re)integration of older workers are also suggested.

DESIGN/METHODOLOGY/APPROACH

In order to comprehend the consequences of societal ageing on the labour market, the authors employ the vector autoregression methodology. This methodology enables them to evaluate the relationship between ageing and selected labour market indicators, one of which is labour productivity. A negative relationship between ageing and productivity was found in studies by Calvo-Sotomayor et al. (2019), Maestas et al. (2023), Park et al. (2021). However, there are examples showing that ageing can contribute to productivity growth (Creina & Dowrick, 2004; Lee et al., 2020). The analysis also focuses on the effect of population ageing on two other key indicators: labour force participation among individuals aged 25–54 and the unemployment rate among individuals aged 15–24 (Milanez, 2020; Mačiulytė-Šniukienė et al., 2019). The ADF test and the Zivot-Andrews test are used to assess stationarity, while the Johansen procedure is employed to evaluate the cointegration of variables. The Granger causality test enabled the determination of whether the variables are useful in making predictions for the remaining variables in the VAR system. The analysis was extended using analytical

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tools such as impulse response functions and forecast error variance decomposition, and the most recent available period from the first quarter 2002 to the third quarter 2024 has been used for analysis, with the data obtained from the Official Statistics Portal of the State Data Agency (2024).

FINDINGS

The findings of the study suggest that the process of ageing does not exert a statistically significant influence on selected Lithuanian labour market indicators. The Granger causality test demonstrated that the proportion of the labour force aged 55-64 does not exhibit statistical significance in predicting other labour market indicators, including the labour force participation rate and labour productivity. The impulse response function analysis confirmed that the impact of a shock to the proportion of the labour force aged 55-64 on other labour market indicators is negligible, and that this effect is short-term and statistically insignificant. Furthermore, the analysis of the variance decomposition of the forecast error revealed that the majority of the error variance is explained by the indicators themselves, and the impact of the share of the labour force aged 55-64 on the forecast errors is relatively negligible. However, it is acknowledged that the results of the study may be influenced by a number of factors, including the small research sample, Lithuania's accession to the European Union, the 2007–2008 financial crisis, and the emergence of the coronavirus pandemic. Consequently, it is challenging to accurately assess the impact of ageing on the Lithuanian labour market. Nevertheless, given the persistence of ageing trends, it is anticipated that the effects of ageing on the labour market will become more evident in the future. It is also hypothesised that the results are influenced by various factors characteristic of relatively young markets like Lithuania (Kasnauskiene & Andriuskaite, 2017).

ORIGINALITY AND VALUE

This study makes a significant contribution to the extant body of knowledge on the subject by offering a novel perspective on the dynamics of ageing and the labour market. Utilising advanced models, the study provides a comprehensive analysis of the impact of an ageing society on the labour market in one of the "super-ageing" societies – a country with more than 20% of its population over the age of 65 years old (World Health Organization, 2023). The insights derived from this study hold significant implications for policymakers seeking to navigate the challenges and opportunities posed by ageing societies in an increasingly interconnected global economy. Additionally, the findings highlight the need for specific strategies and policies that account for the unique economic characteristics and developmental stages of different nations. This may entail the establishment of investment funds with

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a focus on retirement, the introduction of annuity products, or the provision of advisory services to assist individuals in the effective management of their portfolios during their retirement years. Furthermore, the implementation of policies aimed at integrating the elderly into the workforce and promoting entrepreneurship opportunities is recommended. Such measures are expected to enhance the economic contribution of the elderly population and mitigate the consequences of reduced savings and investments that are characteristic of an ageing population. It is also important to acknowledge that even if effective policies are implemented, a time lag may exist between their implementation and the observable effects (Nakatani, 2023). In consideration of prospective research directions that may emerge from the findings of this study, it is recommended that the analysis of larger data samples will be expanded through the incorporation of additional factors.

Keywords: Population ageing, labour market, vector autoregression method

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CAPACITY BUILDING IN THE HOSPITALITY INDUSTRY IN THE MAGHREB REGION

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ABSTRACT

This study aims to empower VET staff and students in the Maghreb region (Tunisia and Morocco) to identify and seize business opportunities in the local gastronomy sector. Strategies to accomplish this objective, include to effectively address sustainability challenges in the local food ecosystem by providing competence-oriented culinary, IT and entrepreneurship related work based training, and by facilitating youth career counselling and continuous learning and training in the field. "The main goal of the Food Routes project is to establish a more adaptive and inclusive VET framework for both countries, equipping young learners and educators to fully engage with the socio-economic potential of the gastronomy industry. By fostering stronger collaboration between educational institutions and businesses, the project will enhance employability, encourage entrepreneurial thinking, and contribute to the socio-economic recovery of the region" (AKMI, 2024). The project is funded by ERASMUS-EDU-2023-CB-VET Capacity building in the field of Vocational education and training (VET).

The research is based on the following three gaps:

1. Knowledge, awareness and implementation gap in the areas of sustainable (social, ecological and economic) entrepreneurship, digital transformation in the food industry, sustainable food production and consumption, and education in the food industry (Toussaint, 2021; Samkange et al., 2021; Kosior, 2022; Annosi et al., 2020; Casanova-Correa et al., 2022; Tippmann, 2020; O'Halloran and Silver, 2022; Prasanna, Verma and Bodh, 2024).

2. Lack of guidance for and integrating relevant stakeholders in the industry (Casanova-Correa, 2022; Sharma, Joshi and Govindan, 2023; Prasanna, Verma and Bodh, 2024).

3. Lack of inclusive, equitable and sustainable entrepreneurship to support marginalized groups (Toussaint,2021; Samkange et al., 2021; Valley et al., 2020; Fagioli, 2024). Khojasteh (2020) point to the transformative potential of immigrant and smallholder food enterprises, respectively, in revitalizing communities and enhancing food security.

According to Amentae (2021), future research should deepen our understanding of the interaction of internationalization, education/training, sustainability, climate changes, transformative digitalization

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and entrepreneurial opportunities in the food sector. Summarizing, the research aims to provide comprehensive frameworks to understand the interaction of internationalization, entrepreneurship, entrepreneurial and culinary education to utilize entrepreneurship opportunities, social sustainability (i.e. digital divides), ecological sustainability (climate changes) and digital transformation differentiated by Tunesian and Moroccon idiosyncratic conditions.

METHODOLOGY

The sample of the study includes employers, employees, VET educators, VET students and other stakeholders of the respective food ecosystems in the country. To allow for knowledge and best practice transfer, a comparative study with employers, employees and students from the project partner countries Germany, Greece, and Italy has been conducted.

This comprehensive study started with extensive desk research conducted to understand the economic landscapes in Morocco and Tunisia. After gaining insight on employment patterns, skill gaps, and opportunities for the Tourism and Gastronomy sector in the Country, both exploratory/ qualitative and quantitative descriptive research was carried out. The qualitative semi-structured interview data for this study in both countries were retrieved from the employers (16), employees/students (15), VET trainers (30), and partners - Germany, Greece, and Italy (46). The VET trainers were interviewed to gain insights into the gaps in training programs and the alignment of curricula with industry requirements. The interview findings were analysed using content analysis and the software MaxQDA to investigate commonalities and differences between VET learners and businesses. To investigate a nuanced learner perspective, 400 VET learners (200 from Morocco and 200 from Tunisia) were surveyed to assess their career aspirations, interests in the gastronomy sector, and skill development needs.

FINDINGS

The multifaceted findings summarized by a SWOT Analysis revealed a dichotomy in the current VET curricula not aligning with the presently required competences. As such, there is a need for review and continuous improvement of the curriculum in effective collaboration with the industry. The most common mentioned recommendations for both Morocco and Tunisia related to sustainability, digital transformation, marketing/digital marketing/international marketing topics, entrepreneurial skills as well as leadership and management skills, among others. The study also revealed the urgent need for technological investments in the VET institutions to meet the needs of all stakeholders involved in the training process. The trainings are not limited to the learners alone, but should involve a strategy for the continuous training of the trainers as well.

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As human resources related challenges are prominent in this study, recommendations to curb them were revealed. Offering mentorships, internships, apprenticeships, certifications, networking, specialization, and job rotation opportunities would help produce skilled employees and entrepreneurs. Selected learners from both countries will participate in work-based seminars and entrepreneurial competitions organized at the locations of the European partners of the project. Despite these interventions, the employers are urged to design a workplace culture conducive to ensure employee motivation and retention. In addition, collaboration with both national and international partners enhance the quality of vocational education and create clear pathways to employment. These collaborations should be encouraged by the government or policymakers by providing appropriate incentives and recommendations. Latter will be particularly sensitized by a Manifesto developed from the research data and an initiated web movement outlining the aspirations and needs of the youth in Tunisia and Morocco. The paramount concerted efforts between VET Institutions and the Food Industry are summarized by a collaboration roadmap for the future.

Keywords: Capacity Building; Hospitality Industry; Maghreb Region

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THE VUCA-D: A NEW (DIS-)CONNECTED SOCIETY

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ABSTRACT

INTRODUCTION

The pervasive issue of declining meaningful human connection, termed a "relational dusk", is characterized by a paradox of hyper-connectivity alongside diminished genuine communication beyond mere information exchange (Candiotto, 2022). Digital information systems increasingly shape social behaviors, leading to detrimental outcomes. This detrimental perspective, particularly impacts young individuals who often present an idealized online represented-self that diverges from the true emotions (Hidalgo, Tan & Verlegh, 2015) people demonstrate in reality rather than the web-mediated identity. The erosion of traditional face-to-face communication in favor of networked we-mediated individual and collective emotional realities (Montag & Markett, 2023) fosters observational learning and imitation, contributing to dysfunctional patterns like obsession, apathy, anhedonia, paranoia, conformity, sleeping and eating disorders, compulsive scrolling, and various addictions (Al-Samarraie et al., 2022; Griffiths & Kuss, 2017; Hou et al., 2019). This altered emotional landscape results in personal and relational problems with broader societal implications (Naderer, Peter & Karsay, 2022; Fischer, 2022). Consequently, the need for physical touch and shared spaces diminishes in a volatile, uncertain, complex and ambiguous VUCA world, as described by Drucker (1992) and others (Johansen & Euchner, 2013), a hallmark of fluidity in relationships (Bauman, 2013). The metaphor used, referring to the "hyper-connected islands", illustrates how individuals opt for intense networked (always more web-mediated) but isolated connections in reality. This kind of situation would foster a pathological disinterest in genuine connection and relation. Hyper-connectivity within the digitalization (-D), and the virtualization of human relational experience create increasingly intricate online systems, leading to mystification of relationships, generative of a "(dis-)connected society". Latter becomes ever more artificial, isolating rather than connecting. The virtualization of connections in the realm of relationship, exacerbating the possession dynamic, also involves brands in this perspective. So, humans tend to possess more and identify themselves increasingly with brands, and within this logic they boost a theatricalization of lives and sociality, mediated by a screen, that is the same able to isolate whilst only ideally engaging in a co-operative system. Pathological signals emerge from this dimension of the digital-human. Sometimes, in digital marketing, a parallel

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reciprocity is observed between humans and brands (Bengtsson, 2003; MacInnis & Folkes, 2017), but the mystification behind shapes the borders of a reified self, reflected within the light of a brand, inducing to satisfy an only temporary sense of belonging and self-fulfillment. Derived detrimental outcomes potentially lead to new frustrations and anxieties related to possession as an extended self within the digital pervasiveness (Bardhi, Eckhardt & Arnould, 2012; Belk, 2013). Conversely, long-term relationship dynamics centered on meaning attribution (Colombetti, 2010; Nevins, Bearden & Money, 2007; Dervin & Naumer, 2009), love (Stanfield & Stanfield, 1997; Paradiso-Michau, 2007), gifting (Grant, 2013) and a real reciprocity (Paradiso-Michau, 2007) as extensions of the self (Mauss, 2002; Belk, 1988) are threatened, resulting in a phenomenological state of isolation and relational-communicative inconsistency. This dimension represents the opposite of human pro-sociality, as conceived within Aristotelian logic. A key solution, that could be shaped as a third way, extends from a human-centric re-discovering perspective in the VUCA-D society, where brand relationships meaningfully contribute to consumer identity (Kaufmann, Altıntaş & Czinkota, 2017).

This multidisciplinary research aims to provide a curative reflection (Glucksman, 2010; House, 1929; Fiscalini, 1988; Czinkota et al., 2020) and perspective of generating awareness on this topical challenge, both at theoretical-academic and organizational-societal practice. Thanks to a deep literary analysis, able to identify key research contents and trends in the area of interest, the authors address how today's society, particularly youth, can ensure sustainable relationships through a re-discovered communication in the VUCA-D era. In addition, the authors seek to provoke a dynamic of consciousness-making starting from the atavistic, original and innate human nature of living relationships in a way to overcome their decline and ever increasing youth isolation (de JongGierveld & Havens, 2004; Osborn, Weatherburn & French, 2021). The main aim is to shape the lines for generating a critical analysis on the realistic observed condition that humans are suffering from (Morrow, Morrow & Brown, 1994). To address this objective, the authors promote a roadmap for a responsible and sustainable future relationship-base, especially redefining the role of brand in co-constructing a fruitful and perpetual generative-value dynamics by an even more solid and "true love". In this way, the overcoming of mystification of the "possessive" dimension toward relationship, would reflect its benefits, not only in the realm of business-consumer relations, but also in the social environment.

THEORETICAL ANCHORAGE

Drawing on Goffman's (Goffman, 1956) dynamics of the extended representative self and the concepts of possession and gift (Belk, 1988; Grant, 2013; Mauss, 2002) in the digital world (Belk, 20213), this

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work also utilizes curative marketing philosophy (Kaufmann, Czinkota & Zakrzewski, 2015), which offers an identity-based curative reflection and behavioral approach to balance brand relationships through brand love, behavioral branding, and co-creation (Kaufmann, Correia Loureiro and Manarioti, 2016). Rethinking societal conditions as VUCA-D (Modarelli, 2025) necessitates a re-evaluation of networking (Modarelli & Rainero, 2023), because at the moment the hyper-networked condition of VUCA-D society lacks of a holistic and true view toward communication, co-operation, reciprocity and sharing (Schieder & Lorenz, 2012; Horwitz, 1984), affecting the genuine human pro-social propensity, hiding emotions, real touch need and face-to-face approach behind a screen. Youngsters, who demonstrate fewer emotional-cognitive resources, are particularly vulnerable to increasing complexity (Adami, 2002), and the digital realm, while meant to connect, paradoxically isolates individuals, fostering self-reliance (Waizenegger, 2015). A central challenge is reconciling progress with sustainability both at environmental, but also at social level, because contemporary occidental society (but not limited to) exhibits a wide range of contradictions. In fact, the dependency on sharing, struggles beyond superficial self-display and the need of recognition. In this way, people, and ever increasing youth, express their identity with possession dynamics. Possessing objects and possessing brands flows towards the detrimental dimension of possessing humans as objects, sharing humans like objects, and the reification of relationship reflects its counterparty within the reification of the self. In this way, people lose themselves, approaching more the isolated way for avoiding losing the fictitious condition of acquired possession and the perceived, but feeble control over one's own image constructed thanks to a potential liar identity. The pervasive feeling of fear, in this context, and the overwhelmed sense of pressure related to judgment enhances anxieties, pushing people away from reality and from other people (Dhir et al., 2018; Helsper, 2011; Reich, Schneider & Zwillich, 2024). The durability of a relational dynamic perspective (Tavory & Eliasoph, 2013), intending it as integral to human evolution, actually loses importance, to favor immediacy and dissatisfaction that moves the need for rapid change (Rosa, 2010; Meyer & Davis, 2000). Fragmentation of relational social dimension reflects the fragmentation of the theatricalized possession extended self.

METHOD

The study combines systematic literature review, bibliometric analysis and textual content analysis from both documentary and observational perspectives. The metaphors used for interpreting the phenomena, highlight the ideal structure for a generative value society within the VUCA-D.

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ORIGINALITY AND FINDINGS

In organizational branding and corporate social responsibility, the impact of social isolation on face-to-face interactions and self-perception, suggests a vital need for prioritizing human relationships at all levels. Understanding and enhancing networks is crucial for communal living. In this sense, the network should represent the actual atavistic connotations of sharing, reciprocity and balancing of common objectives. In this sense, a functioning network without a functioning relational and social dynamic cannot exist. Therefore, the responsibility of the brand, in offering a dimension of love, cannot ignore the focus of this reciprocal love on co-operation and co-creation that generate value, putting the dynamics of possession secondary, but assuming more the connotations of identity in productive co-construction and in the dynamics of consumption. By attributing the true sociological meaning of identity to the brand relationship, and involving the end consumer user in a cycle of service, human and social responsibility, this would restore identity and well-being to the human beings and society, severely affected in his existential condition by the VUCA-D society (Vargo and Lusch, 2017; Balmer and Greyser, 2006; Grönroos, 1994; Kaufmann, Correia Loureiro and Manarioti, 2016). An initial conceptualization is provided.

Keywords: Isolation, Consumer-Brand Relationship, Self-Representation, Image, Identity, Authenticity, Possession, Organizational dimension, Technology, Resilience

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EMPLOYEE-ORGANIZATION RELATIONSHIP IN TIMES OF CRISIS

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ABSTRACT

THEORETICAL FRAMEWORK AND RESEARCH PURPOSE

Furloughs during the COVID-19 crisis affected the organizational climate, specifically the employee-organization relationship (Heath *et al*., 2024). However, examining furloughed employees during the pandemic has received relatively little attention (Grace, 2023). Therefore, we aim to investigate the relationship between perceived job insecurity and organizational trust, mediated by psychological contract breach (PCB) and moderated by perceived organizational support (POS). The study is innovative because it examines the proposed research model on furloughed employees versus those who continued to work.

The study is grounded in two key theoretical frameworks. The *Conservation of Resources (COR) theory* (Hobfoll, 1989) provides a lens through which we understand how job insecurity and PCB are experienced as resource losses. Under this framework, furloughs are seen not merely as procedural pauses but as events that drain employees' emotional and psychological resources. At the same time, *social exchange theory* (Blau, 1964) highlights the reciprocal nature of employment relationships. When expectations are violated, especially in times of crisis, the balance of exchange is disrupted, potentially eroding organizational trust.

The current study offers several key contributions. First, this study joins a growing stream of research on furloughs and their impact on the employee-organization relationship (e.g., Grace, 2023). We examine the differences between furloughed employees (whose organizations remained open during the lockdowns) and those who continued to work. In the context of involuntary furlough employment policy, we provide innovative insights for understanding employees' furlough experiences. Second, organizational trust has not been studied among furloughed employees who are expected to return to work in the same organization. Huffman *et al*. (2022) suggest conducting further research to understand the effect of furloughs on employees' trust during a crisis. Third, we examine the relationship between employees' perceived job insecurity and their level of organizational trust, mediated by PCB and moderated by POS. This study is the first of its kind to address PCB as a

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mediating variable in the relationship between perceived job insecurity and organizational trust. To the best of our knowledge, this moderating effect has not previously been examined.

METHOD

Data were collected in two waves in May–June 2021 from 256 participants: 122 furloughed employees and 134 who continued working during the pandemic. All constructs were measured using established Likert-type scales and using previously validated instruments. Structural equation modeling (SEM) was used to validate the measurement model. Mediation and moderation hypotheses were tested using the PROCESS, with all relevant variables mean-centered prior to interaction analysis.

RESULTS

Our measurement model showed reasonable and above-threshold fit between the empirical data and the theoretical constructs using fit indices (Model Goodness-of-Fit: χ^2=340.49, df=163, p<.001; Relative χ^2=2.08; CFI=.954, TLI=.947; RMSEA=.065 [.056, .075]).

Significant differences were found across all the four variables between furloughed employees and those who continued working. Regression analyses through PROCESS (Model 4) indicated that PCB fully mediated the relationship between job insecurity and organizational trust both for employees who continued working (95% CI [-0.157 -0.056]), and furloughed employees (95% CI [-0.236 -0.093]). Moreover, we found a significant difference between the two groups (b=-0.059, 95% CI [-0.125 -0.001]), showing that the mediation is stronger for the furloughed employees. The moderation effect through PROCESS (Model 1) was not statistically significant both for furloughed employees (95% CI [-0.153 0.079]) and employees who continued working (95% CI [-0.232 0.054]).

DISCUSSION

The study's main contribution is the understanding that furloughing employees against their will due to the pandemic affected their trust, as well as other aspects of their workplace. Theoretically, these findings illustrate the two opposite processes of a loss spiral, in which resources are depleted, and a gain spiral, in which resources accumulate (Hobfoll, 1989). Furloughs break the psychological contract, as employees expect employers to protect them in times of crisis (Mandeville et al., 2019).

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While Hobfoll (1989) argues that individuals strive to protect their resources against possible losses, the furlough policy is a situation that Hobfoll (2001) describes as 'an actual loss of resources'. The significant differences between the two groups support Hobfoll's (1989) argument that resource acquisition is easier when people already possess a substantive level of resources. This reinforces our understanding of furloughs' negative impact on organizational trust. According to the social exchange theory (Blau, 1964), the current study is the first of its kind to address PCB as a mediator between job insecurity and organizational trust during times of crisis. In line with the norm of reciprocity, furloughed employees might attempt to restore balance by reducing their investment in the organization, for example by lowering their level of trust in the organization.

Unexpectedly, POS was not found to be a moderating variable in the relationship between PCB and organizational trust. Although our hypothesis was not corroborated, this finding holds significant implications regarding organizational policies during periods of employment crisis and employees' perception of such policies. Whereas psychological contract is more subjective, POS is more factual in nature. Organizations took various actions to demonstrate organizational support; however, these actions did not change the perceived organizational trust. This indicates that during periods of employment crisis, employees attribute great importance to PCB.

Keywords: Psychological Contract Breach, Furloughed employees, Job insecurity, Organizational trust, Comparative analysis, Times of crisis

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BREAKING THE GLASS CEILING FROM HOME: UNDERSTANDING TURNOVER INTENTIONS OF REMOTE WORKING MOTHERS

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ABSTRACT

RESEARCH PURPOSE AND THEORETICAL BACKGROUND

The study examines factors influencing turnover intentions among pregnant employees and those on post-maternity leave who work remotely or in hybrid arrangements. Since the COVID-19 pandemic, remote work has become widespread, particularly among women (Touzet, 2023), yet research on this population has been limited. Recent studies show that women planning to have children are more likely than men to intend to quit their jobs (Olsson *et al*., 2023), and while flexible work arrangements can reduce turnover, remote work may carry stigma that undermines women's effectiveness as boundary crossers (Barhate and Hirudayaraj, 2021). The present study makes three contributions: First, it provides new theoretical insights by synthesizing the theory of gendered organizations (Acker, 1990) and the theory of the work-family boundary (Clark, 2000). Second, there is a gap in research exploring how family-supportive management and perceived pregnancy discrimination affect turnover intentions among pregnant and post-maternity employees in the context of remote work. Finally, this study responds to Hyunkang and Gordon's (2024) call for an investigation into the potential mechanisms underlying turnover intentions, with a particular focus on the attitudes of pregnant and post-maternity employees. The research proposes a model examining the relationship between family-supportive management and perceived pregnancy discrimination on turnover intentions, with psychological contract breach and organizational trust as sequential mediators.

METHODOLOGY

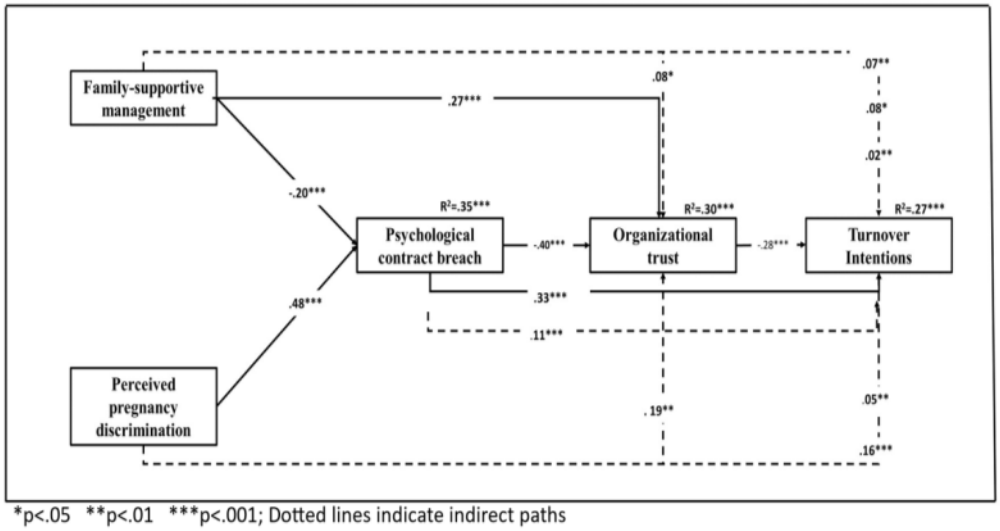
The study conducted an online survey in two waves during May-June 2023, with 406 women who were either pregnant or on post-maternity leave. Data collection used standardized instruments to measure the research variables.

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RESULTS

The results supported all hypotheses, showing that psychological contract breach mediated the relationship between family-supportive management and organizational trust, as well as between perceived pregnancy discrimination and organizational trust. Organizational trust mediated the effect of psychological contract breach on turnover intentions. The study found complete indirect effects of both family-supportive management and perceived pregnancy discrimination on turnover intentions through the combined mediation of psychological contract breach and organizational trust.

Figure 1: Graphical illustration of the structural model



*p<.05 **p<.01 ***p<.001; Dotted lines indicate indirect paths

RESEARCH CONTRIBUTIONS

The main purpose of this study was to examine the factors influencing the turnover intentions of pregnant and post-maternity leave employees under remote and hybrid work arrangements. This study makes several significant theoretical and practical contributions to understanding women's workplace experiences. First, it advances gender literature by providing a micro-level analysis of gendered organizations in the post-pandemic context, building on recent work by Bates (2022) who argued for updating Acker's theory due to changing work environments. Second, responding to Hyunkang and Gordon's (2024) call for investigation into turnover intention mechanisms, the research identifies the sequential mediating role of psychological contract breach and organizational trust, extending previous findings on manager support (Agarwal and Bhargava, 2014) and discrimination (DelCampo and Blancero, 2008). Third, the study breaks new ground by examining how family-supportive management and perceived pregnancy discrimination affect psychological contract breach

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in remote settings, supporting van der Lippe and Lippényi's (2020) findings that remote work benefits women more when combined with family-supportive management.

To conclude, the findings demonstrate that while organizations can modify work-home boundaries through remote options, these changes must align with organizational culture to effectively support pregnant and post-maternity leave employees. Family-friendly policies may only succeed when organizations simultaneously create supportive environments and address persistent gender stereotypes. Organizations should implement clear family-friendly policies while providing training to foster trust between employees and managers.

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THE IMPACT OF FAMILY OWNERSHIP AND BUSINESS SIZE ON MORALITY AND CORPORATE SOCIAL RESPONSIBILITY PERCEPTIONS

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ABSTRACT

Small family businesses, which play a pivotal role in bolstering local economies (Beck and Prügl, 2018), are struggling to compete with larger national and international businesses. Consequently, strategies to enhance perceptions of small family businesses are critical for local economies. While researchers devised managerial strategies for family-owned businesses encountering such challenges (Carrigan and Buckley, 2008), research on consumer perceptions of family-owned businesses is scarce and fragmented. This study aims to understand how family-ownership and business size can affect consumer perceptions of the businesses and offer implications for these struggling businesses.

According to Consumer inference theory (Kardes, 1993), consumers make inferences of businesses based on the extrinsic cues such as family ownership and business size. People tend to humanize family firms, and humanized brands are perceived as possessing morality (Beck and Prügl, 2018). Thus, family ownership (vs. non-family) will increase perceived morality of the business (H1). Morality is positively associated with perceived authenticity (Lee and Jeong, 2022) and corporate social responsibility (CSR) (Brunk and Blümelhuber, 2011) (H2), which in turn positively influence trust with the business (e.g., Morhart *et al.*, 2015) (H3). Trust is an important antecedent of attitude (Lude and Prügl, 2018) which positively influence behavioral intention (Fishbein and Ajzen, 1975). Thus, trust will positively influence (H4a) attitude and (H4b) behavioral intention; and attitude will positively influence behavioral intention (H5). Lastly, because small firms are often believed to be more socially responsible than larger firms (Solymossy and Masters, 2002), the business size will moderate the effect of perceived CSR on trust (H6).

To test the hypotheses, a 2 (ownership: family vs. non-family) x 2 (size: large vs. small) between-subjects online experiment was conducted (CloudResearch, N=389, US consumers aged 18-75). Previously validated instruments were used. Manipulations of business type ($F=144.588$, $p<.001$, $M_{fam}=5.78$ vs. $M_{non}=3.95$) and size were successful ($F=595.205$, $p<.001$, $M_{large}=5.63$ vs. $M_{small}=2.14$). Structural Equation Modeling (SEM) results indicated an acceptable fit to the data ($\chi^2/df=2.523$, CFI=.969, TLI=.965, RMSEA=.053, SRMR=.046). As hypothesized, family-ownership positively influenced perceived morality ($\beta=0.296$, $p<.001$), and morality positively predicted perceived CSR

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(β=0.815, p<.001) and authenticity (β=0.874, p<.001; H1 and H2 supported). Perceived CSR (β=0.106, p<.001) and authenticity (β=0.889, p<.001; H3 supported) in turn predicted trust. Then, trust positively affected attitude (β=.665, p<.001) and behavioral intention (β=.560, p<.001). Attitude positively influenced behavioral intention (β=.306, p<.001; H4 and H5 supported). A multi-group SEM analysis (N_{small} =190; N_{large}=199) confirmed the moderation of the business size (H6 supported). While perceived CSR had a significant effect on trust for the small business (β=0.211, p<.01), this effect was non-significant for the large business ($\Delta\chi^2$=3.90, p=.048). The relationship between attitude and behavioral intention was significantly stronger for small (β=0.415, p<.001) than large business (β=0.218, p<.01; $\Delta\chi^2$=8.85, p=.003).

Our research confirms that family-ownership can be an effective cue to positively influence consumer perceptions regarding morality and trust. Notably, the benefits of family-ownership are amplified when the business is small. Consumers perceive small (vs. large) family-owned businesses' CSR efforts as more genuine and trustworthy and therefore, trust in the business may more readily translate into supportive behaviors. Thus, the small family businesses should use their ownership and size actively when communicating their moral values and CSR initiatives to foster trust. Future research can validate these findings in various contexts (e.g., different products) to enhance the generalizability.

Keywords: family business, size perception, morality, corporate social responsibility, authenticity, trust

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MANAGING COMPLEXITY – THE APPLICATION OF SOFT OPERATIONAL RESEARCH AND PROBLEM STRUCTURING METHODS IN EUROPE AND BEYOND

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ABSTRACT

In an era that is characterised by fast technological progress and accelerated change, the world around us is full of complexity, turbulence and volatility. Ongoing problems and new challenges, such as climate change, poverty, human trafficking, and geopolitical conflict, create further uncertainty and affect millions of people around the globe. In such complex environments, managers and leaders of organisations and societies often struggle to find ways to meet expectations and to move forward.

Within the broader analytical field of management science, the decision-support discipline of operational research (OR) has provided managers and leaders with a wide range of advanced methods and tools for problem-solving, which have led to a very successful record of applications. A 75-year anniversary paper of JORS – the flagship journal of the British OR Society and the oldest OR journal in the world, published in 2024 offers a summary of the main OR methods and the way that they have advanced over the years. These methods cover classical OR areas such as mathematical programming and time series forecasting, as well as more recent developments in the field such as artificial intelligence and machine learning. A prominent part of this paper is devoted to what is often called 'Soft OR' and problem structuring methods (PSMs), which covers a distinct domain of OR work that is in many respects different from the more traditional form of the discipline.

Soft OR and problem structuring methods (PSMs) provide a group of rigorous analytical approaches which share some characteristics with other OR methods, mainly a clear focus on modelling and a commitment to effective problem-solving, but at the same time differ in much of their philosophy and orientation. The distinct characteristic of problem structuring methods is that they are highly analytical but non-mathematical and at the same time place heavy emphasis on the inclusion and participation of all relevant stakeholders in the entire modelling process. For problem structuring methods, social reality is subjective and dependent on how one perceives a particular situation, based on his or her own experiences, interests and values. The epistemological assumptions they make are anti-positivistic, treating knowledge as subjective and based on experience and insight. As such, problem structuring methods allow for a range of different stakeholder views of a problematic

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situation to be expressed, explored and accommodated and can therefore provide important decision support in situations characterised by high levels of complexity and often conflict among the stakeholders.

This paper discusses the nature of both traditional operational research and problem structuring methods, and gives an account of the main characteristics that the two fields have, as well as the theoretical assumptions they make. The paper then presents the results of a recent review of soft OR and problem structuring methods, which aims to identify the current state of this field of analytical work and its application in different parts of the world. The results show a healthy level of application of soft OR and problem structuring methods across a range of different problem domains. On the other hand, the results highlight the stark contrast in how this important domain of analytical work has been approached by European and American operational researchers.

Keywords: Managing complexity, soft operational research, problem structuring methods, participatory modelling, problem-solving.

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FROM DIGITAL ENGAGEMENT TO SUSTAINABLE CHOICES: THE MEDIATING ROLE OF GEN Z'S WELL-BEING

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ABSTRACT

INTRODUCTION

In recent years, businesses have intensified their efforts to attract Generation Z through online initiatives. To a certain extent, these efforts have been successful, as most companies now engage in e-commerce with considerable results. However, the landscape has evolved. Sustainability has emerged as a key priority at both national and global levels. Online transactions are no longer solely driven by sales growth; instead, they must be adapted to align with broader objectives, such as environmental protection and the promotion of more sustainable consumer behaviors. The present study seeks to examine how businesses can leverage digital technology and Generation Z's interaction with online platforms to foster a shift toward sustainability, with a particular emphasis on the fashion industry.

1. BACKGROUND OF THE RESEARCH

This study examined three distinct types of co-creation through digital engagement: (1) the co-creation of socially sustainable activities, (2) user-generated content (UGC), and (3) electronic word-of-mouth (e-WoM). The first category encompasses active engagement in sustainability-related initiatives, such as volunteering for environmental causes, donating to sustainability-focused projects, or participating in corporate sustainability programs (Hsieh *et al*., 2016; Sohier *et al*., 2023). The second category, UGC, refers to content created and shared by users on social media platforms, specifically addressing sustainability concerns (Koivisto *et al*., 2020; Bruns *et al*., 2016). Finally, e-WoM involves public online discussions (Huete-Alcocer, 2017), feedback or recommendations (Benhammou et al., 2024) related to sustainability, with a particular focus on the fashion industry. These three types of co-creation were examined separately to provide a comprehensive analysis of Generation Z's level of participation and to generate valuable insights for businesses seeking to refine their marketing strategies.

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2. METHODOLOGY AND RESULTS

For the purposes of this study, a quantitative research approach was employed, involving a survey conducted among 393 Generation Z participants in Greece. The collected data were analyzed using SmartPLS software. To test the proposed hypotheses, the Disjoint Two-Stage Approach, as recommended by Sarstedt et al. (2019) and Senapati and Panda (2024) was utilized. To distinguish between two kinds of well-being (eudemonic and hedonic), a dual-model approach was used.

The results revealed some interesting findings. Firstly, the co-creation of socially sustainable activities does not have a significant impact on either kind of well-being. Secondly, the co-creation through user generated content seems to have a significant impact on both kinds of well-being (eudemonic and hedonic). Third, the co-creation through e-WoM does not have an effect on Generation Z consumers' well-being in Greece. Finally, both kinds of well-being, eudemonic and hedonic, do have a positive impact on the Generation Z's intention to purchase sustainable fashion items.

3. THEORETICAL AND PRACTICAL CONTRIBUTIONS OF THE STUDY

This study contributes to the marketing academic community by shedding light into three topics: UGC fosters a sense of purpose and has a meaningful contribution among Generation Z consumers, which are essential aspects of well-being. The co-creation of socially sustainable activities and electronic word-of-mouth (e-WoM) related to fashion, did not significantly influence the WB of Generation Z consumers.

From a practical approach, this study highlights the role of user-generated content (UGC) in engaging Generation Z consumers in sustainable fashion practices. Encouraging consumer involvement in content creation fosters emotional connection, brand loyalty, and responsible consumption. Businesses can enhance engagement by prioritizing sustainability-focused UGC and community-driven experiences. Beyond UGC, meaningful content that emphasizes the emotional satisfaction of sustainability strengthens well-being and long-term commitment. Campaigns celebrating sustainable participation nurture pride and joy, reinforcing behavioral change. Embedding sustainability as a core brand value deepens consumer connections and inspires responsible choices. These insights provide strategic guidance for fashion brands aligning with Generation Z's values and promoting sustainability.

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4. LIMITATIONS AND AVENUES FOR FUTURE RESEARCH

This study is subject to several limitations, which present opportunities for future research. Firstly, its focus on Generation Z in Greece constrains the generalizability of the findings to diverse cultural and demographic contexts. Future studies could extend the scope to other regions or age cohorts. Secondly, the study examined only online forms of co-creation, highlighting the need for further exploration of physical or hybrid co-creative processes. Lastly, its reliance on quantitative survey methods suggests the potential for qualitative approaches to provide deeper insights. Despite these constraints, the study offers valuable contributions to understanding sustainability and social media's influence on young consumers.

Keywords: Digital engagement, Generation Z, well-being, online co-creation, sustainability, fashion

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON CONSUMER BUYING BEHAVIOR: A SYSTEMATIC REVIEW OF RECENT EMPIRICAL STUDIES ON DECISION-MAKING PROCESSES AND PURCHASE INTENTIONS

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ABSTRACT

Artificial Intelligence (AI) has dramatically changed how consumers buy, especially online retail. Recent empirical research has investigated the effect of AI applications on decision-making and purchasing intentions, emphasizing AI's significant influence on consumer interaction and satisfaction (Dai & Liu, 2024; Jangra & Jangra, 2022). AI plays a crucial role in shaping online consumer choices by boosting personalization, user experience, and purchase intentions (Manikandan & Bhuvaneswari, 2024; Mohsin, 2024). This systematic review is designed to synthesize the findings derived from recent empirical research, thereby offering a comprehensive understanding of the manner in which artificial intelligence influences consumer purchasing behavior. Artificial Intelligence (AI) technologies, including personalized recommendations, chatbots, predictive analytics, and social media engagement, have become essential components of online retail platforms (Fan & Liu, 2022). These applications have demonstrated a significant capacity to enhance consumer experiences by customizing shopping journeys, increasing engagement, and streamlining decision-making processes. For example, AI-driven personalization has established itself as a fundamental factor in shaping consumer decision-making by providing tailored and relevant experiences, enhancing purchase intentions and customer satisfaction Louis & Noerlina & Syahchari, 2024). In addition, recent research consistently demonstrates that AI personalization exerts the most substantial influence on purchase intention, followed by the effectiveness of chatbots, predictive analytics, and social media engagement (Dai & Liu, 2024). AI-driven personalisation significantly enhances consumer purchase intentions by delivering customized experiences that resonate with individual preferences (Aggarwal, Sharma & Saxena, 2024). Chatbots facilitate real-time support, improving customer service and engagement, while predictive analytics assist in forecasting consumer needs, further augmenting satisfaction (Jangra & Jangra, 2022). Moreover, AI-enabled platforms are critical in mediating the relationship between psychosocial factors and purchase intentions, highlighting the significance of usability in influencing consumer behavior (Mohsin, 2024). Psychosocial factors, including subjective norms, faith,

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consciousness, and perceived control, exhibit a notably heightened effect on purchase intention when amplified by the usability advantages provided by AI (Raji et al., 2024). This systematic review will employ a structured methodology to identify and evaluate recent empirical studies published in reputable academic journals. The search strategy will encompass databases such as Scopus, Web of Science, and Google Scholar, utilizing keywords pertinent to artificial intelligence, consumer behavior, decision-making processes, and purchase intentions. Eligible studies will include those that investigate the effects of AI applications on consumer purchasing behavior, particularly within online retail environments. The quality of these studies will be assessed in accordance with established criteria for empirical research.

Keywords: Artificial Intelligence (AI); Consumer Behavior; Online Retail; Personalization; Purchase Intentions; Decision-Making Processes.

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MAPPING AI'S IMPACT ON MARCOM:A MULTIFACETED STRATEGIC FRAMEWORK THROUGH LITERATURE ANALYSIS

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ABSTRACT

INTRODUCTION

The rapid evolution of artificial intelligence (AI) is fundamentally revolutionizing the landscape of marketing communications (MarCom). As digital technologies continue to advance, organizations face both unprecedented opportunities and complex challenges in integrating AI into their marketing strategies (Anantrasirichai & Bull, 2020). The contemporary marketing environment is characterized by increasing data volumes, accelerated consumer interactions, and a growing demand for hyper-personalized engagement. In this context, AI has emerged not merely as a technological enhancement but as a strategic imperative that redefines how brands engage with audiences, optimize campaigns, and generate value (Baruno et al., 2025).

This research is motivated by the urgent requirement for a comprehensive and practical framework to facilitate the integration of artificial intelligence into marketing communications. Although the existing literature extensively discusses AI's potential, a deficiency remains in systematic approaches that consider both the technical and human aspects of this integration. The study aims to synthesize current knowledge, identify key themes, and propose a strategic framework that aligns theoretical insights with practical implementation strategies for marketing professionals.

PURPOSE AND OBJECTIVES

The primary aim of this study is to develop a comprehensive strategic framework for integrating artificial intelligence into marketing communications (Bilgihan et al., 2024). This framework is designed to:

- Map the critical dimensions and phases of AI adoption in MarCom.
- Address the interplay between human expertise and machine capabilities.
- Provide guidelines for ethical, methodological, and organizational readiness.
- Support marketing professionals in navigating the complexities of digital transformation.

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The research aims to connect academic theory with industry practice, providing a roadmap that is both thorough and flexible to the evolving landscape of AI technologies.

RATIONALE AND SIGNIFICANCE

This research's importance stems from its holistic approach to integrating artificial intelligence. Many existing studies tend to focus only on specific aspects like automation or analytics, often overlooking the broader organizational, ethical, and human considerations (Hicham et al., 2023). This study adopts a comprehensive view, emphasizing that successfully implementing artificial intelligence involves more than just technical skills; it also demands organizational change, continuous learning, and a nuanced understanding of human-machine collaboration.

Furthermore, the research examines the societal implications of artificial intelligence in marketing, encompassing concerns related to consumer privacy, employment trends, and the democratization of marketing expertise (Malthouse & Copulsky, 2022). As artificial intelligence becomes increasingly integrated into routine business activities, its impact surpasses mere efficiency improvements and begins to influence the structure of marketing practices and consumer interactions fundamentally (Pandey, 2021).

THEORETICAL FOUNDATIONS

This research is grounded in several disciplines, including information systems, consumer behavior, strategic management, and organizational theory (Tai, 2023). Central to the framework is human-machine collaboration, emphasising that artificial intelligence (AI) should augment, not replace, human creativity and judgment. Guided by systems thinking, this approach highlights humans' strengths—like intuition, imagination, and ethical reasoning—and machines' capabilities—such as data processing, pattern recognition, and automation (Wang & Liu, 2025).

The research also incorporates established taxonomies of artificial intelligence within marketing, including classifications such as mechanical, thinking, and feeling AI. (Olan et al., 2021). These categories are employed to delineate the diverse roles that AI may undertake, spanning from automating routine tasks to enabling empathetic customer interactions. By synthesising these theoretical frameworks, the study provides a comprehensive foundation for understanding the complex impact of AI on marketing communications (Bastray, 2025).

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LITERATURE REVIEW

A systematic review of 76 peer-reviewed articles forms the backbone of the study's literature analysis. The review spans publications from 2020 to 2025, ensuring coverage of the most recent advancements and debates in the field (Anantrasirichai & Bull, 2020; Cillo & Rubera, 2024; Grewal et al., 2024). Key themes identified in the literature include:

- *Human-Machine Collaboration:* The balance between human oversight and AI-driven analytics is crucial for innovation and operational excellence.
- *Efficiency and Time Optimization:* AI's capacity to automate repetitive tasks and optimize campaigns in real time is a major driver of adoption.
- *Methodological Quality:* High standards in data integrity, algorithm selection, and validation are essential for reliable AI deployment.
- *Analytical Methods and Tools:* The use of machine learning, natural language processing, and predictive analytics enables intelligent data-driven decision-making.
- *Tool Selection and Implementation:* Choosing the right AI tools requires alignment with organizational goals and technical capabilities.
- *Phased Implementation:* A gradual, systematic approach to AI adoption supports change management and organizational development.
- *Dynamic Adaptation:* Continuous learning and system optimization are necessary to keep pace with evolving technologies and market conditions.

The literature underscores the importance of integrating these themes into a unified framework that is adaptable to diverse organizational contexts.

RESEARCH DESIGN AND METHODOLOGY

The integration of artificial intelligence (AI) into marketing communications is a rapidly evolving domain, and comprehending its actual influence necessitates more than mere quantitative data or anecdotal evidence alone. By implementing a mixed-methods research design, this study aims to bridge the gap between numerical data, such as survey outcomes and usage statistics, and qualitative insights derived from interviews and open-ended responses (Hu & Luo, 2024). This dual methodology guarantees that we not only quantify the extent and frequency of AI adoption in marketing communications but also obtain an in-depth understanding of the experiences, challenges, and perceptions of professionals engaging with this technological transformation (England, 2021).

The integration of these two research perspectives facilitates a more comprehensive and authentic understanding of the influence of artificial intelligence on contemporary marketing communication. Quantitative findings establish a robust foundation for trend and pattern

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identification, while qualitative data enriches this foundation by illuminating the narratives and motivations underpinning the numerical data (Pilcher & Cortazzi, 2023). Collectively, these methodologies offer a holistic perspective that is both evidence-based and attuned to the complexities encountered by organisations and individuals as they integrate AI into their marketing strategies.

SYSTEMATIC LITERATURE REVIEW

This systematic literature review aimed to provide a comprehensive overview of how artificial intelligence is being applied within marketing communications. To ensure a thorough and reliable analysis, the review drew from some of the most reputable sources in academic research (Gana, 2024). Articles were collected from leading databases, including Scopus and Web of Science, as well as from specialized journals dedicated to marketing. This broad approach helped capture a wide spectrum of perspectives and findings within the field.

To maintain high standards of quality and relevance, only peer-reviewed studies were included. The review specifically targeted research that explored the use of AI in marketing communications, with all selected articles published in the English language. Furthermore, each study had to meet rigorous methodological criteria to ensure the integrity and reliability of the findings.

The screening process was thorough and systematic. An initial search produced 1,461 articles (Pandey, 2021). Each was carefully screened for relevance and methodological quality. After this rigorous review, only 76 articles met the criteria. This careful selection guarantees that the insights and conclusions are credible and highly pertinent to AI in marketing communications (Tomczyk et al., 2024).

ANALYTICAL APPROACH

The research methodology aims to provide a comprehensive and detailed overview of the literature landscape. Researchers used a combination of quantitative and qualitative methods to ensure a broad and in-depth analysis (Pandei, 2021).

Quantitative Analysis: The researchers employ bibliometric methods to systematically analyse publication trends, citation behaviours, and keyword usage. This approach provides a comprehensive overview of research activity, highlighting shifts in scholarly focus and the evolution of essential topics over time.

Qualitative Analysis: Through thematic content analysis, researchers scrutinize the selected literature to identify core concepts, examine the interrelations among ideas, and generate theoretical insights. This process helps researchers discern not only the subject of study but also the mechanisms and reasons behind the emergence of particular themes as prominent within the field.

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Framework Synthesis: The insights obtained from both quantitative and qualitative analyses are subsequently integrated. This synthesis enables researchers to construct a strategic framework that is firmly rooted in theoretical foundations while remaining responsive to practical considerations. The outcome is a resilient model that directs future research and informs professional practice.

QUALITY ASSURANCE

The research team has carefully maintained high methodological standards throughout the study. Data extraction is independently confirmed by two researchers, thereby reducing the likelihood of mistakes and enhancing the reliability of the results. All analytical choices are thoroughly documented, supporting transparency and facilitating the replication of procedures by others (Wang & Liu, 2025). Additionally, the framework undergoes strict peer review by both academic experts and industry professionals, ensuring its relevance and credibility in various contexts. This comprehensive, multi-step approach helps the team produce results that are not only methodologically sound but also practical and valuable for both researchers and practitioners.

CONCEPTUAL FRAMEWORK

The outcome of the analytical process will offer a comprehensive framework that delineates seven essential dimensions of AI integration in marketing communications. This framework is designed to guide practitioners through each stage of AI adoption, from initial planning to dynamic adaptation. It emphasizes the interdependence of technical, organizational, and human factors, advocating for a holistic approach to implementation (Mahakal, 2023).

ETHICAL AND SOCIAL CONSIDERATIONS

Ethical considerations are integral to the proposed framework. The study acknowledges the significance of:

- Protecting consumer privacy and data security.
- Mitigating algorithmic bias and ensuring transparency.
- Maintaining human oversight and accountability in automated processes.

These factors are especially important in marketing communications, where AI systems engage directly with consumers and manage sensitive data (Gupta et al., 2023). The framework provides guidelines for assessing ethical risks and establishing governance structures to oversee the deployment of AI.

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PRACTICAL IMPLICATIONS

For marketing professionals, the framework will offer actionable guidance on:

- Assessing organizational readiness for AI adoption.
- Building technical infrastructure and human resource capabilities.
- Selecting and integrating AI tools that align with strategic objectives.
- Managing change and fostering a culture of continuous learning.
- Implementing quality assurance measures to ensure reliable outcomes.

The study also provides strategies for mitigating risks associated with both technical failures and human factors, such as resistance to change or skill gaps.

FUTURE DIRECTIONS

Recognizing the rapid and ever-evolving landscape of artificial intelligence, the study thoughtfully identifies several promising pathways for future research. These recommendations are crafted to ensure that the proposed framework remains robust, adaptable, and relevant as both technology and organizational needs continue to shift. A key priority for future work involves the empirical validation of the framework within a variety of organizational environments. By applying the framework in different industries, company sizes, and cultural settings, researchers can assess its practical utility and uncover context-specific nuances. This approach not only tests the framework's versatility but also provides valuable insights into how AI-driven strategies perform under real-world conditions.

The study also highlights the need to continuously explore new and emerging AI technologies, particularly as they relate to marketing strategy. As innovations such as generative AI, advanced machine learning algorithms, and real-time data analytics become more prevalent, it is crucial to examine their implications for marketing practices. This ongoing investigation ensures that the framework remains aligned with the latest technological advancements and can guide organizations in leveraging these tools effectively.

Central to the study's methodology is the acknowledgement that the proposed framework must not remain static. Instead, it is intentionally designed to accommodate ongoing refinement and adaptation. As the field of AI progresses, so too must the strategies and models that support it. This dedication to continuous enhancement guarantees that the framework will maintain its relevance and practical value, empowering organizations to navigate the complexities of AI-driven marketing with confidence.

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CONCLUSION

The integration of artificial intelligence into marketing communications stands at a pivotal juncture, where technological innovation and human ingenuity must work in concert to shape the future of the discipline. This research, through its comprehensive framework, underscores that the journey toward AI-driven marketing excellence is not solely a matter of adopting new tools, but of embracing a mindset that values adaptability, ethical stewardship, and continuous learning (Campbell, et al., 2020).

Reflecting on the insights gathered, it becomes clear that successful AI integration requires more than technical proficiency. It demands a holistic approach—one that recognizes the importance of organizational readiness, ethical governance, and the nurturing of human expertise alongside machine intelligence (Hao et al., 2025). By mapping the critical dimensions of AI adoption, this study offers marketing professionals a practical guide to navigating the often complex terrain of digital transformation. The framework's emphasis on phased implementation, dynamic adaptation, and quality assurance ensures that organizations are not only prepared for the initial challenges of AI adoption but are also equipped to evolve as technologies and market conditions change (Lida, 2020).

The research also highlights the broader societal implications of AI in marketing. Issues such as data privacy, algorithmic bias, and the shifting landscape of employment are not peripheral concerns—they are central to the responsible advancement of the field. The proposed framework's inclusion of ethical and social considerations reflects a commitment to ensuring that AI serves the interests of both organizations and the wider community.

From a methodological standpoint, the study's mixed-methods approach provides a nuanced understanding of AI's impact, blending quantitative rigor with the richness of qualitative insights. This dual perspective not only grounds the framework in empirical evidence but also captures the lived experiences and challenges faced by practitioners on the front lines of digital transformation.

In sum, this study offers more than a roadmap for AI integration—it provides a call to action for marketing professionals to lead with foresight, responsibility, and creativity. By fostering a culture of collaboration, ethical awareness, and lifelong learning, organisations can not only harness the transformative potential of AI but also build more resilient, innovative, and human-centred marketing practices for the future (Pantic & Rothkrantz, 2003

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NAVIGATING THE AI FRONTIER: A COMPREHENSIVE SYSTEMATIC REVIEW OF TECHNOLOGICAL INNOVATION IN CORPORATE COMMUNICATIONS

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ABSTRACT

INTRODUCTION

Technological innovation is reshaping corporate communication, altering how companies interact with stakeholders and achieve their sustainability goals (Akter et al, 2021). The rise of artificial intelligence (AI) has introduced new approaches to communication, stakeholder involvement, and alignment with the United Nations Sustainable Development Goals (SDGs) (Dwivedi, 2024).

This review examines how artificial intelligence (AI) is changing corporate communication, emphasizing more sustainable and responsible approaches. As companies face growing demands for transparency, ethics, and environmental awareness, AI becomes a vital tool to fulfil these needs (Irwansyah et al., 2024). It personalizes content, manages social media interactions, automates reporting, and analyzes public sentiment—doing more than saving time; it transforms how businesses engage with their audiences. The review examines how these technologies enable organisations to communicate more effectively, efficiently, and in ways that foster long-term trust and sustainability (Truby, 2020).

This review will synthesize key insights from academic research and industry reports published from 2018 to 2025. It will examine four main areas: the impact of AI on communication strategies, the technologies behind these changes, effective implementation methods, and the ethical considerations involved (Khan et al., 2022). The focus is not only on AI's capabilities but also on its applications, whether they promote or hinder responsible business practices. By combining research findings with practical examples, the review aims to provide a comprehensive overview of how AI can help companies become more effective communicators and responsible corporate citizens (Sætra, 2021; Zhukovskyi, 2024).

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BACKGROUND AND RATIONALE

Corporate communications have undergone rapid evolution recently, driven by technologies such as artificial intelligence, machine learning, augmented reality, and virtual reality. Major global companies, such as Amazon, Microsoft, and Apple, are leveraging these innovations to create more interactive and immersive experiences for their stakeholders. Specifically, artificial intelligence enhances brand responsiveness through automated customer service and data-driven insights, while mobile technology enables users to access services and information in real-time, anytime, anywhere (Lalic et al., 2019).

The escalating complexity of corporate environments and the growing emphasis on sustainability have necessitated a reassessment of communication strategies (Goralski & Tan, 2020). AI technologies are now acknowledged as strategic assets capable of enhancing operational efficiency, customizing stakeholder engagement, and supporting responsible brand initiatives aligned with the Sustainable Development Goals (SDGs). Nonetheless, these advancements also present challenges related to data privacy, algorithmic bias, and the authenticity of AI-generated content, underscoring the need for comprehensive ethical frameworks and robust regulatory oversight (D'Amore et al., 2022).

OBJECTIVES

The primary aim of this study is to systematically review and synthesise existing knowledge on the role of AI in corporate communication strategies (Kolo & Haumer, 2020), with particular focus on:

- The technological capabilities and limitations of AI within communication contexts.

- Strategic implementation frameworks for AI in sustainable communication.

- The alignment of AI-driven communication practices with the SDGs.

- Ethical challenges and potential risks related to AI adoption, including data privacy and algorithmic bias.

THEORETICAL FRAMEWORK

The research is based on four related theoretical areas:

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1. Organizational Communication Theory

Artificial Intelligence (AI) revolutionises interactions between corporations and stakeholders through advanced hyper-personalization and immediate responsiveness (Ng et al., 2021). Machine learning technologies, including natural language generation (NLG), facilitate customised communications, whereas sentiment analysis platforms improve the tracking of brand perception. This corresponds with media richness theory, which posits that AI can enhance message clarity across digital channels. However, it also elicits concerns regarding the potential erosion of human trust resulting from excessive automation (Lysaght et al., 2019).

2. Stakeholder-SDGs Nexus

A revised triple bottom line framework now considers the influence of AI on environmental, social, and governance (ESG) outcomes. The study references case examples showing how AI improves supply chain transparency (aligning with SDG 12: Responsible Consumption) and encourages industry innovation (SDG 9) (Shahbazi & Bunker, 2024). Sætra's hierarchical model is utilized to evaluate AI's effect on sustainability across organizational, industry, and global scales, revealing possible tensions between efficiency and equitable growth.

3. Technology Adoption Models

The Technology-Organisation-Environment (TOE) framework is employed to identify barriers to the implementation of artificial intelligence, including deficiencies in data infrastructure and resistance from the workforce (Wu et al., 2022). The study also cites Floridi's theory of information ethics, highlighting the importance of accountability in algorithmic decision-making to reduce bias in customer management systems.

4. Ethical Governance

A synthesized ethical governance framework is proposed, integrating compliance with the General Data Protection Regulation (GDPR) and Sustainable Development Goal 16 (Peace, Justice, and Strong Institutions). This incorporates methodologies such as bias auditing in healthcare, artificial intelligence, and transparency protocols in crisis response, thereby fostering the advancement of inherently equitable AI systems.

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LITERATURE REVIEW

Evolution of Corporate Communication Technologies

The integration of artificial intelligence into corporate communications has transformed stakeholder engagement, crisis management, and operational efficiency (Moraes et al., 2021). Notable technological innovations include:

Technology	Application	Impact
AI Chatbots	24/7 customer query resolution	Reduction in operational costs
Sentiment Analysis	Brand perception tracking	Faster crisis response times
Predictive Analytics	Personalized recommendations	Increased conversion rates

Table 1: Key technological innovations

These tools facilitate highly personalised communication at scale, spanning areas such as human resources and marketing. Major companies are leveraging AI, machine learning, augmented reality, and virtual reality to develop immersive experiences for both internal teams and external audiences.

Operational Efficiency and Strategic Advantages

AI automation enhances the efficiency of repetitive tasks, allowing communication professionals to focus on strategic initiatives. Content creation, social media management, and stakeholder engagement are increasingly supported by AI-driven systems, which enhance productivity and improve the quality of decision-making (Shao & Yin, 2025). Real-time data synthesis platforms, such as Sprinklr's AI tools, enable organisations to identify emerging trends and refine their crisis management strategies.

Alignment with Sustainable Development Goals

Artificial Intelligence (AI) is progressively integrated into sustainability frameworks, thereby supporting Environmental, Social, and Governance (ESG) impact assessments as well as Sustainable Development Goal (SDG) reporting. The research investigates how AI-enhanced transparency within supply chains, predictive analytics for demand forecasting, and machine learning-based supplier

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evaluations foster sustainable business practices (Vaio et al., 2020). The adoption of AI is regarded as both an ethical obligation and a strategic benefit for organizations aiming to align with the SDGs.

Ethical Challenges

The implementation of artificial intelligence within corporate communications raises considerable ethical considerations, particularly about data privacy, algorithmic bias, and the veracity of content generated by (AI Mirek-Rogowska et al., 2024). The study highlights the importance of fairness management strategies, thorough bias mitigation frameworks, and context-aware regulatory measures to ensure the responsible integration of AI.

METHODOLOGY

The study shall utilise a systematic literature review methodology, in strict accordance with PRISMA guidelines, to ensure methodological rigor and transparency. The research strategy includes querying prominent academic databases (Scopus, Web of Science, IEEE Xplore) employing targeted keywords pertinent to artificial intelligence, corporate communications, stakeholder engagement, and sustainability. The inclusion criteria are explicitly defined to encompass peer-reviewed articles published between 2018 and 2025, industry reports from Fortune 500 companies, and publications in the English language.

A multi-stage screening process will be conducted, commencing with an evaluation of titles and abstracts, followed by a comprehensive analysis of full texts (Campbell et al., 2020). The ultimate sample will undergo thematic analysis to identify key domains at the nexus of artificial intelligence and sustainability within corporate communications, specifically focusing on operational efficiency, stakeholder engagement, SDG alignment, ethical challenges, and strategic implementation frameworks.

THEORETICAL IMPLICATIONS

The convergence of artificial intelligence and stakeholder theory necessitates a reassessment of engagement strategies, as organizations utilize data-driven automation to customize outreach efforts. This technological evolution challenges conventional trust-building approaches, raising concerns regarding transparency and the possible decline in personal trust within stakeholder relationships. The alignment of artificial intelligence investments with the Sustainable Development Goals (SDGs) is

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increasingly recognized as a vital consideration, frequently outweighing traditional return-on-investment metrics in decisions related to technology adoption.

The research will explore the tension between operational efficiency and ethical responsibility, emphasizing the need for organizations to balance technological innovation with robust data governance and stakeholder-centric practices.

FUTURE RESEARCH DIRECTIONS

The study delineates several emerging research priorities in the domains of AI governance and sustainable communications:

- Conducting longitudinal studies to evaluate the long-term effects of AI implementation on Sustainable Development Goal (SDG) metrics across various industries.

- Performing comparative analyses of barriers to AI adoption in the Global North and Global South, with particular consideration of socio-economic and cultural factors.

- Developing sector-specific implementation models that address the unique challenges present in healthcare, manufacturing, and other sectors.

- Innovating regulatory frameworks, including pilot projects for blockchain-based auditing systems for AI within diverse jurisdictions.

- Conducting quantitative research to determine optimal human-AI collaboration ratios, with differentiation between high-stakes and creative environments.

These research directions are designed to guide the creation of adaptable frameworks that align technological advancements with equitable progress toward the SDGs.

DISCUSSION

The forthcoming study will investigate the dual function of artificial intelligence as both a catalyst and a disruptor within sustainable corporate communication practices. It will analyse the progression of AI from a tactical instrument aimed at cost reduction to a strategic asset for stakeholder engagement and the alignment with Sustainable Development Goals (SDGs) (Kulkov et al., 2023). Furthermore, the research will scrutinize ongoing challenges related to authenticity, data privacy, and

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algorithmic bias, underscoring the importance of context-specific ethical frameworks and governance mechanisms.

The study aims to elucidate the disparity between the widespread adoption of AI and the comparatively immature state of governance frameworks, advocating for interdepartmental collaboration and third-party bias certification as essential prerequisites for the responsible deployment of artificial intelligence (Shao et al., 2023). Particular emphasis will be placed on the risks associated with 'SDG-washing' and digital divides, especially in developing countries, as well as the potential of localised natural language processing models and regulatory sandboxes to mitigate these concerns.

CONCLUSION

This extended abstract delineates a systematic review designed to examine the transformative influence of artificial intelligence on corporate communications, emphasizing operational efficiency, stakeholder engagement, SDG alignment, and ethical governance. By synthesizing existing research and proposing future scholarly avenues, the study aims to provide academics and practitioners with the essential insights needed to effectively manage the complexities associated with AI-driven innovation within the corporate sector. Moreover, the research aims to contribute to the formulation of communication strategies that harmonize technological progress with ethical responsibility and sustainable development goals, noting that no study results are presented at this juncture.

Keywords: artificial intelligence (AI), corporate communications, sustainable development goals (SDGs), technology innovation, personalization and stakeholder engagement.

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SCROLLING INTO THE GAMES: HOW SOCIAL MEDIA SHAPES CONSUMER ENGAGEMENT WITH SPONSORS AT PARIS OLYMPICS 2024

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ABSTRACT

INTRODUCTION- AIM OF RESEARCH

Sponsorships have attracted heightened interest from academics and professionals owing to their capacity to penetrate advertising saturation in the marketplace. Organizations want to associate themselves with events, personalities, or other entities to enhance their connection with customers. Social media has significantly altered the consumption of media content, especially during major sporting events such as the Olympics. The Olympic Games, supported by a diverse array of sponsors, offer a significant foundation for examining sponsorship agreements because of the exceptionally massive attendance associated with this event. This presents sponsors with significant opportunities to derive value through consumer engagement (Florek et al, 2008). While earlier research has predominantly focused on evaluating sponsorship effectiveness regarding attitudes and purchasing behaviors towards sponsoring companies (Koronios, Ntasis, and Dimitropoulos, 2022), a comprehensive model analyzing the impact of social media usage on consumer engagement with sponsors has yet to be developed. This study enhances sponsorship theory by examining the extent to which social media influences consumers' responses to sponsorship.

THEORETICAL BACKGROUND

Event attachment refers to the inclination of participants to engage with an event, influenced by factors such as the environment, overall appearance, and demographics of the attendees (Sung et al. 2021). Research in sports marketing indicates that attachment to sports organizations and events generates favorable behaviors. Attachment to events enhances the development of vivid memories linked to the event, thereby increasing motivation to engage in activities related to the event, including interactions with the sponsors of the event (Sung et al. 2021).

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Subjective knowledge refers to customers' perceptions of their understanding of an item, company, or purchasing choice, in contrast to objective knowledge. Subjective knowledge of event sponsorships pertains to the understanding developed via an individual's cumulative prior experiences and insights into an event and its sponsors (Hochstein et al. 2021). Previous exposure, regular attendance, and involvement in an event enhance event knowledge. It stems from an individual's engagement and desire to acquire more knowledge about the event, seeing it as significant and personally relevant.

Congruence denotes the extent of similarity between two objects or activities (Henderson, Mazodier, & Sundar, 2019). In sponsorship agreements, congruence evaluates the alignment between the sponsor and the sponsored entity. This congruence arises from the alignment between the pertinent characteristics of the sponsor and the attributes of the sponsored entity (Misra, Roy & Bailey, 2015). Therefore, a sponsoring firm that closely matches the characteristics of the sponsored entity can establish a robust association. This study posits that consumer responses and engagement will be enhanced by a strong alignment between the sponsoring firm and the sponsored event.

Social media usage has become a prevalent activity among Internet users (Dessart, Veloutsou, and Morgan-Thomas, 2015), offering sports clubs and their sponsors an additional avenue for engaging with supporters and consumers. Individuals use social media platforms to obtain essential information, assist in decision-making and purchasing, engage with others, share information, and seek entertainment (Voorveld et al., 2018). In this context, various sports organizations consistently interact with their supporters and followers via multiple social media platforms.

The concept of sponsorship engagement with sponsors was defined by assessing respondents' awareness of sponsors, their attitudes towards sponsors, and their intentions to purchase the sponsors' products. The elements align with the three distinct levels of the hierarchy of effects model (Barry, 1987). The attendees were asked to evaluate how the sponsorship of a specific event by a particular sponsor affects their awareness of the sponsor (cognitive level), their attitudes towards the sponsor (affective level), and their willingness to consider the sponsor’s product (conative level). This method facilitated a thorough assessment of sponsorship engagement across cognitive, affective, and conative dimensions.

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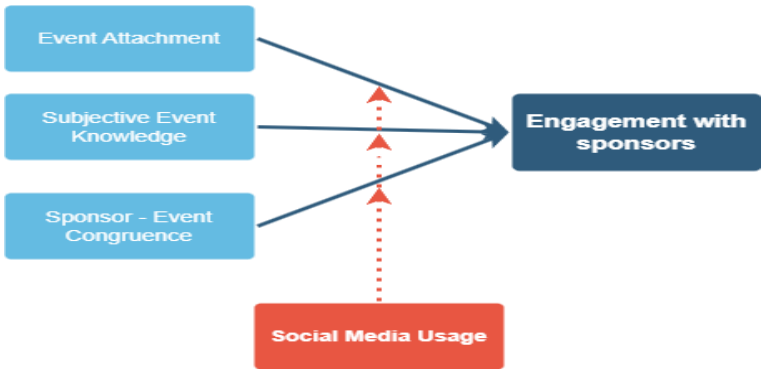


Figure 1. Proposed model

Direct Effects:

$H_{1,2,3}$: Event Attachment, Subjective Event Knowledge and Sponsor-event congruence are expected to affect spectators' engagement with sponsors

Indirect Effects (Mediated by Social Media Usage):

H_4: Social Media Usage positively mediates the relationship between Event Attachment and spectators' engagement with sponsors

H_5: Social Media Usage positively mediates the relationship between Subjective Event Knowledge and spectators' engagement with sponsors

H_6: Social Media Usage positively mediates the relationship between Sponsor-Event congruence and spectators' engagement with sponsors

METHODOLOGY, RESEARCH DESIGN AND DATA ANALYSIS

For the aim of the study, a quantitative methodology was employed, and online surveys were gathered from Greek spectators of Paris 2024 Olympics. A total of 7,412 questionnaires were successfully completed and analyzed by SPSS and AMOS

RESULTS, DISCUSSION AND IMPLICATIONS/CONCLUSIONS

The hypothesized relationships within the model were assessed using Structural Equation Modeling (SEM). Explanatory Factor Analysis (EFA) demonstrated strong construct validity, as evidenced by a robust Kaiser-Meyer-Olkin (KMO) index exceeding 0.8 across all scales, confirming

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their adequacy for further hypothesis testing. The proportion of variance explained by the extracted factors ranged from 24.1% to 85.9% across the 5 variables, highlighting the substantial explanatory power of the constructs. Confirmatory Factor Analysis (CFA) further validated the measurement model, yielding strong fit indices: normed χ^2 values remained below 1, the Root Mean Square Error of Approximation (RMSEA) did not exceed 0.1, the Normed Fit Index (NFI) consistently surpassed 0.95, and the Comparative Fit Index (CFI) exceeded 0.9 for all scales. These results indicate a well-fitting measurement structure. Notably, a high correlation coefficient (0.801) was observed between Event Attachment and spectators' engagement with sponsors, suggesting a strong positive association between these variables. Correlations among the remaining constructs ranged from 0.317 to 0.704, reflecting varying degrees of interrelationships. Finally, the SEM results provided strong empirical support for all proposed hypotheses (H1–H6), reinforcing the theoretical framework and offering a quantitative foundation for understanding the interdependencies among the studied variables.

Table 1: Structural Equation Model Weights

Affect			b	p	Result
Direct Effects					
H1: Event Attachment		Engagement with Sponsors	0,611	<.001	S
H2: Subjective Event Knowledge		Engagement with Sponsors	0,738	<.001	S
H3: Sponsors Event Congruence		Engagement with Sponsors	0,759	<.001	S
Indirect Effects (Mediated by Social Media Usage)					
H4: Social Media Usage mediates Subjective Event Attachment		Engagement with Sponsors	0,901	<.001	S
H5: Social Media Usage mediates Subjective Event Knowledge		Engagement with Sponsors	0,672	<.001	S
H6: Social Media Usage mediates Sponsors Event Congruence		Engagement with Sponsors	0,837	<.001	S

S=Supported, R=Rejected, SE=Standard Error, NNFI = .971; CFI = .980; SRMR = .025; RMSEA = .082.

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HYBRID REALITY TOURISM: BUSINESS MODEL INNOVATION AT THE PHYSICAL-VIRTUAL INTERFACE

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ABSTRACT

The intersection of extended-reality technologies and physical travel is fundamentally transforming the mechanisms through which value is generated, conveyed, and appropriated within the tourism sector. Investments in destination digital twins, mixed-reality events, and non-fungible token (NFT) passes have surged since 2020, indicating a transition from geographically constrained interactions to hybrid reality tourism (HRT); a flexible continuum wherein virtual dimensions extend, enhance, and commercialise physical experiences (Buhalis, Leung, & Lin, 2023). Bibliometric mapping elucidates that concepts pertaining to HRT have emerged as a distinct and rapidly expanding research cluster (Zainal Abidin et al., 2025). Notwithstanding this momentum, the existing body of scholarship exhibits a notable fragmentation: the majority of investigations tend to isolate individual touchpoints, such as VR previews (Assiouras et al., 2024) or mobile AR guides (Yin et al., 2021), failing to synthesise these elements into cohesive business-model frameworks.

AIM AND RESEARCH QUESTIONS

Responding to this gap, the present study systematically reviews extant literature to: (1) identify how tourism suppliers combine metaverse affordances with physical offerings to craft new value propositions, (2) classify the revenue architectures underpinning these propositions, and (3) delineate the stakeholder capabilities that orchestrate value across the physical–virtual continuum.

METHODOLOGY

A systematic literature review (SLR) was conducted in accordance with PRISMA guidelines. Searches of Scopus, Web of Science and ScienceDirect employed Boolean combinations of tourism, metaverse, virtual reality, augmented reality, digital twin, and business model. The process cover publications from 2015-2025, written in English. Thematic coding was executed with NVivo, while co-citation and keyword-co-occurrence networks were visualised in VOSviewer to uncover structural patterns. Reliability was ensured through intercoder agreement.

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PRELIMINARY FINDINGS

The review reveals four interconnected HRT archetypes that correspond with the customer journey:

Immersive Discovery: high-fidelity virtual reality or destination replicas evoke emotional pre-visit motivation and guide users towards premium enhancements or affiliate reservations (Assiouras et al., 2024; Hadjielias et al., 2022).

Augmented co-presence: context-aware AR overlays personalise narratives, promote inclusivity, and create micro-transaction avenues for premium content and brand sponsorships (Serravalle et al., 2019; Yin et al., 2021).

Phygital commerce: encompasses tokenised vouchers and dynamic NFTs that serve to connect on-site consumption with virtual rewards, facilitating royalty-bearing smart contracts and carbon-offset micro-payments (Calderón-Fajardo et al., 2024).

Eternal Engagement: post-visit digital souvenirs, avatar reunions and branded metaverse events sustain emotional bonds and generate subscription income and virtual-merchandising margins (He & Timothy, 2024).

Cross-archetype orchestration depends on data-driven personalisation engines, interoperability standards for asset portability, and governance mechanisms that distribute rights fairly between content creators and platform owners (Cranmer et al., 2021).

CONTRIBUTION TO THEORY

Through the synthesis of fragmented empirical data into a structured typological framework, this research propels the theoretical discourse surrounding business-model innovation within the tourism sector in three distinct manners. Initially, it broadens the scope of augmented-reality value-logic inquiry to include not only the immediate on-site experience but also the monetisation strategies applicable before and after the visit. Secondly, it recontextualises the discourse surrounding substitution: instead of undermining physical transactions, proficient HRT frameworks establish a beneficial feedback loop wherein virtual engagement enhances actual bookings, and post-visit experiences rejuvenate attachment to the destination (Flavián et al. 2021). Third, the science-mapping overlay situates HRT as an emergent paradigm poised to prevail in the discourse surrounding metaverse tourism in the forthcoming decade (Zainal Abidin et al., 2025).

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PRACTICAL IMPLICATIONS

Tourism small and medium-sized enterprises may engage in low-barrier strategies (such as white-label virtual reality previews) to cultivate demand without incurring substantial capital expenditures. Destination marketers may consider the strategic bundling of dynamic NFT passes, which serve to unlock both on-site augmented reality layers and forthcoming virtual festivals. This approach could potentially mitigate revenue volatility while simultaneously engaging digitally native cohorts (Calderón-Fajardo et al., 2024). It is imperative for policymakers to develop comprehensive guidelines pertaining to data sovereignty and accessibility, aimed at facilitating equitable value capture and fostering inclusive participation. Concurrently, sustainability agencies may utilise high-resolution technology to address the challenges posed by overtourism through the implementation of partial digital substitution (Filimonau et al., 2024; Kouroupi & Metaxas, 2023).

EXPECTED OUTCOMES

The SLR synthesises a coherent knowledge base for scholars and practitioners, highlights methodological blind spots—particularly the paucity of longitudinal conversion metrics—and proposes an agenda for mixed-methods validation of HRT performance and environmental impact.

Keywords: hybrid reality tourism, metaverse, systematic literature review, business model, virtual reality, augmented reality, digital souvenirs, revenue streams, experience economy, destination management

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LOCAL ATTITUDES TOWARD GLOBAL EMPLOYEES IN THE WORKPLACE

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ABSTRACT

Globalization has significantly reshaped labor markets, leading to increased workforce diversity as organizations employ individuals from various cultural and national backgrounds. Global workers, often referred to as migrants, expatriates, or international employees (e.g. Andresen et al., 2018), encompass a diverse group of individuals who cross national borders to develop their global careers and contribute their skills, knowledge, and labor in different countries. Studies have shown that diverse workforces can enhance innovation, creativity, and problem-solving due to the variety of perspectives they bring (Farndale, et al., 2025). However, workforce diversity also introduces challenges such as communication barriers, cultural misunderstandings, and potential workplace conflicts (Kharroubi, 2021).

A key distinction in this study is its focus on employees' attitudes toward global workers within workplace settings, as opposed to the broader population-level perspectives often analyzed in migration studies (e.g. Dempster & Hargrave, 2022). By narrowing the scope to workplace dynamics, this research aims to provide actionable insights into how employee interactions are influenced by workforce diversity and perceived cultural similarities.

ATTITUDES TOWARD GLOBAL WORKERS

The Stereotype Content Model (SCM) is used for measure employee‘s attitudes toward global workers. The model describes the usual content of stereotypes toward others, positing that humans universally want to know the other’s intent (positive or negative) and capability (Fiske et al., 2002). These two dimensions reflect **warmth** (e.g., friendliness) and **competence** (e.g., capability). The unique combination of these attributes forms stereotypes and prejudices, such as (a) *Paternalistic Prejudice:* High warmth, low competence (e.g., disrespected but pitied groups); (b) *Envious Prejudice*: High competence, low warmth (e.g., respected but envied groups); (c) *Contemptuous Prejudice*: Low warmth, low competence; (d) *Admiration*: High warmth, high competence.

Fiske et al. (2002) describes moderation effects affecting the stereotype content of the outgroup. For example, perceived status did predict perceived competence, and perceived competition predicted perceived (lack of) warmth. General knowledge about the outgroup and perceived similarity also

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moderates attitudes towards outgroups. These variables are also considered in the present study, along with the measurement of the attitudes towards each target group.

Knowledge about the Outgroup: Outgroup knowledge is associated with more positive attitudes toward other groups (Zagefka et al., 2017) and is included as a control variable. This variable considers the understanding and familiarity with specific immigrant groups.

Perceived Status of the Outgroup: This factor reflects perceptions on the socio-economic success of the outgroup, including the prestige of their typical occupations, their educational qualifications, and their economic success (Fiske et al., 2002; Durante et al., 2013).

Perceived Similarity of the Outgroup: According to the Similarity-Attraction Theory (Byrne, 1971), perceived similarity with the target group correlates with more positive attitudes. Shared traits and commonalities in cultural or professional attributes are crucial for fostering acceptance.

Perceived Competition from the Outgroup: This factor captures perceived realist and symbolic threats posed by the outgroup, including when its members have power and/or get special resources (Fiske et al., 2002; Durante et al., 2013).

Perceived Warmth of the Outgroup: This dimension was measured following the four-items scale by Fiske et al. (2002), assessing outgroup members attributes of tolerance, warmth, good nature, sincerity.

Perceived Competence of the Outgroup: It was measured following the five-items scale by Fiske et al. (2002) to determine the extent to which five attributes (competence, confidence, independence competition and intelligence) apply to each target outgroup.

Perceived Realistic Threat: This factor encompasses the perceptions of insecurity, loss of jobs and housing due to the presence of immigrants (González et al., 2008).

Perceived Symbolic Threat: This factor includes the perception of threats to local culture, values, norms and identity due to the presence of immigrants (González et al., 2008).

RESEARCH SAMPLE

544 Lithuanian employees participated in the study conducted in December 2024, including 276 respondents who work with foreigners and 268 who do not. 37.3% of respondents work with Slavs (non EU), 16.2% with workers from other EU countries, 8.3% with individuals from Africa and South Asia, and 7.4% with coworkers from the Central Asia region.

RESULTS

The results indicate that respondents who work exclusively with Lithuanians have a more negative attitude toward all target outgroups: Slavs (non EU), Central Asia workers, Africa and South Asia, and EU workers. This etncocentric group rated all dimensions lower than others. Furthermore, there

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was significant differences between groups for the perceived competence of the outgroups, in that EU immigrants scored higher in competence, warmth and favourable attitudes. No statistical differences were found for perceived competition from the outgroups, including low (and non-significant between groups differences) for perceived realistic and symbolic threats posed by immigrants in Lithuania.

This study makes a significant contribution to International Human Resource Management by uncovering how local employee attitudes toward global co-workers are shaped by nuanced intergroup perceptions rather than simplistic notions of cultural threat or competition. By applying the Stereotype Content Model in the Lithuanian workplace context, the research highlights that warmth and competence perceptions—critical drivers of workplace dynamics—are more strongly influenced by knowledge of and perceived similarity with outgroup members than by perceived competition. This challenges the conventional assumption that increased diversity inherently leads to tension, showing instead that shared identities and mutual understanding foster more favourable attitudes toward global workers.

Methodologically, the study advances SCM research by focusing on a real-world, professional population rather than student samples, and by specifically targeting regional outgroups relevant to Lithuania's labour market. The research also bridges SCM with global mobility literature, emphasizing how local employee perceptions shape the integration of global employees. These insights are crucial for HR practitioners seeking to develop effective inclusion strategies and foster intercultural collaboration.

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Keywords: global workforce, organizational diversity, employees' attitudes, perceived cultural similarities, Lithuania.

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CULTURAL IDENTITY STRATEGIES OF LITHUANIAN MIGRANTS

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ABSTRACT

During the migration process, individuals undergo various physical and psychological changes, two of which stand out in the current context: the challenge of maintaining one's culture and building connections with a new culture (Berry, 1980). Moreover, immigrants encounter new moral and legal norms that can reshape their value systems, often leading to psychological challenges due to value divergence between their home and host countries. Whether a person is an immigrant or an expatriate, they adopt a cultural identity strategy. After settling in a host country, some individuals strive to learn the local language, celebrate national holidays, and integrate new traditions into their daily lives as part of their adaptation process (Al Ariss and Syed, 2011).

This study aims to examine the cultural identity strategies adopted by Lithuanian migrants in the United Kingdom and Norway.

CASE SELECTION

The United Kingdom and Norway were chosen as study sites based on their significance as host countries. By 2023, these two countries accounted for 10% of all emigrants from Lithuania. While the UK remained a primary destination for many years, Norway gained popularity after 2010 (European Migration Network (EMN), 2024).

These countries also differ significantly in cultural and linguistic aspects. According to the Inglehart-Welzel World Cultural Map (2020), Norway belongs to the Protestant Europe cluster, characterized by high secular and self-expression values, whereas the UK is part of the English-speaking cluster, which exhibits moderately lower self-expression values. In contrast, Lithuania falls under the Catholic Europe cluster, where survival values are more dominant, though secular values are higher than in the UK.

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RESEARCH DESIGN

This study employs a qualitative research methodology (Patton, 2014) to capture the experiences and interpretations of individuals regarding their cultural adaptation. A total of 22 semi-structured interviews were conducted with Lithuanian migrants residing in the UK (13) and Norway (9). All participants left Lithuania after the country joined the EU, meaning their value systems were shaped either during the Soviet era or the early years of independence, marked by economic and social uncertainty.

Participants were required to be Lithuanian-born, first-generation migrants, Lithuanian citizens, and adults who had been raised in a Lithuanian environment. All interviews were translated into English, uploaded into MaxQda software, and coded. The interview analysis followed the qualitative content analysis approach (Mayring, 2000), combining a theory-driven deductive approach and a data-driven inductive approach to develop a coding framework.

Cultural identity strategies were assessed using the four-category framework proposed by Li et al. (2021): (1) global, (2) cosmopolitan, (3) multicultural, and (4) monocultural.

RESULTS

Findings indicate that participants adopted different cultural identity strategies (see Table 1): ten opted for a multicultural strategy, seven followed a cosmopolitan approach, four adhered to a monocultural identity, and one exhibited a global identity. These findings align with Arnett's (2002) concept of global citizenship, as one participant demonstrated a strong connection to a global community while placing less emphasis on national culture.

Table 1. Cultural identity strategies of informants

No.	Nicknames	Gender	Age	Years in the host country	Host country	Cultural identity strategy	Plans to return to Lithuania
1	Saulius	M	26	5	Norway	Monocultural	Maybe
2	Rasa	F	31	13	U.K.	Monocultural	Yes
3	Juozas	M	32	7	Norway	Multicultural	Yes
4	Liuda	F	33	15	U.K.	Multicultural	No
5	Elinga	F	34	9	Norway	Multicultural	No
6	Judita	F	36	11	Norway	Cosmopolitan	No
7	Regina	F	36	19	U.K.	Multicultural	No
8	Justina	F	37	11	U.K.	Cosmopolitan	Yes
9	Giedre	F	37	18	U.K.	Multicultural	No
10	Ernesta	F	40	12	Norway	Multicultural	No
11	Ramunas	M	41	16	Norway	Cosmopolitan	No
12	Jolita	F	42	20	U.K.	Multicultural	No
13	Marijona	F	43	13	U.K.	Multicultural	No

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14	Evelina	F	43	20	U.K.	Cosmopolitan	No
15	Algirdas	M	44	13	Norway	Cosmopolitan	Maybe
16	Jonas	M	44	16	U.K.	Multicultural	No
17	Julita	F	45	10	U.K.	Multicultural	Yes
18	Virginija	F	46	16	Norway	Monocultural	Yes
19	Albertas	M	48	20.5	U.K.	Global	No
20	Jura	F	56	8	Norway	Monocultural	Yes
21	Gintas	M	57	10	U.K.	Cosmopolitan	No
22	Rosita	F	61	17	U.K.	Cosmopolitan	Maybe

The study reinforces previous research on the influence of host cultures on migrant identity transformation. However, additional factors, such as individual attitudes, pre-existing values, and the nationality of a spouse, also shape cultural identity strategies. Interestingly, the host culture itself was not the primary determinant, as similar results were observed in both the UK and Norway.

This study contributes to the understanding of migrants' cultural identities by emphasizing the complexity of cultural adaptation processes and the factors influencing identity formation. It contextualizes migrant identity strategies within the broader cultural clusters identified by the Inglehart-Welzel World Cultural Map. This adds theoretical depth to understanding how migrants navigate cultural contrasts between Catholic Europe (Lithuania), Protestant Europe (Norway), and the English-speaking world (UK).

The identification of cosmopolitan and global identities among migrants aligns with emerging discourses in global talent management that value boundaryless careers and transnational mindsets. Finally, the research provides valuable insights for human resource professionals managing multicultural and migrant workforces. Understanding employees' cultural identity strategies can enhance policies for inclusion, adaptation, and team dynamics.

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Keywords: cultural identity, cultural identity strategy; values, Lithuanian migrants.

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MORE THAN JUST EFFORT: COGNITIVE PATHWAYS TO THE IKEA EFFECT.

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ABSTRACT

This study aims both to bridge and expand the cognitive antecedents and behavioral consequences of IKEA Effect (Norton, Mochon & Ariely, 2012). Specifically, our aim is to identify conditions through which increased invested effort to the assembly task of a product, increases attitudes and re-purchase behavior, replicating existing lines of research (Atakan, Bagozzi & Yoon, 2014; Fuchs, Prandelli & Schreier, 2010; Kumar, 2024; Peck et al., 2021; Sarstedt, Neubert & Barth, 2017), while identifying the cognitive mechanism behind the observed results. Moreover, and beyond replication of existing findings, in this line of research we identify conditions where increased invested effort to the assembly task of a product, decreases attitudes and repurchase behavior for the product, reversing the well-established IKEA effect, by showing that the effect of invested effort on attitudes and repurchasing behavior in moderated by cognitive responses.

Applying a factorial experimental approach, participants were initially exposed to favorable or unfavorable product reviews and were asked to indicate their cognitive responses. Subsequently after completing the first task half of the participants were asked to invest effort by assembling the product themselves (high effort condition), while the other half watched a video of the product assembly (low effort condition). As expected for the conditions of the favorable cognitive responses, in line with previous research, we replicated previous findings showing that invested effort magnifies the effects of positive cognitive responses on attitudes and purchase intentions with participants investing greater effort, expressing more favorable attitudes and increased repurchase intention. Counter intuitively though for individuals who put the product together after reading negative reviews the results were reverse. Specifically participants with negative cognitive responses expressed less favorable attitudes and decreased repurchase intentions. Accounting for cognitive responses as a moderating variable and using Elaboration Likelihood model as our conceptual framework we manage to both replicate but also reverse the well-established IKEA effect. The findings provide important theoretical contributions and show that investing self-assembling effort has rather complex effects of attitude change and consumer behavior, by both increasing or decrease satisfaction, depending on the previously generated cognitive responses.

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Keywords: IKEA effect, consumer effort, online reviews, cognitive responses , Elaboration Likelihood Model (ELM)

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EVALUATING SUSTAINABLE DEVELOPMENT GOALS IN THE ICT SECTOR USING A DATA-DRIVEN APPROACH

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ABSTRACT

In recent years, corporate attention to social responsibility and sustainable development has significantly increased, leading firms and scholars to recognize the essential role businesses could play in addressing social issues (Mio *et al.*, 2020). The 2030 Agenda for Sustainable Development, adopted by the United Nations (UN) member states, established the Sustainable Development Goals (SDGs) as a structured framework for companies to enhance transparency, comply with regulations, and integrate sustainability into their strategic operations (Arduini et al., 2024; Iazzi, Ligorio and Iaia, 2022). The growing interest in non-financial performance is closely intertwined with the need to evaluate the disclosure of SDGs by firms in various sectors.

The SDGs underscore the importance of the Information and Communication Technology (ICT) sector in achieving sustainable development. Specifically, this industry could contribute to reducing inequalities and ensure better work conditions that sustainably stimulate the economy (Cioacă *et al.*, 2020). Moreover, Wen et al. (2021) analyzed the impact of ICT on pollutant emissions and the promotion of green product innovation. Mantovani Ribeiro et al. (2021) investigate the ICTs in smart and sustainable city initiatives. Since the Sustainable SDGs primarily emphasize governmental agency and do not impose obligations on businesses, they are not inherently designed to assess corporate ethical, social, and environmental performance (Spangenberg, 2017).

In recent years, software house companies have shown a growing strategic interest in developing automated systems for assessing Environmental, Social, and Governance (ESG) performance. Sustainability metrics become increasingly significant to corporate decision-making, investors, regulators, and stakeholders demand more reliable, transparent, and comparable ESG evaluations. Consequently, firms are searching for new digitizable, standardizable, and reliable data-driven approaches to conduct evaluations as objectively as possible. In such a sense, emerging technologies enhance ESG disclosure (Asif *et al.*, 2023).

The current literature revealed a research gap in assessing sustainability reporting in the ICT sector (Ramautar *et al.*, 2023). The purpose of this paper is to address both theoretical and practical

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implications of SDGs adoption measurement in the Italian ICT sector. From a theoretical perspective, this study aims to contribute to the debate on the determinants and tendencies of sustainability reporting and SDG communication in the ICT sector, in terms of conformity to Global Reporting Initiative (GRI) standards. Indeed, in the recent regulatory scenario, where the current non-financial disclosure policies lack a systematic overview, GRI standards are widely recognized in business praxis at a global level and across different sectors (Adams *et al.*, 2021). Furthermore, from a practical point of view, it provides valuable insights for business management related to the adoption of informatics tools and frameworks aimed at promoting automation, standardization, and objectivity of assessments of non-financial reports.

Specifically, a content analysis (Guthrie and Abeysekera, 2006; Steenkamp and Northcott, 2007) of the collected GRI content index is performed from the non-financial reports of a sample of 100 Italian ICT companies. The subjects of the present qualitative analysis are the ICT enterprises, and the units are identified in the non-financial reports of the sampled companies. A multi-step approach contributes to minimizing subjective interpretation bias. Specifically, two researchers conducted the analysis, and a third party validated the coding process. Whereupon an SDG Reporting Score (SRS) has been adopted as a qualitative proxy to estimate firm orientation toward SDG reporting, starting from the report Linking the SDGs and the GRI Standards GRI Supports the Sustainable Development Goals (Global Reporting Initiative, 2022).

Such a methodological framework is consistent with the study of Iazzi, Ligorio, Vrontis, et al. (2022). The analysis involves comprehending which GRI standards were adopted by the selected firms, the content analysis to pick out the disclosed GRI indicators through the SDG Compass, and the scoring formula application.

Aligning with the above-mentioned purposes, this research attempts to answer the following research questions:

RQ1: What is the state of the art of SDG communication and reporting in the ICT sector in Italy?

RQ2: What is the relationship between financial and non-financial performance in the Italian ICT sector?

RQ3: How does the shareholding structure influence the sustainability reporting of the selected companies?

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RQ2: Are there frameworks that allow the evaluation of companies' sustainability reports through an automated data-driven approach?

RQ3: Which key sustainability indicators are most frequently disclosed in non-financial reports in the ICT sector, and how do they align with the SDGs prioritized by the sampled companies?

An empirical assessment using a logistic regression was built to answer RQ1, RQ2, and RQ3. Specifically, the first 100 Italian companies, ordered by total assets, were extracted from the Aida Database.

A binary variable that identifies the presence of a sustainability report published by the company (1 = yes; 0 = no) represents the dependent variable of the model and is referred to as SR.

Analyzing Corporate Social Responsibility (CSR) disclosure requires a thorough consideration of firm-specific characteristics, given their crucial role in shaping both the quality of disclosures and impact on financial valuation (Pizzi *et al.*, 2024). Thus, the independent variables evaluate the financial performance, companies' setup, and belonging to an international group. The size of the company (SIZE), expressed as a logarithm of its total assets, is selected as a structural indicator (Loughran and McDonald, 2023). Operating loss (LOSS) consists of a dichotomous variable that identifies the presence of a negative economic result (1 = loss; 0 = profit). Liquidity ratio (LIQUIDITY) measures the company's ability to meet short-term commitments, reflecting its financial strength (Gómez-González *et al.*, 2024). The debt/Equity ratio (DER) represents a proxy of the degree of financial leverage of companies to evaluate the signaling effect of debt in the sustainable management report (Na *et al.*, 2020). Return on Equity (ROE), expressed as the ratio between net income after taxes and total equity (Almashhadani and Almashhadani, 2023), represents the profitability of the capital invested by shareholders, as an indicator of economic efficiency. Member type (MTYPE) is a dummy variable (1 = if the reference member belongs to the financial world; 0 = otherwise) to evaluate the impact of the ownership structure on sustainability orientation. International Group (INT) represents the company's foreign projection and probable exposure to global ESG standards and is expressed as a dummy (1 = if the company belongs to an international group; 0 = if not).

The Tolerance and Variance Inflation Factor (VIF) indicators were determined to detect the absence of multicollinearity issues among the covariates. The results in Table 1 show tolerance values higher than 0.2 and corresponding VIF values lower than 5 for all the variables, confirming that the logistic regression estimates are statistically reliable and not affected by biases arising from linear dependencies between the regressors.

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The results of the logistic regression, represented in Table 2, show that SIZE positively affects the presence of the sustainability report ($\beta = 0.895$, $p = 0.014$), highlighting that larger companies are more likely to draft and publish a sustainability report. This result is consistent with the existing literature, according to which larger companies are more exposed to pressure from stakeholders and use greater resources to structure non-financial reporting (Doan and Vu, 2024; Esposito et al., 2024).

Companies that record a LOSS are less inclined to undertake sustainable disclosure paths ($\beta = -4.615$, $p = 0.013$), due to the negative impact of economic prospects on management priorities and the availability of resources dedicated to non-financial reporting. This is aligned with the results of Francis et al. (2008), stating that firms obtaining higher earnings quality are apt to engage in extensive voluntary disclosure practices.

MTYPE is also positively associated with the probability of publishing a report ($\beta = 2.943$, $p = 0.042$), suggesting that the presence of financial partners favors the adoption of sustainability disclosure practices, due to regulatory pressure and a greater sensitivity towards transparency by the financial sector (Dong *et al.*, 2021).

Belonging to an international group (INT) represents the most incisive predictor of sustainability reporting commitment ($\beta = 5.805$, $p < 0.001$). Companies with an international presence are significantly more inclined to draft ESG reports, due to a greater exposure to advanced regulatory contexts and global standards, thus reflecting the growing attention to sustainable reporting in international markets, where compliance with SDGs and GRI standards is perceived as a competitive reputational lever. Along with this, previous studies found that foreign shareholding exerts a positive influence on corporate ESG performance, while also increasing transparency in disclosure practices (Zhang and Wu, 2024).

On the contrary, LIQUIDITY, DER, and ROE, do not show statistically significant effects on SR.

Hence, the empirical results reveal that the Italian ICT sector's commitment to sustainability reporting is encouraged by dimensional, international governance, and financial factors, strengthening the interpretation of SDGs reporting as a strategic and reputational choice.

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	Tolerance	VIF
SIZE	0.703	1.422
LOSS	0.535	1.870
LIQUIDITY	0.879	1.137
DER	0.821	1.218
ROE	0.680	1.472
MTYPE	0.494	2.023
INT	0.443	2.256

Source: Authors' own elaboration

Table 1. Multicollinearity Diagnostic

Wald Test

Model		Estimate	Standard Error	z	Wald Statistic	df	p
M_0	(Intercept)	−0.595	0.220	−2.701	7.294	1	0.007
M_1	(Intercept)	−12.269	4.022	−3.050	9.305	1	0.002
SIZE		0.895	0.365	2.451	6.007	1	0.014
LOSS		−4.615	1.865	−2.475	6.124	1	0.013
LIQUIDITY		−0.185	0.219	−0.848	0.719	1	0.396
DER		−0.028	0.280	−0.101	0.010	1	0.920
ROE		−0.006	0.020	−0.296	0.088	1	0.767
MTYPE		2.943	1.449	2.032	4.129	1	0.042
INT		5.805	1.475	3.935	15.484	1	< .001

Source: Authors' own elaboration

Table 2. Logistic regression coefficients

Keywords: Information and Communication Technology, Global Reporting Initiative, Sustainable Development Goals, data-driven, non-financial reporting, sustainability disclosure.

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THE ROLE OF CONSUMERS IN THE RASFF SYSTEM: ENGAGEMENT STRATEGIES FOR A PARTICIPATORY FOOD SAFETY

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ABSTRACT

INTRODUCTION

RASFF is a key system of the European Union, designed to facilitate the rapid exchange of information between competent authorities in the case of food safety threats. However, the structure of this system remains almost entirely centralized, relying primarily on reports from authorities and economic operators. Consumers are often the first to detect food safety issues, but they are not provided with a direct and effective channel to interact with the system. Although RASFF is an advanced and highly useful system, in an era of digital transformation and global interconnectivity, it is crucial to develop tools able to encourage the active participation of citizens and final consumers in reporting and managing food safety risks (European Food Safety Authority, 2023).

METHODOLOGY AND RESULTS

This study adopted a qualitative and hybrid approach, which combined (i) policy analysis and (ii) the analysis of international case studies. The policy analysis included a review of existing regulations and legal frameworks related to food safety, with a specific focus on consumer engagement, drawing from studies carried out by the World Health Organization (World Health Organization, 2022) and the European Commission (European Commission, 2020). The analysis of case studies reported specific initiatives which have encouraged direct citizen participation in food safety policies. The increasing consumer awareness regarding food incidents, including frauds, should lead competent authorities to actively engage citizens through a citizen science approach. The latter is a method of collaborative and voluntary research in which citizens (called citizen scientists), directly participate in the collection and processing of data within scientific investigations (Silvertown, 2009). Numerous approaches have been used globally to detect potential food incidents, such as introducing portable sensors like Tellspec, Nima, and Foodsniffer. Such tools aim to provide useful insights to detect food fraud,

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counterfeiting, and to assess food quality directly through consumer involvement (Goisser et al., 2021). Nima is particularly noteworthy; it is a pocket-sized device allowing consumers to detect gluten presence down to 20 ppm in solid and liquid food products, critically important for individuals suffering from celiac disease or gluten-related food intolerances (Nima, 2020). FoodSniffer enables consumers to assess the freshness of raw meat, poultry, and fish (FoodSniffer, 2020), while Tellspec, associated with the FishQC & Fraud app, provides consumers with rapid information about the nutritional quality and freshness of fish, helping them identify deteriorated or counterfeit foods (Tellspec, 2020). By instilling a sense of mistrust in consumers and empowering them within the food supply chain, citizens will become increasingly responsible and inclined to verify the authenticity of food and related labeling (Charlebois et al., 2016). This evidence suggests that integrating advanced digital tools with consumer engagement strategies, including both economic and non-economic incentives, can make RASFF more robust and responsive.

DISCUSSIONS

The spread of digital tools such as mobile applications, citizen science, and the Internet of Things (IoT) represents a significant opportunity to transform RASFF into a more interactive, responsive, and efficient system. A more participatory approach would undoubtedly enhance the timeliness of responses to food safety emergencies, while significantly raising awareness about sector-specific challenges. However, implementing these resources requires viable solutions to validate and verify reports from private individuals while ensuring at the same time their privacy (Hassoun et al., 2024). Moreover, the lack of a standardized infrastructure for integrating future consumer reports into authority-led systems presents a major challenge for future developments (European Food Safety Authority, 2023).

CONCLUSIONS

This study emphasizes the critical importance of actively involving consumers into RASFF processes to improve the efficiency and transparency of this crucial system. The adoption of cutting-edge digital tools, along with consumer engagement, awareness and incentive strategies, represents a key step toward a more inclusive and effective alert system. Future research should focus on: (i) developing standardized and globally accepted consumer participatory models for food safety, exploiting the potentials of the digital transformation and testing their effectiveness in various real environments; (ii) developing and promoting policies which facilitate active citizen participation in global food safety protection (World Health Organization, 2022).

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Keywords: food incidents, Citizen Science, trust, transparency, Digital Transformation.

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EXPLORING THE DYNAMICS OF PLAY AT WORK

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ABSTRACT

In contemporary organizational landscapes, the traditional demarcation between work and leisure is undergoing a transformation, giving rise to a paradigm shift where elements of play are increasingly integrated into professional settings. The convergence of work and play is not a new phenomenon; however, the deliberate infusion of playful activities into the workplace is garnering attention as organizations seek to foster innovative cultures, enhance employee engagement, and improve overall well-being.

Research on play at work is relatively sparse, with only a few studies defining and conceptualizing play in the context of work. Play as a concept was primarily researched amongst children and Van Vleet and Feeney (2015) was one among the first to conceptualize play for adults. They defined play in adulthood is "an activity or behavior that (a) is carried out with the goal of amusement and fun, (b) involves an enthusiastic and in-the-moment attitude or approach, and (c) is highly interactive among play partners or with the activity itself" (Van Vleet and Feeney, 2015, p. 640).

This research explores the multifaceted dynamics of play at work, exploring its positive contributions and, notably, unveiling the shadows—examining the potential negative implications that might accompany the integration of playful elements within professional environments. Thus, this study delves into the often-unexplored shadows of play at work, aiming to unveil its negative dimensions while acknowledging its positive counterparts.

The study included 32 interviews with participants aged 26 to 45 and an average age of 32 to explore the dual nature of play at work. A semi-structured interview protocol was developed which focused on the respondents' familiarity with the concept of play at work, benefits of play at work and potential negative consequences and situations associated with the dark side of play. The interviews lasted for at an average 30 minutes. All the interviews were audio-recorded.

Participants revealed a spectrum of experiences, emphasizing the positive impact of play on energy levels, interpersonal connections, and unexpected avenues for interaction with key executives. However, the study also sheds light on the shadows cast by work-related play. Unintended

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competition emerged as a notable concern, as participants described scenarios where playful activities inadvertently fueled rivalries among colleagues. The perception of partiality also surfaced, raising questions about the potential for favoritism and its impact on team dynamics. Furthermore, the study uncovered the risk of distraction, emphasizing the need for a delicate balance between fostering a playful environment and maintaining productivity.

The study contributes to the existing body of knowledge by providing a nuanced exploration of both the positive and negative aspects of play at work. By acknowledging the shadows within the play paradigm, the study offers valuable insights for organizations aiming to integrate play into their culture while minimizing potential challenges. It serves as a resource for scholars, practitioners, and organizational leaders seeking a comprehensive understanding of the intricate dynamics surrounding the incorporation of playful elements within professional environments.

Keywords : play at work, workplace fun, gamification

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INVESTIGATING THE SUCCESS OF GROWTH HACKING THROUGH A DATA-DRIVEN DECISION-MAKING FRAMEWORK

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ABSTRACT

Growth hacking (GH) has emerged as a critical strategy for achieving rapid and sustainable growth in the modern business landscape (Macca et al., 2025; Scuotto et al., 2025). It leverages the convergence of marketing, digital technologies, and iterative experimentation to identify and exploit growth opportunities (Ellis and Brown, 2017). It is particularly advantageous for startups and platform-based enterprises, where resource constraints necessitate cost-effective and scalable growth strategies (Bargoni et al., 2024; Holiday, 2014). Recent advancements in digital technologies, such as predictive analytics and AI, have further enhanced the effectiveness of GH strategies (Gerlich et al., 2025; Santoro et al., 2024).

Data-driven decision-making (DDDM) represents a paradigm shift in organizational strategy, emphasizing evidence-based practices underpinned by robust data analysis (Brynjolfsson et al., 2011; George et al., 2014; LaValle et al., 2011; Troisi et al., 2020; Visvizi et al., 2022). However, the integration of DDDM into GH strategies remains underexplored, especially concerning the interplay of organisational and technical conditions that maximise GH outcomes.

This study develops a comprehensive framework based on five key dimensions of DDDM: learning orientation, technological infrastructure, data analysis skills, proactive process management, and knowledge renewal. These dimensions collectively create a comprehensive framework for uncovering the necessary and sufficient conditions for optimal GH performance. Learning orientation fosters a culture of continuous learning and adaptation, while technological infrastructure provides the tools for data integration and analysis. Data analysis skills enable the interpretation of data into actionable insights, and proactive process management ensures data optimisation across business functions. Lastly, knowledge renewal emphasizes the continuous integration of internal and external knowledge to adapt to changing conditions. Despite the increasing significance of these dimensions, the specific configurations that drive successful GH implementation remain unclear. This study aims to address this gap by examining the interplay of these factors, offering new insights into the necessary and sufficient conditions for maximizing GH performance.

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This study employs fuzzy set Qualitative Comparative Analysis (fsQCA) to investigate the configurations of DDDM conditions that contribute to producing high GH performance outcomes in platform-based enterprises. The sample comprises 12 platform-based enterprises across diverse industries representing varied contexts. Data collection follows a triangulation approach (Eisenhardt, 1989; Yin, 2009), including semi-structured interviews with entrepreneurs, growth managers, and GH experts, supplemented by organizational reports and publicly available resources. The fsQCA method is chosen for its ability to analyze causal complexity and identify equifinal pathways where multiple configurations of conditions lead to the same outcome (Ragin, 2009).

The findings reveal four distinct configurations of DDDM dimensions that lead to successful GH implementation. Each configuration represents a unique combination of conditions, highlighting the multifaceted nature of data-driven growth strategies. Solution 1 highlights the critical role of robust data collection tools, alongside learning orientation, proactive process management, and internal and external knowledge integration. Solutions 2 and 3 demonstrate that technical expertise and prompt decision-making can compensate for the absence of proactive process management, while proactive process management can offset slower decision-making speeds. Solution 4 emphasises the sufficiency of strategic agility, with prompt decision-making and process management compensating for the absence of technical skills. Notably, advanced analytics capabilities, such as AI and machine learning, were found to be redundant in achieving growth hacking success, suggesting that while beneficial, they are not universally necessary. Furthermore, the analysis identifies learning orientation, internal and external knowledge integration, and proactive process management as necessary conditions for successful GH implementation. These conditions are foundational prerequisites that enable organizations to extract value from data, integrate knowledge across functions, and execute GH strategies effectively.

This research extends GH literature (Bargoni et al., 2024; Cristofaro et al., 2025; Santoro et al., 2024; Troisi et al., 2020) by employing fsQCA to examine how dimensions of DDDM contribute individually and configurationally to achieving effective GH outcomes. It provides a novel perspective by dissecting DDDM into its core dimensions and identifying their configurational pathways that lead to successful GH implementation. The identification of necessary conditions complements existing literature, emphasizing the criticality of these dimensions in DDDM.

From a practical standpoint, the findings provide actionable guidance for platform-based enterprises aiming to optimize their GH strategies through DDDM. Enterprises should introduce mechanisms to encourage the presence of necessary conditions, such as learning orientation, knowledge integration,

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and proactive process management. Training initiatives, multi-channel data collection strategies, and upskilling the workforce in data analysis and decision-making are recommended. The equifinal pathways revealed in this research suggest that enterprises should tailor their data-driven approaches based on their unique strengths and resource constraints, leveraging alternative pathways to achieve growth hacking success. Future research could investigate the configurations leading to unsuccessful outcomes to provide a more comprehensive understanding of GH dynamics. Additionally, replicating the analysis on larger and more diverse samples could enhance the generalizability of the findings. Investigating the role of emerging technologies, such as AI and machine learning, in enhancing the identified necessary and sufficient conditions could yield actionable insights for forward-looking organizations.

Keywords: Growth Hacking, Big data, Digital transformation, Experimentation process, QCA, Growth strategies, Business growth, Decision-making, Data-driven

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DE-GLOBALISATION AND SUPPLY CHAIN

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ABSTRACT

The international business landscape, which for a considerable period was marked by continuous expansion driven by globalisation, has undergone a significant transformation in recent years. The ease with which companies established cross-border operations, the flow of products between continents and the creation of complex global production chains, once focused on optimising efficiency and reducing costs in an apparently open and collaborative international environment, have been called into question by a series of global events. Financial crises, rising geopolitical tensions, social movements critical of globalisation and, particularly, the COVID-19 pandemic have exposed the fragility of this model. The international environment has become less stable and more unpredictable, with a growing focus on national interests, economic security and strategic autonomy, to the detriment of multilateral cooperation. This context of uncertainty and critical reflection has put supply chains in the spotlight, revealing that their former great strength - being global and efficient - was also their main weakness, given their dependence on distant suppliers, logistical complexity and the just-in-time philosophy.

This study aims to critically analyze how the dynamics of reconfiguration of the global scenario, often referred to as "deglobalisation" or "slowbalisation", are affecting the organisation and management of supply chains. Deglobalisation is presented as a process of weakening interdependence between nations at the macroeconomic level, driven by multiple crises such as the refugee crisis in Europe, Brexit, the COVID-19 pandemic and the Russia-Ukraine conflict. Deglobalisation is manifested in a decrease in foreign direct investment and trade, as well as protectionist measures. While globalisation has brought advantages such as lower prices and access to markets, it has also generated disadvantages such as unemployment and environmental problems, leading to the concept of slowbalisation, a sharp slowdown in the growth of globalisation.

The indicators of deglobalisation are visible both economically and politically. Economically, there has been a slowdown and even a decline in international trade flows and foreign direct investment in relation to global GDP, marked by the 2008-2010 crisis. Despite the relative stability of trade in goods and services, FDI flows have decreased, being partially replaced by data and knowledge flows. Politically, the increase in protectionist measures, such as the US-China trade war, demonstrates a shift towards controlling global value chains and stimulating local economies. This protectionism, which includes tariffs, quotas and non-tariff barriers, as well as less traditional measures such as subsidies and

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industrial policies, contrasts with the consensus opinion among economists about the superiority of free trade. In addition, stricter investment policies, especially in technology-intensive sectors and against specific investors for national security reasons, and the rise of nationalist and populist sentiments, such as Brexit and the "America First" policy, contribute to a less favourable environment for globalisation.

In the context of the previous hyperglobalisation, supply chains were optimised for cost efficiency, characterised by geographical extension, a focus on efficiency, a just-in-time model and dependence on the outside. However, the pandemic, the Russia-Ukraine conflict and geopolitical tensions have exposed the vulnerabilities of these chains, driving their reconfiguration. Multinational companies are going through a process of de-internationalisation, readapting their strategies without necessarily abandoning the international market. One of the adaptations observed is re-shoring, the repatriation of production activities to the country of origin, motivated by the mitigation of geopolitical and pandemic risks, increased labour and transportation costs, political pressure and nationalist consumer sentiment. The advantages include shorter delivery times, greater flexibility and control. Near-shoring, the relocation to geographically closer countries, aims to reduce the complexity of the chain, reduce logistical risks and take advantage of cost advantages and access to regional markets. Friend-shoring involves the transfer of production to politically stable and aligned countries, with the aim of guaranteeing supply and reducing dependence on rival or unstable nations. Finally, there is the formation of more regional supply chains, with smaller and geographically close financial communities, seeking a balance between efficiency and resilience, in line with the realist theory of the emergence of regional economic blocs.

The methodology used in this study involved a systematic literature review (SLR) to analyze the available evidence on the interaction between deglobalisation and supply chains. The process was divided into three stages: assembly (identification and collection of literature), organisation (filtering and selection of relevant studies) and evaluation (analysis and presentation of the synthesised literature). The search was carried out in the Scopus and Web of Science databases, using the keywords "de-globali*" OR "anti global*" AND "supply chai*" OR "value chai*", limiting the search to publications in English. The selected articles were read in full, and their main contributions were summarised.

The results of the analysis reveal a consensus among the authors on the relevance of deglobalisation as a global trend, driven by political and geopolitical factors (protectionism, nationalism, tensions between powers, national security), economic, social (inequality, public discontent) and environmental (global crises, sustainability). In the political sphere, protectionism and anti-globalisation policies are central, with multinational companies seeking to influence trade policies in a context of growing

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protectionism and trade resistance. The resurgence of nationalism and populism drives policies focused on domestic interests, reflecting discontent with the results of globalisation. Geopolitical tensions, especially the US-China rivalry and the conflict in Ukraine, fragment the global order and increase uncertainty. Concerns about national security and sovereignty lead to greater state interventionism and economic restrictions.

Social and environmental factors also play a crucial role in deglobalisation. Global crises, such as the COVID-19 pandemic, have exposed vulnerabilities and accelerated deglobalisation trends. The perception that globalisation has exacerbated social inequality and public discontent fuels reactions against economic openness. The perception that globalisation has exacerbated social inequality and public discontent fuels reactions against economic openness. Growing environmental awareness and the climate crisis highlight the unsustainability of long value chains, encouraging more local and sustainable solutions. The analysis of the selected articles highlights the complexity and interconnectedness of these factors in the reconfiguration of supply chains in a changing world.

Five tables are going to present the main results categorised by: globalisation main drivers; Political factors; Social and environmental factors; economic factors; and technological factors.

Keywords: Deglobalisation; Supply Chain; International Business; Slowbalisation; Geopolitical Tensions; Protectionism

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SHAPING ENTREPRENEURIAL CAREER ASPIRATIONS IN TIMOR-LESTE: EXTENDING SOCIAL COGNITIVE CAREER THEORY WITH ENTREPRENEURIAL IDENTITY AND SOCIOCULTURAL CONTEXTS

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ABSTRACT

The Democratic Republic of Timor-Leste, also known as Timor-Leste, is a young Southeast Asian country located in the eastern part of Timor Island, north of Australia. With over 64.6% of its population under the age of 30, Timor-Leste today faces a pressing challenge of high youth unemployment and limited formal job opportunities due to the lack of industrial diversification, over-reliance on agriculture, and limited access to quality education and employment

In response to this challenge, entrepreneurship has been promoted as a viable pathway for job creation and economic diversification for the youth. However, certain structural and sociocultural barriers hinder young people in Timor-Leste from choosing entrepreneurship as their career. The traditional local norms that strongly emphasize collective responsibility and family loyalty may lead individuals to prioritise familial obligations or opt for more secure employment paths. Current societal norms also overwhelmingly favor government jobs or traditional professions, even stigmatizing entrepreneurship as a risky or unstable career path.

To explain the interacting personal and environmental factors that shaped the entrepreneurial career aspirations of the young people in Timor-Leste we turn to Social Cognitive Career Theory (SCCT) by Lent, Brown, and Hackett (1994). SCCT explains career development as the outcome of self-efficacy beliefs and personal goals. In entrepreneurial contexts, these constructs translate into confidence in one's ability to perform business-related tasks and beliefs about the likely rewards or risks of pursuing self-employment. These cognitive factors are shaped by previous learning experiences, exposure to role models, and the quality of social support systems (Bandura, 1986). SCCT is particularly valuable for understanding how individuals form intentions and commit to career paths, especially under conditions of uncertainty and limited resources.

Nonetheless, recent scholarships suggest that other potential mechanisms such as entrepreneurial identity may also explain entrepreneurial career aspirations. Entrepreneurial identity, defined as the internalization of an entrepreneurial role into one's self-concept, plays a crucial motivational role in sustaining entrepreneurial behavior (Farmer et al., 2011). This identity is shaped by exposure to entrepreneurial models, supportive educational environments, and positive feedback from social

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networks. A strong entrepreneurial identity enhances persistence, goal clarity, and resilience in the face of failure, factors not fully explained by SCCT's original constructions. Integrating entrepreneurial identity into the SCCT framework allows for a more holistic understanding of entrepreneurial career aspirations, particularly in culturally complex contexts like Timor-Leste.

This study addresses both empirical and theoretical gaps by investigating the entrepreneurial career aspirations of Timorese youth through an extended SCCT framework. In this study, we propose a conceptual framework connecting entrepreneurship education and entrepreneurial career aspirations (ECA) through three potential mechanisms: Self-efficacy, outcome expectations, and identity formation. Moreover, to capture the contextual factors that affect ECA in Timor-Leste, we investigate the effect of sociocultural factors as the moderating variables that may weaken ECA.

Employing a quantitative approach, this study employs survey data from around 400 final-year university students in Timor-Leste who have completed entrepreneurship-related subjects. Data will be analysed by using Partial Least Squares (PLS) to test the three proposed mechanisms and elements of sociocultural aspects that weaken the effect of education on ECA.

In doing so, this study makes a significant theoretical contribution by introducing entrepreneurial identity as a third critical mediating mechanism. In addition, this study reveals important contextual factors that hinder the development of entrepreneurship in Timor-Leste. This empirical contribution is important given that there is a lack of verified information regarding entrepreneurial career aspirations among youth in Timor-Leste. This poses a challenge for policymakers and educators, making it difficult to design targeted programs to encourage entrepreneurship or support other career aspirations among Timor-Leste youth. Understanding these career aspirations is critical, as fostering the ambition to become business leaders can be pivotal in transforming Timor-Leste's economic landscape. Programs that nurture entrepreneurial intent and leadership abilities will be essential in helping young people in Timor-Leste pursue business leadership roles (Ratten & Jones, 2018). Without a deeper understanding of these aspirations, Timor-Leste risks underutilizing its most important resource, its youth.

Keywords: Entrepreneurial career aspirations, entrepreneurial identity, Social Cognitive Career Theory (SCCT), self-efficacy, developing economies, Timor-Leste, youth entrepreneurship, sociocultural factors

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REVERSE (POSITIVE) DISCRIMINATION AND THE AGENDA OF GENDER EQUALITY. *A THEMATIC ANALYSIS*

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ABSTRACT

We are yet to achieve gender equality in workplaces (Hjálmsdóttir and Bjarnadóttir, 2021). Workplace gender equality refers to equal opportunities in hiring, promotions, pay, and equal access to policies and benefits without any discrimination or bias (Coron, 2020; Fransson and Thörnqvist, 2006). In the quest to attain equality through equity, various anti-discrimination approaches have been taken by organizations, albeit in vain. As per the gender global gap report 2022 by the World Economic Forum, it will take another 132 years to reach full parity (World Economic Forum, 2022). A by-product of these approaches is reverse discrimination, which pertains particularly to affirmative action and is also known as positive discrimination (Noon, 2010). It refers to a practice of providing preferential treatment or privileges to individuals who belong to historically disadvantaged groups, such as females (Sher, 1975). In addition to this positive connotation, it also implies that a group is getting an advantage at the expense of another group and, therefore, is referred to as reverse discrimination.

Unlike women, men are not granted the same instrumental freedoms (Sen, 1999). For men, the socio-political environment has not changed much. While girls receive messages like 'you can be anything,' boys are still dancing to the tunes of the obsolete breadwinning model. Since institutions and organizations are backward-looking, specifically regarding equality and justice, they formulate policies and procedures based on the injustices suffered by a more traditional society than ours. Consequently, they are incapable of discerning what is currently wrong in the present and hence lack the required capability to design policies suitable for addressing current needs (Gagnon and Cornelius, 2000).

Reverse discrimination is one such confound of the short-sightedness. The essence of anti-discrimination approaches has seen a significant shift from providing equal opportunities to reversing the discrimination. Using reflexive thematic analysis (RTA) (Braun and Clarke, 2019, 2021), we attempt to examine the impact of this shift on the perception of equality and its overall narrative. Drawing on the experiences of the participants, we attempted to generate insights on how reverse discrimination is enacted and espoused in organizations and how it impacts felt fairness.

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Keywords: Reverse discrimination, positive discrimination, equality, gender equality, reflexive thematic analysis.

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PHYSICAL ATTRACTIVENESS AND PERFORMANCE: AN INDIVIDUAL-LEVEL PERSPECTIVE

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ABSTRACT

INTRODUCTION AND PURPOSE

Physical attractiveness (PA), a characteristic that is, in most cases immutable, has the power to impact personal and work outcomes in an individual's life (Judge, Hurst, & Simon, 2009). The consequences of PA are pervasive, enduring, and substantial (Patzer, 2012). In the management literature, PA has been defined as "the degree to which one's facial image elicits favorable reactions from others" (Morrow, 1990, p. 47). Academic researchers have reported both positive and negative effects of PA on several work outcomes like promotion (see Beehr & Gilmore, 1982; Graham, Harvey, & Puria, 2017; Hosoda, Stone-Romero, & Coats, 2003; Ruffle & Shtudiner, 2015). Additionally, factors like sex (Heilman & Saruwatari, 1979; Rosenblat, 2008), acknowledgment of beauty (Johnson, Sitzmann, & Nguyen, 2014), job type (Eagly, Ashmore, Makhijani, & Longo, 1991), and instrumentality (Lee, Pitesa, Pillutla, & Thau, 2015) have been found to moderate the relationship between PA and various workplace outcomes like recruitment and selection.

Broadly, the literature on PA has mainly focused on the demand side of attractiveness advantage wherein the advantage is attributed to either taste-based discrimination or statistical discrimination, or both (Nault, Pitesa, & Thau, 2020). The reason for discrimination is the associations made by the perceiver (demand side) between beauty and positive attributes like intelligence. These attributions stem from *beauty is good* stereotype resulting in taste-based discrimination which suggests that perceivers like to be near attractive people (Mobius & Rosenblat, 2006), or statistical discrimination which suggests that perceivers have higher expectations from attractive individuals because of the positive attributions (Nault et al., 2020). These associations imply that the attractiveness advantage is granted only due to the stereotype and perception of others. The literature fails to take into account the ability and resources of the supply side, i.e., the physically attractive individuals. For example, literature has reported a wage difference between physically attractive individuals and lesser attractive individuals (Hamermesh & Biddle, 1993). The difference was attributed to the discrimination and the association made between beauty and positive characteristics. However, the literature failed to consider that the difference might be because of the confidence or skilled negotiation done by the physically attractive individual (Mobius & Rosenblat, 2006).

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Management literature lacks the examination of the supply side of attractiveness advantage. We argue that over time physically attractive people develop small yet actual differences in abilities and skills, thereby legitimizing the beauty is good stereotype. We draw on the Pygmalion effect, a special case of self-fulfilling prophecy to explain this phenomenon (Kierein & Gold, 2000; Merton, 1948). The attractiveness advantage is a result of the development of actual abilities in physically attractive individuals to fulfill the expectations of others arising out of taste-based and statistical discrimination.

To test this proposition, we have examined performance, an organizational outcome around which work and organizational psychology revolve (Sonnentag & Frese, 2002). Performance is defined as "what the organization hires on to do, and do well" (Campbell, McCloy, Oppler, & Sager, 1993, p. 40). It is a multidimensional concept that encompasses both action and evaluation which suggests the association with ability, *actual ability,* and not perception (Motowildo, Borman, & Schmit, 1997). Since physically attractive individuals develop superior abilities to fulfill the expectation of others, we argue that physically attractive individuals will perform better than lesser attractive counterparts.

Further, we examine a moderating role of sex on the relationship between PA and performance. We argue that specifically in the workplace females are not able to harbor the advantage of beauty. They are under constant stereotype threat on the account of being a female and being beautiful (Spencer, Logel, & Davies, 2016). Social identity of being a beautiful female becomes salient in a workplace setting and inferences about fit and gender (sex) role violation are made (Heilman, 2012). These inferences affect cognitive functioning (Roberson & Kulik, 2007) and hence, weaken the relationship between PA and performance for females.

THEORETICAL BACKGROUND

The study draws on self-fulfilling prophecy and stereotype content model to formulate the hypotheses and explain the relationships between the study variables. Earlier studies have reported discrimination as the key reason for attractiveness advantage in workplaces (Nault et al., 2020). This study examines a positive relationship between PA and the performance of an individual. Physically attractive people actually develop instrumental skills because of the discrimination which helps them to perform better. Hence, organizations being performance-driven systems, PA becomes a valued characteristic. The study also examines how the relationship between PA and performance differs based on sex.

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METHODOLOGY

We collected data on all the study variables from MBA students studying in one of the top management schools in India. The management school was accredited with AACSB, EQUIS, and AMBA. The students appear for an entrance examination to get a seat in the institute. We collected the data from students and official records after getting due consent. We maintained confidentiality while collecting and analyzing the data. Since each organization (or teacher) differs in the baseline criteria for evaluating people, we restricted our sample to one organization and one batch. The boundaries make the comparison based on the performance, more reliable, and valid (Landy & Farr, 1980).

Prior studies have raised concerns about the lack of studies in a natural setting (Gordon, Slade, & Schmitt, 1986; Peterson, 2001). To strengthen our conclusions for broader generalizability, we also conducted a field study among the full-time employees of a multi-national organization. The organization has been in operation for over 30 years, specialized in energy, including solar energy, storage, and management solutions, and sold its products in over 36 countries.

FINDINGS AND CONTRIBUTION

The primary purpose of this study is to advance the research on PA, specifically on the supply side of the attractiveness advantage. The results indicate that physically attractive individuals are able to perform better than their lesser attractive counterparts.

Furthermore, results reveal that beauty is not beneficial for women in both the study contexts. In an organizational context, beauty becomes beastly (Heilman & Saruwatari, 1979) for women due to the inferences made about fit (Heilman, 2001). This study helps us understand how PA creates stereotype threat for women and hinders performance by disrupting cognitive processing.

Clearly, there is evidence that physically attractive individuals are treated favorably. This study provides one plausible explanation of why this is the case. Evidence from this study suggests that PA impacts individual performance. Beauty is good stereotype is legitimized through a causal mechanism of self-fulfilling prophecy. The study provides evidence for a self-fulfilling prophecy by showing that physically attractive people perform better because of the treatment they received in their earlier days. This study opens up a different avenue in the research on PA by emphasizing that the attractiveness advantage is not just because of the perception of others.

Keywords: physical attractiveness, performance, self-fulfilling prophecy, sex, beauty

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EXPLORING MERCURY AND NEW HORIZONS FOR BUSINESS

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ABSTRACT

The current study focuses on the specific case of the planet Mercury, whose study and exploration are extremely difficult, and also explores business activity and perspectives on the matter. For instance, on July 18, 2025, news reports indicated that scientists had potentially identified the first meteorite debris from Mercury found on Earth. The candidate meteorite, reportedly discovered in North Africa, is undergoing rigorous verification by the international Meteoritical Society's Nomenclature Committee. If confirmed, this would be a landmark discovery, as Mercury's high gravity and proximity to the Sun make ejecting material into space extremely difficult - explaining why no meteorites from the planet have been definitively identified before.

The expansion of the space economy has emerged as a transformative domain for innovation, business foresight, and strategic autonomy. As exploration of celestial bodies increasingly intersects with business strategy, the European Union must adapt its fragmented institutional landscape to remain competitive in a new era of public-private collaboration and geopolitical rivalry (Papantoniou, 2023). This study proposes a re-evaluation of Mercury, the innermost and least understood planet in the Solar System, as a case study in how strategic neglect may conceal economic potential. We propose that the term "deprived planet" be introduced for the first time and established in academic discourse for this still mysterious, closest planet to Earth. The novel concept of the "deprived planet," introduced here, identifies Mercury as marginalized both scientifically and economically, yet potentially rich in symbolic and practical opportunities. Of course, anything that remains in the dark may contain economically exploitable challenges and opportunities. In business and management scholarship, emerging domains like the space economy are vital to future-proofing strategy and leadership curricula. The Mercurian case illustrates how scientific underinvestment correlates with underdeveloped economic models and cultural disengagement. The characterization of this celestial body as a "deprived planet" is not limited to the astronomical context but operates on multiple levels: technological, commercial, and symbolic. It highlights the asymmetries in exploration priorities and the potential for reframing lesser-known celestial bodies as sites of innovation and narrative potential. This reconceptualization also intersects with the broader academic discourse on foresight and strategic planning. Management theory often emphasizes anticipatory governance and long-term scenario planning. To date, mankind has experienced the near-total marginalization of Mercury. This lack of

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interest and knowledge provides a metaphor for the risks of short-term thinking in innovation and public investment. Europe's hesitation to mobilize its space capacity toward a cohesive strategy mirrors similar inertia in other domains, such as the mainstreaming of AI or the challenge of green technology, where fragmented policies limit impact (Loesekrug-Pietri, 2023). The BepiColombo mission, produced by two mainstreaming agencies, ESA and JAXA, and scheduled to enter Mercury's orbit in December 2025, offers an important lens through which to explore how scientific exploration can inspire economic models, public engagement, and narrative innovation (Benkhoff et al., 2010). Unlike missions to the Moon or to Mars, Mercury has seen minimal scientific and cultural investment, earning it the designation of a "deprived planet," an emphatic term coined here to reflect its marginal role in both science fiction and planetary science. This neglect has implications not only for knowledge production but also for the soft power and strategic identity of Europe in space affairs. While the United States fosters commercial participation in its Artemis program and lunar projects, including initiatives such as Intuitive Machines' Odysseus lander (Kluger, 2024), Europe continues to operate under divided leadership between a specialized international organization of classical nature, such as ESA, and the sui generis institution that is the European Union, which has historically focused on economic projects rather than on other domains, including outer space exploration. Regulation (EU) 2021/696 and Article 189 TFEU have recently granted the EU formal competence in space policy, yet significant challenges remain in transforming this competence into visionary leadership (Maniatis, 2024). Furthermore, it is worth noting that Mercury's neglect in science fiction literature signals the lack of compelling narratives needed to galvanize public support and investment. Compared to Mars or Venus, Mercury appears far less frequently in speculative futures, despite early references such as H.G. Wells's *A Story of the Days to Come* (1897), which hinted at Mercurian colonization. This lack of mythos underscores a missed opportunity to integrate cultural storytelling into business strategies for space (Nelson, 1997). The engagement of the public is crucial not only in conventional aspects of the business sector on Earth but also in the controversial domain of space exploration and economy. Another underexplored dimension is the potential of cross-sector storytelling and science fiction in entrepreneurship. Fictional engagement has historically influenced technological imagination, as seen with the Moon and Mars. The lack of Mercurian narratives limits the soft power and outreach necessary to build space-related entrepreneurial ecosystems. Companies entering the space sector need cultural frameworks that resonate with public imagination, policymakers, and investors alike. Lastly, by integrating Mercury into Earth-centric missions, such as Earth observation and data-processing strategies, it is possible to bridge high-cost planetary missions with concrete business applications. Technological spin-offs from the BepiColombo mission, particularly in ion propulsion,

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autonomous navigation, and planetary mapping, could find use in Earth-based industries such as logistics, energy, and geoinformatics (Benkhoff et al., 2010).

Last but not least, Japan's centralized model under JAXA illustrates how institutional cohesion in public management can amplify national goals in space exploration, public communication, and industry participation. In contrast, Europe's dual governance and space law pose challenges to developing a coherent space economy. Learning from Japan's governance history could improve Europe's ability to attract investment, coordinate missions, and embed space exploration into its broader digital and green transitions (Loesekrug-Pietri, 2023).

Keywords: BepiColombo; entrepreneurship; Mercury; science fiction; space economy; space law

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SATELLITES AND NEW HORIZONS FOR BUSINESS

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ABSTRACT

Artificial satellites first appeared in the realm of science fiction with Edward Everett Hale's *The Brick Moon* (1869), a short story that anticipated, nearly a century in advance, the launch of Sputnik I in 1957. That historical launch marked the beginning of the modern era of both space science and space law. Although no dedicated subgenre of science fiction focuses exclusively on satellites, these devices frequently feature in broader space narratives and have been popularized in mainstream culture by works such as the 2013 film *Gravity*, which reignited public interest in space exploration. Today, satellite technology underpins a wide array of economic activities, ranging from global telecommunications and Earth observation to navigation systems and autonomous supply chains. Satellites serve both symbolic and functional roles within economic globalization and have become integral to business management analysis (McDougall, 1985). Furthermore, the space economy has recently incorporated emerging sectors such as space tourism (Maniatis, 2024). This research examines artificial satellites from an economic and managerial perspective, identifying new horizons for business. In this context, satellites are reframed as both technological tools and managerial constructs.

In the contemporary business ecosystem, satellites are no longer merely external instruments but are embedded within integrated corporate strategies. Their growing commercialization and privatization, especially through NewSpace initiatives like Starlink, illustrate the rise of orbital services as competitive business sectors (Loesekrug-Pietri, 2023). Moreover, the satellite economy delivers mission-critical functionality for location-based services, intermodal logistics, real-time data intelligence, and coordination of autonomous vehicles. These advancements are foundational to the evolution of platform economies and adaptive value chains. At the center of this transformation is the role of Global Navigation Satellite Systems (GNSS). Systems such as GPS (United States), Galileo (European Union), GLONASS (Russia), and BeiDou (China) support business models across sectors including transport, telecommunications, agriculture, and fintech. They enable fine-tuned optimization of supply chains, fleet management, mobile payments, and geofencing for marketing strategies. Notably, despite early setbacks caused by private sector withdrawal, the Galileo system has now reached operational reliability and ensures strategic autonomy for the European Union (Papantoniou, 2023). This example highlights how satellite systems contribute not only to technical operations but also to the political economy of strategic independence. Beyond their practical

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applications, satellites can also be analyzed conceptually through the neologism *doryphorical*, introduced in this study. Derived from the Greek "δορυφορικός", the term describes orbiting or satellite-like behaviors, whether physical, economic, or organizational. It applies to actors or infrastructures that revolve around central hubs while performing supporting or data-driven roles. In business theory, doryphorical structures may include platform-dependent app developers, logistics contractors tied to anchor firms, or analytics modules orbiting a decision-making core. While the term is initially proposed in the context of space technology, it also offers broader utility for economic analysis. It provides a novel framework for exploring the interdependence between peripheral and core agents within digital capitalism. Satellite data has also become a commercial asset across several industries. In agribusiness, Earth observation data supports yield forecasting and precision agriculture, a critical tool for a vulnerable sector heavily reliant on public subsidies. In the insurance industry, satellite imagery aids in risk assessment and disaster modeling. In environmental compliance, high-resolution sensors enable real-time ESG monitoring, which increasingly influences firm valuation and investor behavior. These applications underscore not only the technical capacity of satellites but also a shift in how economic visibility and traceability are defined (Loesekrug-Pietri, 2023). This business relevance is echoed in popular culture, where satellites are portrayed as both enablers and risks. The aforementioned blockbuster *Gravity* dramatizes a catastrophic cascade of orbital debris, a scenario based on the real "Kessler Syndrome". Proposed by NASA scientist Donald J. Kessler in 1978, the syndrome envisions a domino effect in space: one collision generates debris, which in turn causes further collisions, potentially rendering entire orbital regions unusable. Such representations convey both fascination with and dependence on satellite infrastructure, which has come to symbolize technological fragility and systemic risk (Brody, 2013).

This study ultimately advocates for the convergence of legal, economic, and cultural perspectives on satellite-enabled business. While international space law, particularly the Outer Space Treaty (1967) and the Liability Convention (1972), frames State responsibilities, evolving business models call for updated national and supranational regulations. In the EU, Article 189 of the Treaty on the Functioning of the European Union (TFEU) and Regulation (EU) 2021/696 indicate growing institutional engagement, albeit within the limits of supporting competence (Papantoniou, 2023). As orbital infrastructures become more commercialized and decentralized, legal frameworks must adapt to business realities, addressing risk management, contractual accountability, and data governance.

In conclusion, satellites function as both tangible and symbolic drivers of business transformation. They are not only vehicles of innovation and control but also metaphors for the structural logic of modern economies: interconnected, layered, and orbitally organized. Reframing them through a

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business lens highlights their role as *doryphorical* infrastructures, entities that revolve around centers of capital and decision-making, while enabling distributed and coordinated action. The future of satellites, therefore, is not solely technical; it is also managerial, with implications for both the public and private sectors amid advanced globalization. On the basis of this analysis, the proposed introduction of the English neologism *doryphorical* offers a useful conceptual tool for research in management and economics. Lastly, artificial satellites warrant a systematic strategy for popularization and public engagement, which could be promoted through the development of dedicated science fiction literature.

Keywords: business; doryphorical (δορυφορικός); Global Navigation Satellite Systems (GNSS); satellites; science fiction; space law; strategic autonomy

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SHIPWRECKS, SUSTAINABILITY AND NEW HORIZONS FOR BUSINESS

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ABSTRACT

In countries like Greece, endowed with both historical and recent shipwrecks, shipwrecks are attracting growing attention (Tripontikas, 2016). The present study focuses on shipwrecks in light of the fundamental principle of sustainability, in combination with the emergence of new horizons in business. In 2022, Greece designated 91 wrecks, mainly of ships but also of aircrafts, as underwater cultural monuments, aiming to develop diving tourism within maritime zones under national sovereignty. These efforts are visualized in Figure 1, which maps the distribution of shipwrecks and their legal status.

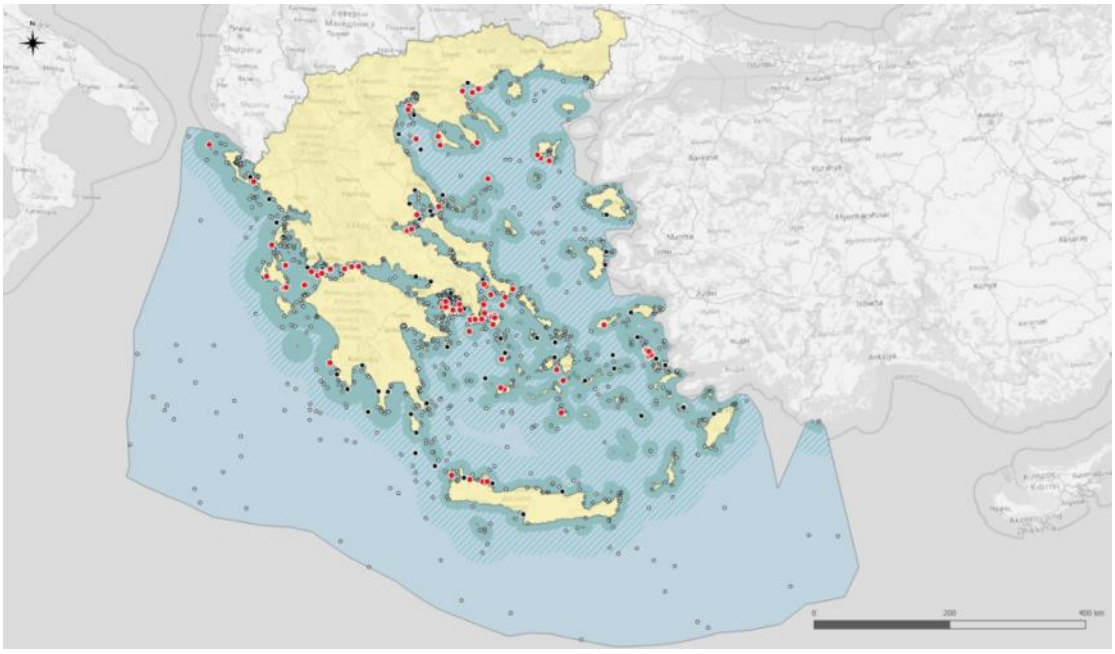


Figure 1. *Map of shipwrecks in the Greek seas*

Territorial sea (or territorial waters) with blue, contiguous zone hatched, Exclusive Economic Zone (EEZ) with light blue; red dots refer to the 91 designated wrecks as historical monuments; black dots refer to 104 historical wrecks; white dots refer to 1513 charted wrecks (Data: Open Street Map, Marine Regions, UK Hydrographic Office).

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Beyond cultural tourism, however, the issue of shipwrecks intersects with sustainability and marine safety. Many modern wrecks, such as the *SEA DIAMOND* cruise ship in Santorini or the *IRENES SERENADE* tanker in Pylos, continue to pose risks to ecosystems, navigation, and even business development, many years after sinking. These cases illustrate the dual character of wrecks, as both heritage assets and potential environmental hazards. Consequently, shipwrecks present a paradox: they are simultaneously sites of attraction and sources of concern. The Nairobi International Convention on the Removal of Wrecks (2007), the first binding multilateral treaty addressing wreck-related hazards, assigns clear responsibility to shipowners, mandates compulsory insurance, and allows coastal States to intervene in their EEZs. Notably, it empowers States to designate wrecks as hazardous not only when they obstruct navigation but also when they threaten coastal tourism or environmental interests. However, as of 2025, Greece has not acceded to this Convention, relying instead on its domestic Law 2881/2001, which imposes similar duties on wreck owners but lacks the broader enforcement architecture of the Nairobi text. Comparatively, Cyprus has acceded to the Nairobi Convention, since 2015. It offers a useful counterpoint through its internationally recognized management of shipwrecks for both heritage and business purposes. Ancient and modern wrecks, such as the *Kyrenia Ship*, which was discovered in 1965, and *ZENOBIA*, have become high-value attractions, integrated into the tourism and underwater archaeology sectors. Cyprus's legal and operational framework supports sustainable diving tourism as a modern business sector, while regulating environmental impacts and preserving underwater cultural heritage, even in the absence of participation in the 2001 UNESCO Convention on Underwater Cultural Heritage. In Greece, recent ministerial decisions, such as the 2023 regulation on artificial reefs (artificial reef deployment) and wreck placement (ship scuttling), confirm the State's strategic interest in developing the diving economy through novel underwater attractions. This regulation authorizes the deployment of vessels, including hazardous ones, to serve as fish shelters and diving points, but applies only within areas of national sovereignty, excluding the EEZ. While these initiatives promote marine tourism, they also underscore regulatory fragmentation and the need for a coherent, long-term policy, particularly as environmental risks become more pressing. The *IRENES SERENADE* wreck in Navarino Bay (1980), which caused one of the largest oil spills in Mediterranean history, remains emblematic. Located near the underwater archaeological site of the pivotal 1827 naval battle, it represents a convergence of environmental disaster, cultural memory, and economic potential. Despite the severity of the spill and repeated calls for action, no full removal has taken place. Today, the concept of sustainability demands an interdisciplinary response, blending law, business innovation, cultural policy, and environmental management. In this context, shipwrecks emerge as testing grounds for new business models that integrate ecological restoration, cultural promotion, and maritime safety. Business

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horizons can be expanded through underwater museums, heritage diving trails, and sustainable marine infrastructure, pro-vided there is legal clarity, environmental responsibility and stakeholder cooperation.

To sum up, a forward-looking regulatory and economic approach, grounded in international norms and adapted to regional needs, can turn submerged risks into sustainable opportunities. Greece should establish an "archaeological contiguous zone," which would be beneficial *inter alia* for the French shipwreck *FLORÉAL* (Maniatis et al., 2022), become a State Party to both the Nairobi Convention and the 2001 UNESCO Convention, and review high-risk shipwrecks like the *IRENES SERENADE*. Last but not least, a general "contiguous zone" would be useful in addressing illegal economic practices, such as violations of tax and customs law.

Keywords: artificial reef deployment; business; maritime law; recreational diving; removal of wrecks; ship scuttling; shipwrecks; sustainability; tourism; underwater cultural heritage

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THE ROLE OF ARTIFICIAL INTELLIGENCE IN CREATIVE LEARNING: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Creativity is a key 21st-century skill, valued for innovation, problem-solving, and adaptability. AI tools like generative models and adaptive feedback systems have transformed how students develop creative skills and engage with knowledge. Using the PRISMA methodology, a structured search in SCOPUS and WoS (2015–2024) resulted in 16 relevant publications after removing duplicates and unrelated content. The analysis focused on theoretical frameworks, implementation strategies, and AI's impact on creativity and ethical challenges.

Regarding the relationship between AI and creativity, Kanakulya (2024) notes that AI can reshape creative processes but not replace human creativity. This aligns with Beghetto's (2019) concern that standardized assessments may restrict creative expression. Henriksen et al. (2024) reinforce this by advocating for a holistic approach that combines creativity and sustainability in education, with AI acting as a catalyst for new creative processes. Savvani and Liapis (2019) show how educational games with AI tools stimulate creativity and critical thinking by encouraging problem-solving strategies. Lim et al. (2024) also show that students' drawings were more creative than AI-generated ones, but AI allows students to explore different artistic approaches.

AI's capacity for personalization also emerges as a key theme. Medina-Zuta et al. (2023) highlight AI's ability to adapt learning environments to individual needs, and Ali et al. (2024a) show that text-to-image AI tools enhance visual creativity. Collaborative learning also benefits from AI integration, as demonstrated by Daungcharone et al. (2023) and Tantry et al. (2024), who found that AI tools boost motivation and problem-solving skills. Alves Moreira et al. (2019) add that AI-supported artifact creation stimulates critical thinking and practical creativity. Finally, Ali et al. (2024b) illustrate how AI-assisted narrative creation enables students to explore new forms of creative expression.

Truesdell et al. (2023) show that AI enhances creative expression and artistic development. Mahapatra et al. (2021) report that AI-supported flipped classroom models increase student engagement and creativity by offering greater control over learning. Ragone et al. (2024) suggest that AI creates more inclusive learning environments, but Raimi et al. (2024) warn that excessive automation may homogenize creativity. Imadi et al. (2023) find that AI literacy increases creativity and problem-solving capacity.

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Despite its benefits, AI in education raises ethical and social concerns. Beghetto (2019) warns that standardized assessments may undermine originality and critical thinking. Ali et al. (2024a) highlight algorithmic bias and data privacy issues, while Truesdell et al. (2023) warn that automation could replace creative professionals. Henriksen et al. (2024) emphasize the environmental impact of AI, stressing the need for sustainable technological practices.

This review shows that AI significantly enhances creative learning by enabling personalization, experimentation, and innovation. It fosters critical thinking, problem-solving, and artistic expression through generative models, personalization tools, and collaborative approaches in basic and higher education. However, challenges remain regarding ethics, data privacy, and over-reliance on automation. Future research should focus on AI models that preserve human agency, originality, and diversity. Promoting AI literacy among students and educators will be key to navigating AI's role in education.

Keywords: artificial intelligence, creative learning, personalized learning, ethical challenges, education, student engagement

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BUSINESS PROFITABILITY OF RESIN EXTRACTION IN MARITIME PINE STANDS

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ABSTRACT

Pinus pinaster, one of the most important forest species in Portugal, covers approximately 713,000 hectares of mainland territory (ICNF, 2015) and plays an important role in the forestry economy, particularly in the production of timber and resin. Beyond its economic value, resin extraction offers significant environmental and social benefits (Wang et al., 2023), contributing to the sustainability of forestry activities by reducing fire risk and creating employment in rural areas.

This study aims to assess the economic viability of resin extraction in maritime pine stands primarily managed for timber production. Various exploitation scenarios are considered, each defined by different combinations of geographical location, terrain characteristics, and technological and production choices, with the objective of optimizing both timber and resin yields.

This multidisciplinary effort brought together academics and industry specialists, facilitating the identification of various technical operations, their options, and constraints—both during the installation and exploitation phases of the forest stand. Additionally, it enabled the identification of the resulting products and the quantification of associated yields and costs.

The systems analyzed include both the planting of new stands and the management of natural regeneration, which can be thinned at different stages and incorporate various resin extraction methods, namely life and death tapping. Revenue from the sale of both timber and resin was considered. Costs accounted for stand establishment as well as the operational expenses associated with the various forestry activities required for its management.

The technical and economic data were sourced from specialized literature (e.g., Fonseca and Carneiro, 2019), reference cost tables for afforestation, reforestation, forest improvement, and exploitation, developed by the Monitoring Commission for Forestry Operations (CAOF, 2022a, 2022b, 2022c),

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simulations of forest development throughout the production cycle, and the diametric distribution generated by the Modispinaster platform, alongside market research.

The economic and financial indicators calculated include the Net Present Value (NPV) and its annuity, the Internal Rate of Return (IRR), and the Benefit/Cost ratio (B/C), allowing for a comparative assessment of the different logging models.

The results indicate that resin extraction enhances the profitability of forest exploitation and, like thinning, generates annual capital inflows, mitigating the long income gaps associated with timber harvesting. Additionally, the increased presence of workers in the forest, combined with the need to keep areas clear for resin extraction, significantly reduces the risk of wildfires.

Scenarios that incorporated natural regeneration proved to be more advantageous than those relying on planting, as they avoid high initial costs and make better use of natural growth conditions. Among the different resin extraction methods analysed, death tapping—conducted intensively in the final years of the cycle before felling—had the most positive impact on NPV in stands with smaller-diameter trees, thereby maximizing economic returns.

This study has therefore enabled the identification, based on the various variables and contexts analysed, of the scenarios and corresponding practices that ensure optimal use of available resources and maximise the operator's economic performance. The proposed model also represents a significant contribution to the sector, as it integrates technical, economic, and sustainability aspects that had not previously been addressed in this field of research.

Keywords: Business profitability; decision making; maritime pine; production system.

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SUSTAINABLE WINE CONSUMPTION – IMPLICATIONS FROM A GAMIFIED ANALYSIS ON ITALIAN AND AMERICAN GEN-Z

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ABSTRACT

While the wine industry is continuously advancing towards more sustainable practices and production systems (Garcia et al., 2024; Pucci et al., 2020), the debate surrounding consumer preferences for sustainable wine remains highly debated (Kelkar et al., 2024; Pickering, 2023; Schäufele & Hamm, 2017). A substantial body of literature has highlighted the capacity of sustainable attributes to influence consumer preferences; however, the extent of consumers' willingness to pay for these attributes remains unclear (Modica et al., 2025; Sogari et al., 2016). Furthermore, a clear relationship has been identified between sustainability initiatives, social media engagement, and consumers' propensity to purchase wine online (Galati et al., 2019; Pucci et al., 2019), despite the majority of wine consumption still occurring through in-person transactions (Rui et al., 2024). Nevertheless, the literature addressing the factors that influence in-store food consumption is relatively outdated (Jones et al., 2011; Lehner, 2015), despite significant changes in consumer preferences over time, particularly among Generation Z (Aqueveque, 2023; Savelli & Travasi, 2024). This study aims to identify the key factors that influence consumer choices during in-store transactions. Specifically, it investigates the roles of a standard sustainability logo, a bottle-neck label, and sustainability education. Given the industry's growing focus on sustainability, this research targets 95 Gen-Z[1] consumers and employs an experimental design based on the Keynesian beauty contest framework (Duffy & Nagel, 1997). To compare the behavior of Italian and American Gen-Z consumers, we developed a game in which participants were asked to predict the consumption preferences of their peers (Gen-Z of the same nationality) under various scenarios. More precisely, participants estimated the relative consumption (expressed as a percentage) for 12 bottles of wines (sourced from 6 wineries across 3 distinct territories, with 2 bottles per winery and 4 bottles per territory) featuring different prices and attributes across five distinct scenarios. In the first scenario, none of the bottles included references to

[1] Students' age ranges between 20 to 23 years.

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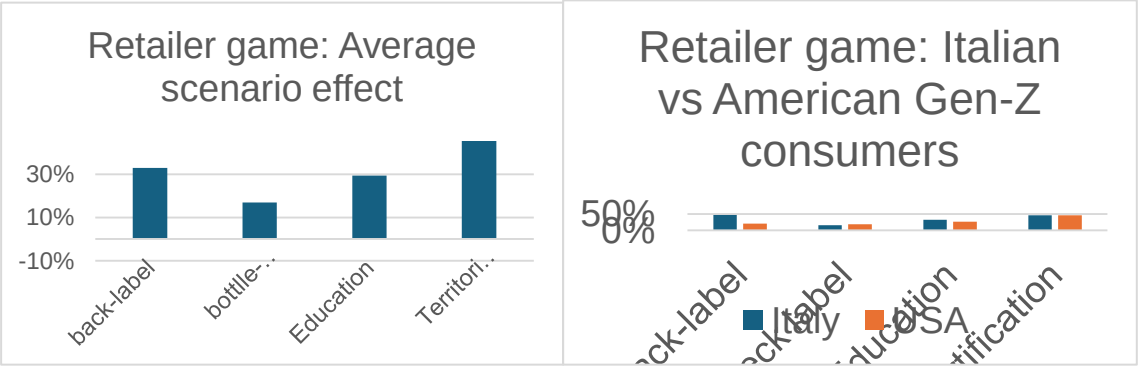
sustainability. In the second scenario, half of the bottles displayed standard sustainability logos on their back labels. The third scenario introduced a bottle-neck green label attached to the sustainable bottles, aiming to assess the impact of this additional visual cue. The fourth scenario mirrored the configuration of the second one; however, consumers were explicitly informed about the characteristics of the sustainability certification under investigation before the consumption phase. Finally, in the fifth scenario, consumers were provided with information distinguishing between certifications at the winery level and the territorial level. In this context, only one winery (2 bottles), located in a certified sustainable territory, displayed a double logo on the bottle-neck label (representing both winery and territorial certification), while the remaining wineries exhibited only the winery-level logo. Participants were informed that their selection would have been compared with the results of a VR experiment in which these settings were really tested among gen-Z consumers of their own country. In this context, consistent with the beauty contest framework, participants were asked to make choices based on their beliefs about the representative Gen-Z consumer rather than their personal preferences. This approach was designed to minimize personal bias regarding the topic. To incentivize effort, given that the participants were students of two different universities (one Italian and one USA), those who predicted consumption most accurately across the various settings were awarded an additional point on their final exam.

To assess the impact of the sustainability logo, we compared the outcomes of the first two experimental settings. Participants, on average, perceived that the logo enhanced sustainable consumption by 33%. However, notable differences emerged between national groups: American participants exhibited significantly lower expectations, estimating an increase of only 20%, whereas Italian participants anticipated a 46% rise. These results enrich the findings of Rui et al. (2024), who observed that sustainable consumption in the United States is more strongly associated with age compared to Italy.

When examining the relative influence of the bottle-neck label (Scenario 3) versus educational interventions (Scenario 4), our analysis revealed that participants generally attributed greater importance to educational aspects over visual cues. Nevertheless, a divergence appeared between the two national groups: American students showed a stronger preference for the visual impact, while their Italian counterparts demonstrated greater trust in educational approaches. This contrast adds depth to the ongoing discussion on the roles of emotions and rationality in consumption behaviour (Genc & De Giovanni, 2021; Zollo, 2021).

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Finally, both American and Italian participants recognized the substantial significance of the sustainability label at the territorial level, attributing an overall increase of over 40% in the number of bottles purchased. This scenario exhibited the highest level of agreement between the two groups. However, their perspectives diverged in interpreting the source of this gain: Americans believed it primarily came at the expense of uncertified corporate products, while Italians speculated a decline among other sustainable offerings. These findings provide critical insights into which consumer segments—those already inclined toward sustainability versus those less committed—are most likely to be influenced by this type of sustainability certification.



While still in its initial stages, this research offers several managerial insights into the role of culture on the purchasing behaviors of Gen-Z consumers and the role of retailers in driving sustainable consumption. Despite providing a primarily descriptive overview of the results, several noteworthy patterns have emerged. From a methodological standpoint to the best of our knowledge, this study represents the first attempt to investigate consumption preferences using a beauty contest framework. This methodology is particularly valuable because it aims to minimize potential biases associated with questionnaire analysis on sustainability, which are often influenced by social desirability bias and idiosyncratic characteristics (Durmaz et al., 2023; Cerri et al., 2019; Gartner et al., 2015). Future research should build on these preliminary findings by further exploring the observed patterns and testing the beauty contest methodology in different contexts, ideally comparing its outcomes with actual consumer behavior.

Keywords: Sustainability, Consumption, Gen-Z, Wine, Gaming.

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ASSESSING SOCIAL SUSTAINABILITY IN VITICULTURE: A STAKEHOLDER-DRIVEN APPROACH IN PORTUGUESE WINE REGIONS

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ABSTRACT

Sustainability in agribusiness is traditionally framed around three core dimensions - economic, environmental, and social (Elkington, 1994) - yet the social aspect remains underexplored in assessment models (Massuça et al., 2023). While previous studies have examined economic and environmental sustainability in viticulture, there is a critical gap in evaluating social sustainability indicators specific to the wine industry (Trigo et al., 2023). This study aims to address this gap by assessing social sustainability through stakeholder-driven indicators in three key Portuguese wine regions: Vinhos Verdes, Douro, and Alentejo. By engaging vineyard owners, workers, policymakers, and community members, the research ensures that sustainability assessments reflect real-world socio-economic conditions rather than top-down, generic models.

A participatory approach was employed using the Real-Time Delphi (RTD) method, which facilitates real-time feedback while mitigating biases and response fatigue (Gordon & Pease, 2006; Quirke et al., 2021). To refine the results further, a hierarchical weighting system was applied, integrating the Analytic Hierarchy Process (AHP) (Saaty, 1980) with the Weighted Scoring Method (WSM) (Keeney & Raiffa, 1993). This structured framework enabled the ranking of social indicators, ensuring both regional specificity and cross-regional comparability.

The study identified eight key categories of social sustainability based on a literature review: (1) community relations and civic participation, (2) demographic dynamics, (3) education and training, (4) employment and labour conditions, (5) equity and social justice, (6) health and safety, (7) living conditions and well-being, and (8) productivity and food security, each with five indicators. Among these clusters, the most widely recognized priorities across all three regions were fair wages, access to health and safety services, and agricultural training. However, significant regional variations emerged. In Vinhos Verdes, stakeholders emphasized workforce demographics and the continuity of agricultural activities, reflecting the region's small-scale vineyard structure. In Douro, housing quality

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and access to amenities were primary concerns due to its rugged landscape and logistical challenges. Meanwhile, in Alentejo, social inclusion and fair competition were key issues, mirroring its large estates and seasonal labour dynamics. These variations highlight the need for region-specific sustainability strategies (Hovardas, 2021; Rasmussen et al., 2017).

This study contributes to the development of standardized yet flexible frameworks for assessing social sustainability in agribusiness. By integrating participatory methodologies with rigorous quantitative weighting techniques, the research offers a replicable model that balances theoretical robustness with practical applicability. The findings provide valuable insights for policymakers and industry stakeholders, guiding efforts to improve labour conditions, strengthen community engagement, and foster social equity in the wine sector. Future research should focus on expanding this model to other agricultural sectors and monitoring the long-term impacts of social sustainability initiatives in viticulture.

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Keywords: Social sustainability, wine industry, Real-Time Delphi, stakeholder engagement, sustainability assessment, Participatory weighting.

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THE ROLE OF BOARD GENDER DIVERSITY IN SHAPING BUSINESS INTERNATIONALISATION: THE MODERATING IMPACT OF ENVIRONMENTAL INNOVATION

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ABSTRACT

Over time, regulators, investors and stakeholders have increasingly emphasised gender diversity on boards as an important aspect of corporate governance. This focus has influenced discussions on the role of women in decision-making processes and highlighted persistent challenges such as the gender pay gap, low representation in leadership positions and the need for greater transparency in corporate governance. In response, several countries have introduced legislative measures, including mandatory quotas, to promote gender equality on boards (Schoonjans, 2024). Both legal requirements and strategic considerations drive these efforts, as research suggests that diverse boards improve the quality of corporate governance, strengthen workers' rights and enhance the company's reputation.

Despite extensive academic research, the impact of gender diversity on boards is still unclear. Theoretical perspectives such as agency theory, resource dependency theory and institutional theory provide different insights. Many studies emphasise the positive effects of female board members, including a stronger stakeholder orientation and a stronger commitment to corporate social responsibility (CSR) (Ashraf et al., 2025; Lin et al., 2023). However, critical mass theory suggests that a limited female presence may have little real impact, while concerns about female risk aversion raise questions about its potential limitations for strategic decisions (Carter et al., 2017; Shoham et al., 2020). Internationalisation is a critical strategic decision for companies operating in a globalised economy. As corporate boards play a central role in guiding the expansion of companies into foreign markets, it is important to understand how gender diversity influences this process (Kuzey et al., 2024). However, research on this topic remains limited and has conflicting perspectives: some scholars argue that diverse boards promote internationalisation through improved expertise and decision-making. In contrast, others suggest that risk aversion leads to more conservative expansion strategies (Song et al., 2020). This gap in the literature guides the first hypothesis of the study.

H1: Board gender diversity has a negative impact on firm internationalisation.

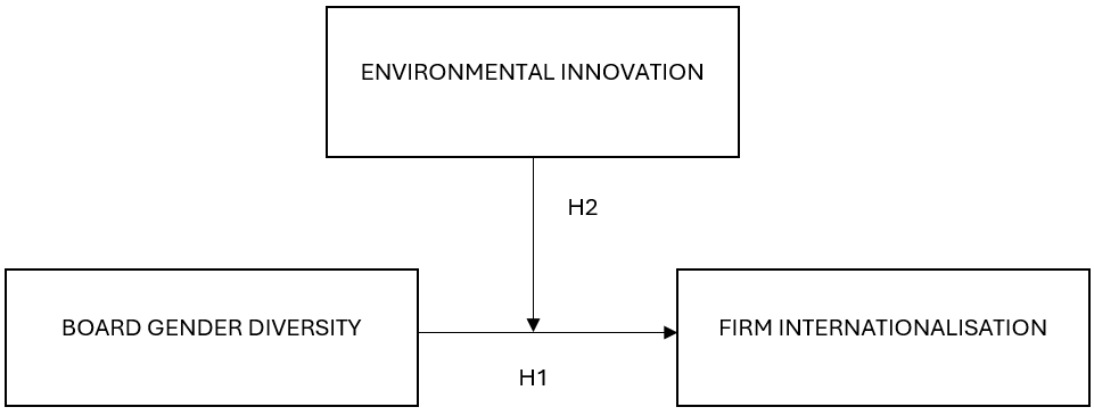
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The modern corporate landscape is increasingly characterised by efforts to reduce the environmental impact of businesses, with companies integrating sustainability into their strategic objectives. A key driver of this change is environmental innovation, which involves developing or improving products, services or processes to minimise environmental damage (Ashraf et al., 2025). While such initiatives offer benefits such as greater efficiency, waste minimisation and a better reputation, they also entail risks such as high research and development costs and uncertainties regarding their success (Traversi et al., 2024). These challenges lead to two opposing views on the relationship between environmental innovation and internationalisation. Some argue that companies that invest in environmental innovation have a proactive mindset, which makes them more likely to expand internationally. Others argue that the high resource requirements and risks associated with these initiatives may limit international expansion (Ashraf et al., 2025). The interaction between gender diversity on boards and environmental innovation adds complexity. As female board members are often associated with higher risk aversion and environmental innovation requires significant investment, this combination may contribute to a more conservative internationalisation strategy. This dynamic favours the second research hypothesis of the study.

H2: Environmental innovation moderates the relationship between board gender diversity and firm internationalisation.

This study aims to fill existing research gaps by contributing to a deeper understanding of the relationship between gender diversity, environmental innovation and internationalisation. The conceptual model is explained in Figure 1.

Figure 1 – Conceptual Model



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A quantitative analysis was conducted on a global sample of S&P 1200 companies over eight years (2016-2023). A panel regression analysis was performed to estimate the role of board gender diversity on firms' internationalisation, while environmental innovation was introduced as a moderating factor. The dependent variable is "Firm Internationalisation", which is measured by the percentage of total revenues generated abroad (Kuzey et al., 2024). The independent variable is "Board Gender Diversity", which is the percentage of women on the board. The moderator variable is "Environmental Innovation", a score of 0-100, which measures the ability of companies to introduce environmental technologies, processes and eco-design products (Traversi et al., 2024). To ensure the robustness of the model, two groups of control variables were added. The first includes firm-level characteristics such as ROA, firm size, debt and firm age, while the second includes board characteristics such as CEO duality, board attendance and CSR committee (Arnaboldi et al., 2018; Askoy et al., 2023; Lin et al., 2023; Abu Alia et al., 2024; Kuzey et al., 2024). All variables were recorded via LSEG Workspace.

In relation to the first hypothesis, the results show a negative and non-significant impact of board gender diversity on internationalisation. These results confirm part of the literature on the relationship between the presence of women on the board and risk aversion (Askoy et al., 2023; Chow, 2022; Ren and Zeng, 2022). To answer the second hypothesis, the role of environmental innovation was included in the study. In particular, we examined both its direct impact on internationalisation and the impact of the interaction between this element and board gender diversity. The results show that in both cases, this form of innovation has a positive impact on the proportion of revenue generated abroad. Conversely, the effect of board gender diversity is negative and significant, and finally, the interaction element (board gender diversity*environmental innovation) is found to have a negative and significant effect on the level of internationalisation.

The negative relationship between board gender diversity and the degree of internationalisation can be explained by the risk-averse and sustainability-oriented decision-making often associated with gender-diverse boards (Ren and Zeng, 2022). Previous studies have shown that female board members are more likely to emphasise ethical behaviour, corporate social responsibility and long-term stakeholder value (Post and Byron, 2015; Glass and Cook, 2016). As international expansion is usually associated with a higher degree of uncertainty and political, legal and cultural risks, boards with a higher proportion of women may pursue more conservative internationalisation strategies (Song et al., 2020).

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When board gender diversity is related to environmental innovation, the company's strategic focus may shift to internal sustainability priorities rather than external market expansion. In such cases, the presence of women on the board has been shown to have the potential to reinforce a cautious approach to international operations (Fernández-Temprano and Tejerina-Gaite, 2020; Konadu et al., 2022).

This study provides both theoretical and practical contributions. It contributes to the academic debate on the potential role of women on boards by exploring the intersection of corporate governance and sustainability in a global setting. It also provides valuable insights into how diversity influences strategic decisions. From a practical perspective, the findings inform corporate leaders, policy makers and stakeholders to balance diversity, sustainability and internationalisation and manage the associated risks and opportunities.

This study is a preliminary work, and despite the relevance of the topics discussed and the contributions to both the literature and stakeholders, some limitations remain. The first relates to the use of the percentage of women on the board as a measure of diversity, while future studies could use other indicators. The second limitation concerns the lack of a cross-country and cross-cultural comparison that could enhance knowledge about the role of women on boards and their influence on decision-making. Finally, as the analysis was conducted on the S&P 1200, it focuses mainly on large companies and developed countries, while an analysis of small and medium-sized companies and other geographical and institutional contexts could provide other insights.

Keywords: Board gender diversity, corporate governance, sustainability, environmental innovation, globalisation, international contexts, moderation analysis.

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THE IMPACT OF ESG RATING DISAGREEMENT ON COST OF CAPITAL: AN EMPIRICAL STUDY OF S&P 1200 COMPANIES

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ABSTRACT

In recent years, the sustainable financial market has emerged as a key driver of responsible corporate behaviour, shaping investment strategies and influencing the decisions of a wide range of stakeholders. Companies are increasingly integrating environmental, social, and governance (ESG) factors into their business models, often resulting in fewer negative effects from regulatory or technological changes and a stronger competitive position. Investors now tend to favour firms with strong ESG performance, viewing it as a reliable indicator of firm value, risk, and financial resilience (Cesarone et al., 2024; Kim and Koo, 2023; Guo et al., 2024). Within this landscape, ESG ratings play a central role by providing a composite measure of a company's sustainability performance (Dorfleitner et al., 2015). These ratings help investment decisions but are limited by inconsistencies across rating agencies (Abhayawansa and Tyagi, 2021; Chatterji et al., 2016). ESG rating disagreement, stemming from differences in rating methodologies, metrics, and weighting systems, undermines the reliability of ESG ratings (Eccles et al., 2017; Berg et al., 2022; Capizzi et al., 2021). These inconsistencies can reduce the reflection of ESG performance in asset prices, discourage firms from improving sustainability practices, and increase market inefficiencies, such as information asymmetry and volatility (Apergis et al., 2022; Avramov et al., 2022; Kim and Koo, 2023). Some scholars even associate rating divergence with greenwashing and unethical managerial behaviour (Guo et al., 2024). Moreover, ESG rating disagreement can diminish the beneficial impact of ESG scores on equity risk (Luo et al., 2023). These negative consequences are a possible reason for the increased cost of debt capital (Dumrose et al., 2022).

Notwithstanding the importance of the topic and the recognised negative consequences of disagreement, research is still in its infancy, and its role in determining the cost of capital has yet to be clarified. Despite the positive effect demonstrated by an increase in ESG rating, the existence of different judgments about the same company can complicate the transmission mechanism. We can conclude that differences of opinion are a crucial aspect influencing the development of the sustainable finance market. Aware of this research gap, one of the objectives of this study is to contribute to this debate by providing empirical evidence on the potential role of disagreement in ESG

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ratings on a company's risk by assessing the impact of this aspect on the cost of capital. Therefore, these aspects are summarised in the following research question:

RQ: *Does disagreement in ESG rating influence the cost of capital?*

To answer this question, we have analysed a longitudinal and global sample of companies included in the S&P 1200. The cost of capital was selected to assess the company's risk, based on previous contributions highlighting the positive role of ESG or CSR disclosure in reducing both idiosyncratic and systemic risk. These risks are reflected by the cost of capital (Abu Afifa and Saadeh, 2023; Lynch and O'Hagan-Luff, 2023; Nguyen et al., 2023).

The independent variable of the analysis is the ESG disagreement. It represents the dispersion of the judgments of different rating providers. We use the standard deviation between Bloomberg and LSEG ratings to measure the disagreement, which indicates how far the ratings are from the average (Christensen et al., 2022; Gibson Brandon et al., 2021). This measure is the most commonly used in the literature (Li and Cheng, 2024; Liu et al, 2024; Li et al, 2024; Wang and Liu, 2024; Wang et al, 2024). Finally, control variables were introduced in line with previous literature. We measure the age of the firm (AGE), the role of idiosyncratic risk (BETA), the interest coverage ratio (INT_C_RATIO), financial leverage (DEBT_TO_EQ) and the natural logarithm of total assets (FIRM SIZE) (Abdollahi et al, 2023; Alduais, 2023; Luo et al, 2023; Apergis et al, 2022; Eliwa et al, 2021; Lynch and O'Hagan-Luff, 2023; Gao et al, 2024).

The analysis is conducted using a fixed-effects panel model. The Hausman specification test and the Breusch-Pagan test have emphasised the superior estimation capacity of the fixed effects model compared to pooled OLS and random effects models. In addition, year fixed effects are also taken into account in the estimation. Several tests were carried out before conducting the analysis. The VIF test ruled out the presence of multicollinearity, while the Wooldridge test established the absence of autocorrelation and cluster standard errors were introduced to control for heteroscedasticity. All variables were winsorised at 1% to reduce the effects of outliers, and the independent variables were lagged by one year to avoid reverse causality (Luo et al., 2023). The following equation represents the model.

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$$COST_OF_CAP_{it} = \beta_0 + \beta_1 ESG_DIS_{i,t-1} + \beta_2 ENV_DIS_{i,t-1} + \beta_3 SOC_DIS_{i,t-1} + \beta_4 GOV_DIS_{i,t-1} + \beta_5 AGE_{i,t-1} + \beta_6 BETA_{i,t-1} + \beta_7 INT_C_RATIO_{i,t-1} + \beta_8 DEBT_TO_EQ_{i,t-1} + \beta_9 FIRM_SIZE_{i,t-1} + Year_i + \varepsilon_{it}$$

The results show contradictory findings: a positive and significant effect only for the overall ESG rating, while the rating of the environmental and social pillar has a negative effect on the dependent variable and that of governance has a negative but non-significant effect.

The empirical analysis leads to interesting, albeit not always predictable, conclusions that contribute to the further development of the literature. The analysis presented focuses on a topical issue in academic research that requires further investigation. It aims to explain the determinants that influence the cost of capital and further support the confounding effect of ESG rating differences on corporate financial performance. Interestingly, the analysis shows that the overall ESG rating and the pillar rating have different effects. This suggests that the different dimensions of sustainability are valued differently by investors and not all of them, especially governance dispersion, are priced into the cost of capital.

Furthermore, the empirical results provide valuable insights for investors, managers, policymakers, and rating agencies. Investors should consider incorporating ESG ratings into portfolio construction and assessing the presence of disagreements, which may be a sign of information asymmetry and greenwashing. Similar conclusions can be drawn for companies. They need to assess the impact of disagreements on the financial market and company performance. To reduce the risk of inconsistencies, they should improve their communication about sustainability activities. To achieve the same goal and ensure that investors receive accurate information, policymakers should increase transparency and communication requirements. Rating agencies have a moral obligation to standardise their rating methodologies and work together to ensure that ratings accurately reflect the sustainable performance of issuers or projects.

The study is not without its limitations. Firstly, the disagreement of ratings is only calculated between two rating agencies, Bloomberg and LSEG, while other agencies also play an important role in this context. Future research could extend the analysis to explain how ESG rating disagreement can affect the performance of companies or financial markets by assessing different perspectives. The analysis was only conducted for a short period. Future research could extend the analysis and include exogenous events such as COVID-19 or the outbreak of war between Russia and Ukraine to further

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explain investors' perception of the disagreement. Finally, the selected sample mainly includes companies from industrialised countries, so an analysis of developing countries would allow a comparison of different geopolitical scenarios.

Keywords: ESG disagreement, Cost of capital, S&P 1200, Environmental, Social and Governance rating, Corporate Sustainability.

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TRANSFORMING HOME CARE DIGITALLY: STRATEGIC PATHWAYS TO BALANCING COMPLIANCE, EFFICIENCY, AND EMOTIONAL INTEGRITY

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ABSTRACT

INTRODUCTION

Home care services are increasingly central to healthcare delivery in Western countries, driven by demographic ageing and changing preferences toward personalized, home-based care. This global trend has heightened operational challenges, including caregiver shortages, high staff turnover, regulatory compliance pressures, and ethical accountability concerns. Digital Care Management Systems (DCMS) have emerged as a prominent response, integrating digital documentation, compliance tracking, and real-time care monitoring into home care practices. Existing research extensively documents the operational benefits of these technologies, including efficiency gains and enhanced managerial oversight. However, critical questions remain about their socio-emotional and ethical implications for frontline care workers and organizational trust dynamics—dimensions largely neglected in current literature.

This study makes an important theoretical contribution by explicitly highlighting the dual nature of digital accountability tools—both as mechanisms for improved operational oversight and as drivers of unintended emotional and ethical tensions. In doing so, it provides critical insights for healthcare scholars, policymakers, and practitioners seeking a balanced approach to digital innovation in caregiving, ensuring that technological advancements align with the relational integrity and emotional sustainability essential to home care services.

To date, scholarship on DCMS has concentrated on *operational* pay-offs—reduced paperwork, streamlined rostering and improved compliance metrics (Cresswell & Sheikh, 2013; Greenhalgh et al., 2009; Vest & Gamm, 2010; Waring & Bishop, 2010). Far less is known about how these platforms recalibrate the *relational* core of domiciliary care, a domain defined by intimate, emotionally intensive interactions (Shinan-Altman & Cohen, 2009; Zamir et al., 2020). To fill this void, we integrate Agency Theory with Sociotechnical Systems Theory and advance four contributions.

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METHODOLOGY

Twelve agencies were chosen based on their relevance to the research question and the diversity of their DCMS applications. Data transcribing and coding were supported by Otter Ai software, 12 video recordings with 18 participants of 12 agency interviews. Data sufficiency was monitored continuously; no new codes emerged after the 14th interview, and two further interviews were conducted to confirm thematic saturation (Guest et al., 2020). Conducted remotely, these interviews lasted between 45 and 90 minutes.

FINDINGS

Our findings show that DCMS deliver the very *monitoring gains* Agency Theory predicts—geo-stamped punctuality, auditable medication logs, automated exception alerts. Yet they simultaneously give rise to what we call an *emotional agency cost* (EAC). EAC is a hidden agency cost that accrues only when the technical substrate makes care work permanently observable. Conceptually, we posit a chain of effects:

1. Digital oversight lower information asymmetry (classic agency payoff)
2. Digital oversight heightened technostress to EAC (a sociotechnical side-effect)
3. EAC diminished relational bandwidth & trust (STS predicts practice is re-configured)

Further theoretical development could beneficially integrate Institutional Theory and Technology Acceptance Models with existing frameworks to deepen understanding of digital transformations in care.

Keywords: *Digital Care Management Systems (DCMS), Home care, Accountability, Emotional labour, Agency Theory, Sociotechnical Systems Theory, Organizational trust, Healthcare digitalization*

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PROMOTING EARLY SUSTAINABLE ENTREPRENEURSHIP COMPETENCIES BY SCHOOL COOPERATIVES: THE EXPERIENCE OF "BELL'IMPRESA! PROJECT"

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ABSTRACT

The European Commission inserted "entrepreneurship" among the key competences for lifelong learning and defined it as the capacity to act on opportunities and transform them into value for others. It relies on various skills such as creativity, critical-thinking, innovation, initiative, cooperation, and problem-solving (European Commission, 2019). It also emphasizes the ethical dimension of entrepreneurship, highlighting the societal and environmental aspects of entrepreneurial skills and the ability of businesses to create a positive impact. It becomes clear that entrepreneurship is not only a valuable tool for addressing market challenges but also a systemic competence that contributes to the harmonious growth of individuals and society.

Entrepreneurship is a crucial skill for students, equipping them to pursue entrepreneurial ventures as appealing and viable career paths (e.g., Fayolle and Gailly, 2015; Meoli et al., 2019). Recently, there has been increased scholarly attention on *sustainable* entrepreneurship, characterized by the ability to establish businesses that prioritize environmental and social responsibilities (e.g., Sharma et al., 2020). Entrepreneurship education is key in advancing sustainable development (Lindner, 2018; Lourenço et al., 2012; Strachan, 2018).

Student entrepreneurship is shaped by various factors, including the degree program, the university attended, family background, personal motivations, and social and cultural environment. Similarly, the characteristics of student entrepreneurship—and their capacity to engage in the social and environmental dimensions of conducting business—depend on the educational experiences and the environment in which those experiences occur.

Earlier studies mainly focused on students' aspirations to start businesses during or after secondary or higher education (e.g., Åstebro et al., 2012; Isada et al., 2015; Premand et al., 2016). However, some research has ventured into entrepreneurship at the primary school level, highlighting innovative

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examples first observed in the UK (Deuchar, 2004; Jamieson, 1984) and Scandinavian countries (Erkkilä, 2000; Hytti, 2002), later reaching other regions (e.g., Cárcamo-Solís et al., 2017; do Paço & Palinhas, 2011; Floris & Pillitu, 2019). Certain studies have looked into specific local contexts (e.g., Barba-Sánchez and Atienza-Sahuquillo, 2016; Hassi, 2016). Nevertheless, this research domain remains relatively neglected (Liguori et al., 2019), even though entrepreneurship is increasingly acknowledged as an essential skill in children's education.

The present study explores school cooperatives as an effective method for developing entrepreneurship, focusing on businesses' social and environmental dimensions. School cooperatives are educational models that integrate cooperative learning and entrepreneurship education to cultivate both hard and soft skills among students. The concept of school cooperatives has gained traction globally, with various countries implementing such programs to prepare students for future challenges, despite previous studies concentrating on school cooperatives employed at higher levels of education. In contrast, a few studies have investigated the possibilities offered by school cooperatives during primary school (e.g., Jardim et al., 2023; Gorenc et al., 2023; Zahra et al., 2024).

By engaging students in cooperative activities, these programs promote teamwork, problem-solving, and decision-making, which are critical for entrepreneurial success as well as personal development and fulfillment. Implementing school cooperative programs helps students develop a proactive and innovative mindset, equipping them with the necessary tools to navigate the complexities of the contemporary workforce and society. Soft skills like communication, leadership, and time management are essential for personal and professional growth. School cooperatives provide a platform for students to hone these skills through collaborative projects and real-world applications. For instance, cooperative learning models have been shown to enhance students' communication and self-confidence, which are vital for entrepreneurial endeavors (Zahra et al., 2024).

In detail, the study adopts a qualitative approach to research in analyzing a single case study (Yin, 2017) called “Bell’Impresa! Project,” granted by a private Foundation and implemented in Northern Italy from 2020 to 2024, involving 12 municipalities, 10 schools, and a network of 5 non-profit organizations and one firm. A total of 3142 students and 425 teachers engaged in the project. Within Bell’Impresa! there were 25 student cooperatives, 48 cooperative workshops, 61 skills workshops, 72 events for students and the community, and 74 informational meetings with companies and experts. The single case study method is suitable for exploring a partially unexplored research field (Eisenhardt, 1989; Yin, 2017) and deepening the analysis through a multistakeholder approach. Data was collected through semi-structured interviews, focus groups, and direct observations. The

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objective of the research is twofold: on the one hand, it aims to understand the interplays between the various stakeholders involved in school cooperatives to promote the effectiveness of the educational method in fostering entrepreneurial skills; on the other hand, the study discovers the social and environmental dimensions of students' entrepreneurship.

The study's primary results focus on creating a robust social alliance that manages school cooperatives by integrating various institutional and technical competencies while defining a common framework of goals and values. Furthermore, it explores the reciprocal interplay between public and private (mainly nonprofit) partners and underlines the mutual responsibilities of these partners in fostering the development of entrepreneurial competencies. Finally, the study highlights that school cooperatives significantly cultivate the social and environmental dimensions of entrepreneurship in terms of entrepreneurial ideas, cooperative organizational models, and values of sustainable development promoted by school cooperatives in various contexts (such as cultural events, public demonstrations, simulated markets, etc.).

The study can positively contribute to existing literature by presenting a new case study explored from a multistakeholder perspective and highlighting insights about organizational factors that promote the implementation of successful school cooperative programs. Furthermore, the research results provide practical implications for future programs, including the need to build social alliances that manage school cooperatives and the opportunity to develop sustainable business ideas that can transform students' daily behaviors.

Keywords: Entrepreneurship Education; Sustainable Entrepreneurship; School Cooperatives; Soft Skills

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THE HOSPITALITY EXPERIENCE QUALITY IN NONPROFIT LONG-TERM CARE ORGANIZATIONS FOR THE COMMON GOOD CREATION

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ABSTRACT

During the last decades, Western European countries—and Italy in particular—witnessed the growth of population aging that faces healthcare systems (England and Azzopardi-Muscat, 2017) not only in terms of quantity of structures and services but above all of service models and corresponding ethical approaches to care. Population aging results from several interrelated factors and should be seen as one of modern society's most significant social achievements. The rise in the absolute number of elderly individuals is partially a consequence of the so-called "baby boom." The increase in life expectancy is closely linked to improved quality of life and health, and introducing the notion of "active aging" as a new way to face aging (Fernández-Ballesteros *et al.*, 2013; Foster and Walker, 2015). However, the implications of aging are not solely positive. They raise essential political, social, economic, and cultural challenges (Golini, 1997). These include the financial sustainability of pension systems, the future of healthcare services and public welfare, and the growing and diverse demand for elderly care services.

Moreover, the very definition of "old age" is under revision. The traditional threshold of 65 years, still used by the OECD to define "old" people, is increasingly seen as outdated, especially in light of improved physical and mental capacities and the notion of "active aging." Recent Italian pension reforms have also pushed the retirement age beyond 65. Academic literature now distinguishes between two subcategories of aging: the "young old" (up to 80 years)—generally active and autonomous, driving demand in wellness, tourism, and lifestyle-related markets—and the "Oldest-old" (80+ years)—typically marked by increasing physical and cognitive frailty, with more significant socio-healthcare needs. This shift generates a complex and diverse landscape of elderly needs. From housing and healthcare to mobility, standardized services can no longer address these needs, and these services' managerial, organizational, and ethical content is complex and challenging. In this scenario, long-term care (LTC) facilities are increasingly aimed at providing services for the oldest older adults by addressing, on the one hand, organizational complexities linked to the nature of the service, which combines increasing health aspects with those of quality hospitality and, on the other, challenges related to the peculiar situation of comorbidity and vulnerability of older people, who are often accompanied in the end-of-life phases. These managerial challenges are not detached from

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financial concerns for the sustainability of institutions, and the reflection on LTCs' service model is open (e.g., Nusem *et al.*, 2017).

Even though in Italy, the services offered by LTC organizations are governed by national and, above all, regional regulations in terms of minimum quality standards (e.g., qualifications of the personnel involved, size of the facilities and equipment), each organization builds its own service model and delivers a different experience for older people and other stakeholders. In this context, ownership type and the related organizational purpose of the LTC providers could be crucial in determining the strategic and operational choices that guide service delivery (McGregor and Harrington, 2020).

Nonprofit LTC providers are organizations moved by purposeful motivation without aiming for profit-making in delivering services for older adults, but focusing on social impact (Alves *et al.*, 2021). Previous studies emphasized how purpose-driven organizations transform their approach to service delivery, shifting the attention from satisfying caregivers' needs as customers to the well-being of older people (Etges and Coelho, 2023). Furthermore, Bradley and colleagues (1998) explored the differences between nonprofit and for-profit LTC organizations in care planning innovation. They underlined the systematic inclination of nonprofits to advance care planning, overcome standardization, and consider the ethical aspects of taking care. On the contrary, by focusing on two different regional contexts, the studies by Suda and Guo (2011) and Skinner and colleagues (2005) underlined how nonprofit organizations tend to concentrate their efforts on financial performance and cost-reduction when they compete with for-profit organizations. In this line, Polivka and Polivka-West (2020) underlined the potential isomorphic effect of privatization policies on nonprofit organizations and their capacity to promote social impact and the common good instead of financial performance.

Consequently, the relationship between service models and an organizational purpose inspired by ethical values in the LTC sector remains unexplored. In detail, the present study applies a qualitative research design to answer the following research question: How do nonprofit LTC organizations design the hospitality experience to contribute to the common good?

The theoretical framework of the study is twofold: on the one hand, the theory of common good (e.g., Argandoña, 1998; Sison and Fontrodona, 2013) and the communitarian view of organizations (e.g., Melè, 2012; Albert and Perouma, 2017); on the other hand, the experience economy (e.g., Pine and Gilmore, 1998; Verhoef et al., 2009). After discussing existing literature, the paper performs a multiple case study analysis (Yin, 2017) by collecting data from semi-structured interviews and analyzing them by adopting a reflexive thematic analysis approach (Braun and Clarke, 2012). The sample of analysis consists of 12 nonprofit LTC organizations based in Northern Italy.

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Data analysis allows us to explore the connection between organizational purpose aimed at the common good and hospitality experience, and understand the social impact of this connection within LCT services provided by nonprofit organizations. The results are discussed in the light of previous literature to discover some theoretical implications of the study. Furthermore, managerial and social implications are presented.

Keywords: long-term care; nonprofit; common good; hospitality; business ethics; ethics of care; service experience

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LEVERAGING ETHICAL CERTIFICATION AS A STRATEGIC ASSET IN AGRI-FOOD SUPPLY CHAINS

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ABSTRACT

INTRODUCTION

In contemporary agri-food systems, rising labor shortages and increasing public attention to social sustainability have made labor management a key concern for farmers (Christiaensen et al., 2021). In Mediterranean countries like Italy, the decline in local interest in agricultural labor has triggered a structural dependency on migrant and often irregularly employed workers (Kalantaryan et al., 2021). Despite institutional attempts to address this imbalance, irregular labor conditions and illicit intermediation practices undermine supply chains social standards and reputational stability (Guidi & Berti, 2023).

To this end, ethical certification schemes have emerged as a potential lever for promoting transparency and aligning Corporate Social Responsibility (CSR) with consumer demand. Indeed, recent studies suggest a growing Italian consumers' sensitivity to social justice attributes, particularly in labor-intensive sectors like fruit and vegetables (F&V) (Rossi et al., 2024). However, the penetration of major ethical certifications such as Fairtrade toward the F&V sector is limited (Ribeiro-Duthie et al., 2021), leading farmers and food retailers to adopt ethical schemes from smaller private initiatives. To our knowledge, a dedicated investigation of strategies viability based on leveraging ethical value is lacking. Therefore, this study aims to answer the following research question: what drivers and trade-offs drive farmers and retail companies to adopt third-party ethical certification schemes?

To investigate this, we conducted a case study on *NoCap*, an Italian association's multistakeholder initiative that integrates workforce management, ethical labelling, and commercial coordination to promote fair agricultural products. Through the lens of the stakeholder engagement construct (Kujala et al., 2022), the analysis foregrounds strategic decision-making processes by farms and retailers engaged in the initiative, exploring how CSR-oriented practices influence organizational behavior and market positioning.

MATERIALS AND METHODS

The empirical foundation of this study rests on a qualitative single-case study of NoCap, located in the province of Foggia, Italy. NoCap is an association founded to provide an integrated solution to labor

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exploitation in agriculture by directly managing recruitment, housing, transportation, legal support, and ethical certification. Its business model connects farms and large-scale retailers through transparent pricing protocols and distributes a small royalty on certified products to sustain the association's operations.

To investigate the managerial implications of adopting a labor-focused CSR strategy, we conducted nine semi-structured interviews with two farmers, six employees from two retail companies, and a NoCap member. Through purposive sampling, data were collected face-to-face or via videocall between August and November 2024. The methodological rigor was reinforced through triangulation with secondary sources of data (newspaper articles, institutional reports) to enhance reliability and minimize any subjective interpretations.

PRELIMINARY RESULTS AND POTENTIAL IMPLICATIONS

The first results reveal that NoCap's initiative is perceived by farmers and food distribution companies as a promising, albeit nascent, model of ethical labor governance. Farmers involved in the initiative recognize that, while profit margins are narrower than those of conventional products, participation enables access to ethically conscious consumer segments and reputational advantages. Likewise, retail firms view NoCap not merely as a supply-chain actor but as a risk-mitigation partner offering a shield against potential reputational damage associated with labor scandals.

The introduction of NoCap's ethical label has proven effective in signaling value to consumers, even though its market penetration remains limited. Informants noted that a growing share of consumers is responsive to social attributes, corroborating studies that identify moral obligation and perceived fairness as drivers of ethical consumption (Mirabella et al., 2025). From a marketing standpoint, this emerging demand suggests an opportunity for product differentiation based on ethical labor credentials.

However, interviewees emphasized that the economic feasibility of NoCap's certification model may be limited to medium- or large-scale farms. According to the two farmers, reduced profit margins on NoCap labelled F&V, already perceived as low in conventional channels, can be absorbed only by farms of sufficient operational size. These larger farms, benefiting from economies of scale, are better positioned to invest in ethical promotion as a strategic asset, using it to enhance their reputation and consumer loyalty. Conversely, smaller farms may struggle to integrate such schemes without external financial support or broader structural incentives.

From an organizational perspective, NoCap functions as a hybrid actor—operating at the intersection of advocacy and market logic. It mediates negotiations between farms and buyers, facilitates logistics,

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and verifies compliance without outsourcing audits to third parties. This unique positioning enables agility and mission alignment but constrains scalability due to limited financial and human resources. Moreover, the findings point to the centrality of communication in the dissemination and impact of ethical certification schemes. While the NoCap label has shown potential in shaping consumer attitudes, informants widely reported that public awareness remains limited. The certification's perceived moral resonance (i.e., its capacity to activate consumers' sense of fairness and social justice) emerges as a critical driver of purchase behavior. Therefore, strategic communication is a crucial complement to operational implementation, not only to build recognition but also to foster demand that can sustain and expand the initiative. These results underscore the importance of integrating communication strategies into CSR frameworks, particularly in sectors where ethical differentiation can serve as both a governance mechanism and a market positioning tool.

Keywords: corporate social responsibility; ethical production; ESG; stakeholder engagement; case study

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WHO FAILS BETTER? INVESTIGATING CONSUMER REACTIONS TO SERVICE FAILURES BY AI AGENTS VS HUMAN EMPLOYEES

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ABSTRACT

As artificial intelligence (AI) becomes more embedded in customer service, AI-powered agents are increasingly replacing human employees in frontline interactions. While AI promises consistency and efficiency, it requires more research to understand how consumers evaluate service failures involving non-human agents. Attribution theory (Weiner, 1985) suggests that people interpret negative events by evaluating responsibility, controllability, and recurrence. In service failures, these appraisals—locus of causality, controllability, and stability—shape consumer responses, influencing emotions, satisfaction, and behavior (Folkes, 1984; Van Vaerenbergh et al., 2014) This study draws on attribution theory to explore how consumers respond to failures caused by AI agents versus human employees. While humans are perceived as emotionally aware and morally accountable, AI agents are seen as neutral tools with limited autonomy and culpability, resulting in reduced blame (Ruyoo et al., 2024; Garvey et al.,2023). Thus, failures caused by AI agents are expected to elicit lower blame attribution (H1). Since blame increases trust erosion (Xie and Peng, 2009), AI agents are expected to preserve brand trust more than humans (H2). Their perceived lack of intent also makes them more forgivable, leading to higher consumer forgiveness (H3). Furthermore, blame attribution (H4) and brand trust (H5) are expected to mediate the effect of agent type on forgiveness (Kim et al., 2023). Consumer forgiveness is also anticipated to enhance re-usage intention (H6), which is consistent with the literature (Celik et al., 2024).

An experimental design randomly assigned participants to a service failure scenario involving either an AI agent or a human employee. Of the 146 respondents, those who misidentified the agent type or lacked prior chatbot experience were excluded, resulting in 102 valid responses. Participants were aged 18–35, and 52% were female.

Although the mean blame attribution score was slightly higher for human employees, the difference was not statistically significant, indicating that agent type did not meaningfully influence how much blame consumers assigned after a service failure (H1 not supported). In contrast, significant differences emerged for both brand trust and forgiveness: participants reported higher levels of trust and greater forgiveness toward AI agents after a service failure compared to human employees,

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supporting H2 and H3. These findings suggest that brand trust was less negatively affected when the failure was caused by an AI agent, and consumers were more inclined to forgive AI agents than human employees. Results are presented in Table 1.

	Mean score (SD) of AI agent	Mean score (SD) of human agent	Mean difference	t(df)	p value*	95% C.I.
Blame Attribution	3.58(1.14)	3.79(0.75)	-.215	-1.12(100)	.263	(-.596, .164)
Brand Trust	2.67(.876)	2.30(.613)	.367	2.45(100)	.016	(.070, .664)
Forgiveness	3.54(.793)	3.20(.683)	.346	2.36(100)	.020	(055, 637)

Table 1. *T-test results*

Table 2 presents the mediation analysis results for blame attribution and brand trust. Blame attribution did not significantly mediate the relationship between agent type and forgiveness, as the confidence interval included zero (H4 not supported). In contrast, brand trust significantly mediated this relationship (H5 supported). This indicates that AI agents, by preserving consumer trust, are more likely to be forgiven after a service failure. The direct effect of agent type on forgiveness became non-significant when trust was included, suggesting full mediation via trust.

Relationship	Total Effect	Direct Effect	Indirect Effect	Confidence Interval		t statistics	Conclusion
				Lower	Upper		
AGT -> BLM ->FRG	-.346 (.201)	-.281 (.144)	-.065	-.197	.048	-1.06	Not Significant
AGT-> TRST ->FRG	-.346 (.020)	-.205 (.144)	-.140	-.311	-.026	-1.19	Full Mediation

Table 2. *Mediation results*

A serial mediation analysis was conducted to test the indirect effect of agent type on re-usage intention through brand trust and forgiveness. Results revealed a significant indirect effect (b = –0.2939, t= -2,571, 95% CI [–0.5600, –0.0391]), supporting H6. Although the direct effect of agent type on re-usage intention was not significant (b = –0.1964, p = .2146), the sequential mediation pathway was statistically significant. This indicates that AI agents can indirectly encourage re-usage intentions by enhancing trust and forgiveness following service failures.

Future research could expand on these insights by employing larger and more demographically diverse samples, particularly across older age groups or consumers with varying levels of AI familiarity. Additionally, examining different service contexts with varying risk levels or emotional

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involvement could provide a more nuanced understanding of when and how AI agents outperform human employees in service recovery.

Keywords: AI, chatbots, service failure, brand trust, blame, forgiveness, re-usage intention

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BRAZIL'S EMERGING MARKET: EXPLAINING AN UNFULFILLED PROMISE THROUGH ANALYTICAL GEOPOLITICS

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ABSTRACT

According to the MSCI Market Classification Framework (2014) and its three criteria (economic development, size and liquidity, and market accessibility), an "emerging market" is a market that does not fully meet these criteria. Brazil clearly fits in the category of emerging market.

In 2009, *The Economist* published a 14-pages special report on "Latin America's big success history", with a suggestive picture of the famous Christ Redeemer statue in Rio de Janeiro taking off like a rocket, symbolizing Brazil's promising economic take off. Almost two decades after that publication, Brazil's economic take off never happened and the country must come to terms with this unfulfilled promise and its causes.

This conference paper aims to answer the question *why did Brazil's promising economic take off not happen?* To reach this answer, the main objective is to hypothesize on the possible causes of Brazil's economic failure by deductively applying the model of analytical geopolitics. While designed to explain state's foreign policy outcomes and state's grand strategy on the international arena, the model helps shedding light into the selected research problem as it suggests investigating crucial geopolitical factors of state's potential (such as geographical aspects and the economic structure), as well as intervening variables (such as the ideological and strategic binders of the political decision-makers (hereby called "geopolitical agents")) combining a strong theoretical apparatus able to explain Brazil's case.

Conventional wisdom on economic perspectives asserted that all emerging economies have slowed down since roughly 2011, and Brazil's domestic economic measures (opening up to trade, big increases in credit and consumption, payment of benefits) have had very limited results in that context. Therefore, Brazil's failure to "take off" can be explained by these causes. Despite these claims, this conference paper argues that Brazil's high taxes, a colossal public sector, reduced economic freedom, poor infrastructure, high import tariffs, and harsh customs procedures, among many other negative economic circumstances, can be seen as symptoms – not causes. Hence one must look for causes elsewhere.

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The model of analytical geopolitics (Morgado, 2023) posits that a country's success in foreign policy outcomes (economic foreign policy included) results of (1) an independent variable comprising the potential (or capabilities) of a state (geographical space, geographical position, transportation, resources and economy, demography and identity, and politico-military structures) related to the international distribution of power (and the threats and opportunities it creates at a given moment); and (2) an intervening variable that includes the geopolitical agents' perceptions and capacities (their perceptions to understand the independent variable, and their capacities in implementing a policy).

While applying this theoretical model to Brazil, the paper asserts that despite (1.1) the relatively large potential of Brazil, and (1.2) the permissiveness of the distribution of power, Brazil has not been able to increase its influence in the international arena in the last decades. The paper's main argument (and hypothesis) is that the choices of the Brazilian geopolitical agents – determined by (2) their perceptions and capacities – have weakened Brazil's relative potential, creating the unfulfilled promise as dependent variable.

The research findings show that the South American leftist movement – from which the Brazilian geopolitical agents have been a driving force – is embedded in the continentalization prescription and that that link caused the prioritization of Brazil's engagement in the South American integration maneuver, in detriment of Brazil's national interests (i.e. Brazil's economic take off). In this way, the *Pátria Grande* (as a continentalization-related goal) has shaped Brazilian foreign policy in the sense that South American integration has become top priority in Brazilian foreign policy conduct.

Contrasting the findings of this paper with the literature, Zahluth Bastos and Hiratuka's (2020) dependence-theory-based hypothesis of a "more hostile context" for Brazil during Rousseff's term is not considered convincing, and nor do the findings of this paper concur with the argument of Brazil's economic recession and corruption to be a result of a "systemic variable," as Giaccaglia affirmed (2018). Milani and Nery (2019) seem to be mistaken too when they claim that the political, economic, and social crisis came in the aftermath of President Rousseff's impeachment.

The explanation of the puzzle provided by this conference paper seems to be more precise – corruption and the embezzlement of money by the PT's (geo)political agents for the purpose of strengthening the internationalist progressive left towards the South American integration objective undermined the state's potential and, therefore, impacted Brazil's economy. Hence, deep divergence arose between Brazil's geopolitical agents (2003-2018) and the Brazilian people, which claim can be backed up by the fact of the countless street demonstrations of the Brazilian people against the political class since 2013. Malamud (2011) inquired why Brazil has not managed to create an "effective

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regional leadership" so far. This conference paper suggests that the priority of the geopolitical agents has not been to build up for Brazil a world or regional status and therefore a developed economy, but to dissolve the country in the region.

In sum, results show that the deterioration of Brazil's relative potential and the lack of improvement of Brazil's position in foreign affairs as emerging market are most likely explained by (a) geopolitical agents' choices, which have made (b) South American integration a top priority with respect to Brazil's geopolitical design.

Keywords: Emerging Market, Brazil, Geopolitical Analysis, Regional Integration

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THE ROLE OF LEADERSHIP DURING CHANGE AND DISRUPTION: DYNAMIC MANAGERIAL CAPABILITIES AND OWNERSHIP COMPETENCE EXPLORED IN THE GERMAN WINE INDUSTRY

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ABSTRACT

The wine industry is currently facing a "multitude of issues threatening to disrupt" the business (Mileham, 2025). Geopolitical instabilities have disrupted sensitive value chains. A shift of consumer preferences, paired with overproduction and losses of key markets has caused prices to plummet and winegrowing areas to be cleared with subsidies. Traditional markets are saturated and new market outlets more difficult to enter. Climate extremes lead to shifts of treatment cycles, and natural disasters aggravate working conditions. The global pandemic has shown that firms need to be able to react to even unforeseeable circumstances to ensure survival. Global trends like digitalization and sustainability require even otherwise unaffected firms to adapt (Lichtenthaler, 2021; Piot-Lepetit, 2023). These developments impact traditional organizations and their strategies (Henchion et al., 2024), as they face increasing pressure to transition from rigid, long-term planning to more flexible, dynamic strategies to cope with conditions of change and resulting uncertainty. The difficulty for the industry is, according to Richard Rumelt, that it considered itself a stable industry in the past decades which is not as used to a differently paced world. Now the industry is forced to act at this different pace, dealing with challenges that new trends and developments bring, "while also developing a different operating pattern from the past" (Atsmon, 2022).

Within organizational strategic management, it is of particular interest how organizations react to less plannable situations and integrate the learnings into their long-term strategy by building the skills to anticipate such situations. Scholars agree that the presence of dynamic capabilities in the organization helps respond to change and be responsive in a dynamic environment. This paper focuses on theoretical concepts that evaluate the role of leadership while exploring intra-organizational behavior and strategy-making concepts that foster an environment of change. With that, the focus is less on individual personality traits and more on the skillset of managerial capabilities that can be acquired and improved. The role of managerial "influence on the likelihood of […] strategy making" (Neugebauer et al., 2016) shall be explored and further concretized.

The concepts explored in this paper are dynamic managerial capabilities (Adner and Helfat, 2003) and ownership competence by Foss et al. (2021). Upon closer inspection, both concepts present conceptual overlaps. By reviewing not only conceptual content but also the definitions of capabilities and

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competences, which were then compared to the definitions of the conceptual core provided by scholars, it becomes apparent that per definition of the terms, capabilities can be seen as a component of competencies (Cambridge Dictionary; Merriam-Webster, Incorporated). In their application however, dynamic capabilities are implicitly being considered a competence rather than mere capabilities: dynamic capabilities are not about any one-time ad-hoc application of skills, but "[enable] the repeated and reliable performance of an activity" (Helfat, 2022). As such, "a dynamic capability provides the capacity for more efficient and/or effective change" (ibid, 2022).

This is of particular importance in the academic field as to not confuse the source of value creation in this line of research. With the increasing volume of articles published on topics of dynamic capabilities and its relatives, many of them start with a selection of papers that are revised based on their interpretation and application of the concepts. These tend to vary in academic research (see Barreto, 2010).

Expanding Teece's initial visualization of the formation and relationship between dynamic capabilities and value creation by the two different concepts mentioned above, the role and position of dynamic capabilities for value creation can be enhanced by *dynamic managerial capabilities* and *ownership competence*.

This research highlights the importance and relevance of dynamic and emergent components in today's organizations and particularly the role of leadership, including owners. Owners that act as managers play a bigger role in the wine- and agribusiness sector compared to other industries. Despite the number of smaller family-held estates decreasing, it is still a prevalent phenomenon in the German wine sector (Richter et al., 2021).

Relevance is shown by highlighting industry-specific traits of the wine industry. For this, six in-depth case interviews have been conducted with owners and managing directors of German wineries (additional interviews currently ongoing). Of those wineries, four are managed by the owner or owner families, two are managed by external managing directors. For the development and validation of the theoretical conceptualization, qualitative case interviews are a good method to gain deeper insight into the application of factors identified by the literature in practical settings. This allows to further advance conceptual ideas and understanding. The cases have been selected based on distinct features, positioning or management team. They span across multiple wine-growing regions and vary in size of land and production. Four of the in-depth semi-structured interviews were conducted in person, two were conducted via video call. Responses were structured using a qualitative content analysis based on Mayring (2014). The categories are based on general factors relevant for dynamic capabilities (Mybes and Hanf, 2024) and enhanced by factors identified by the two theoretical concepts discussed in this paper, dynamic managerial capabilities and ownership competences.

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The presence of both dynamic managerial capabilities, as well as ownership competence can be observed. This includes the role of owner-managers, and the availability of an internal network in family-run businesses, where intra-family stakeholder exchange can prove valuable in the decision-making process. Successful wineries have high managerial social capital and utilize their social network ties.

In the change of generations and a potential lack of suitable successors, it must be considered that "firm level value creation varies with owner competence" (Foss et al., 2021). This implies value preservation by installing a better suited successor, even if it means parting with a family business.

Yet it can also be an opportunity, as "ownership changes allow resources to be bundled and rebundled rather quickly", constituting a relevant factor for value creation. New individuals in the leadership position with new beliefs, which translate into a new bundle of resources, have a different set of competences or capabilities, like dynamic capabilities. These capabilities can allow them to enter new ventures and industries, that previously would not have been seized.

As "different owners follow different paths to value creation" by utilizing resources differently (Foss et al., 2021), it can be observed that generational change can open doors to new and innovative approaches, technology, products and procedures.

Again, successful cases benefit from their social network and the intra-family cross-generational exchange. Additionally, they benefit from their ownership competences and allow "systemic change to start from within, which is the source of heterogeneity across firms" (Teece, 2018).

Also, in the majority of cases, the privately-owned German wine industry (excluding cooperatives) operates without a management team or board. The cases identified specifically aimed at adding specific skills that the owner is lacking or to install a regulatory body, demonstrating governance competence.

It shows that the German wine industry provides several examples of ownership competence and dynamic managerial capabilities in a synergetic relationship.

Employing internal capabilities to iteratively develop strategies impromptu, allows organizations to quickly act upon external change, seizing opportunities early and obtaining a competitive advantage in the competitive environment. Combined with an internal culture, routines and certain leadership traits, management can create an environment that is fit to act upon advances of current challenges. Owners and leadership personnel play a particular role here.

Keywords: Dynamic Capabilities, Dynamic Managerial Capabilities, Ownership Competencies, owner-managers, wine industry

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STRATEGIC WORKFORCE ADAPTATION IN HEALTHCARE: DIGITAL COMPETENCIES, ETHICAL AI, AND BURNOUT PREVENTION

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ABSTRACT

The rapid integration of advanced digital technologies, artificial intelligence (AI), and automation is profoundly reshaping the healthcare sector. While these innovations enhance efficiency, streamline administrative processes, and improve patient care, they also introduce significant challenges for the workforce (Naamati-Schneider, 2023). The digital transformation of healthcare systems and organizations is a multifaceted process that spans various domains, including diagnosis, treatment, research, service delivery, and accessibility. The integration of artificial intelligence and big data in medical information analysis has significantly advanced research, enhanced diagnostic accuracy, and improved treatment approaches. These technological innovations have also contributed to the development of global medical databases and the adoption of robotics, enabling remote diagnostics, personalized medicine, telemedicine, digital healthcare services, seamless treatment continuity, and efficient management of computerized patient records (Marques & Ferreira, 2020; Kraus et al., 2021).

Healthcare professionals must develop new digital competencies, adjust to evolving job roles, and navigate ethical considerations related to data security, AI-driven decision-making, and the interaction between human expertise and machine intelligence (Naamati-Schneider & Alt, 2024; Naamati-Schneider et al., 2024).

The increasing reliance on AI-driven diagnostic tools, telemedicine platforms, and predictive analytics requires physicians, nurses, and administrators to balance technological efficiency with human-centered care, ensuring that automation enhances rather than replaces clinical expertise (Jimma, 2023; Eysenbach, 2023).

This transition requires comprehensive adjustments across multiple levels. Regulatory frameworks must be restructured to effectively address ethical concerns and ensure accountability in AI-driven healthcare (TerKonda & Fish, 2023). Healthcare institutions must undergo structural transformations, redesigning operational workflows and modernizing workforce training programs to facilitate the seamless integration of digital technologies (Göndöcs & Dörfler, 2024). Additionally, higher education institutions responsible for training healthcare professionals, including medical education programs, must adapt their curricula to equip students with the necessary skills and

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knowledge to navigate the rapidly evolving healthcare landscape (Naamati-Schneider & Alt, 2024). At the individual level, healthcare professionals must actively develop AI literacy, refine their digital decision-making capabilities, and effectively manage the cognitive demands associated with technology-integrated clinical environments (Ali et al., 2023).

Despite the potential benefits of digital tools, healthcare organizations continue to struggle with their seamless adoption. AI and digital record-keeping, while positioned as efficiency boosters, have paradoxically increased administrative burdens, reducing direct patient interaction (Naamati-Schneider, 2023). Ethical concerns surrounding bias, transparency, and decision-making autonomy remain unresolved, raising questions about the role of AI in patient care (Matheny et al., 2020). Additionally, the lack of structured AI training programs has resulted in significant skill gaps among healthcare professionals, leading to resistance and inconsistent implementation of emerging technologies. As a result, the digitalization of healthcare is not merely a technological shift but a strategic necessity that requires careful workforce adaptation and policy-driven interventions.

This study presents and maps preliminary qualitative findings that explore the role of digital technology in driving substantial organizational change, with a focus on workforce transformation and adaptation. The findings underscore the need for comprehensive workforce training, interdisciplinary collaboration, and proactive leadership to navigate the challenges of digital healthcare. By addressing these factors, healthcare organizations can not only respond to immediate technological demands but also build a foundation for continuous innovation and long-term success in patient care.

Ensuring a sustainable and effective digital transformation in healthcare requires a coordinated effort across policy, education, and practice to equip professionals with the necessary skills, ethical awareness, and strategic adaptability. By fostering a workforce that is both technologically proficient and patient-centered, healthcare systems can harness digital advancements to improve outcomes while maintaining the core values of compassionate, high-quality care. Moreover, preparing healthcare professionals for this evolving landscape will not only enhance their ability to navigate digital challenges but also help mitigate moral distress, reduce burnout, and decrease workforce attrition, ultimately strengthening the resilience and stability of healthcare organizations in the long term.

Keywords: Healthcare Workforce, AI in Healthcare, Digital Transformation, Workforce Training, Ethical AI, Healthcare Management, Telemedicine

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A SYSTEMATIC REVIEW OF PROGRAMMATIC ADVERTISING LITERATURE

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ABSTRACT

Programmatic advertising uses artificial intelligence to target ads at predetermined user personas according to specific criteria, including user demographics, interests, and online activity (Shehu et al., 2021). In this type of online promotion, ad space bidding takes place based on understanding the surrounding platform environment (Häglund & Björklund, 2024). While legal frameworks such as GDPR provide some safeguards, they fail to grant users complete control over their data (Kawaf et al., 2023). This paper aims to comprehensively analyse existing academic research on programmatic advertising, focusing on its evolution, core concepts, challenges, and future research opportunities. A systematic literature review of 45 studies from Scopus and Web of Science databases was conducted using predefined keywords related to programmatic advertising and user privacy (Núnez-Barriopedro et al., 2022). Papers were filtered by relevance, language, and alignment with research objectives. Thematic coding in MAXQDA was employed to extract insights and identify patterns across the literature. The findings reveal six critical themes: privacy risks related to minimal transparency, user profiling, and unethical data handling. The literature further highlights users' insufficient education about online privacy and inadequacies in current regulatory policies (Kawaf et al., 2023). This study contributes to programmatic advertising by synthesising existing research and addressing gaps in understanding ethical digital advertising (Chen et al., 2019). It provides valuable insights for academics, marketers, and policymakers aiming to foster transparency and trust in digital advertising practices.

Keywords: Programmatic advertising; ePrivacy; Third-party Cookies; Tracking

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SUSTAINABILITY ORIENTATION AND ITS DIGITAL COMMUNICABILITY IN LIFE SCIENCE COMPANIES

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ABSTRACT

The interconnection between sustainability and life sciences (that deals with pharmaceutical, biotechnological, therapeutic, and medical devices, in a narrow, broad, and extended sense; Stremersch and Van Dyck, 2009, Pucci et al.,2012) has attracted considerable attention, particularly in the biotechnological, pharma, and cosmeceutical/nutraceutical sectors, both from an operational and marketing perspective (Gehde, 2020; Schiavone and Ferretti, 2021).

Companies in the life sciences industry are recognizing the importance of sustainability as an integral part of their business strategy. Sustainable management requires the integration of environmental, social, and governance (ESG) practices into day-to-day operations and strategic decisions. Beyond the obligation to publish sustainability reports, that in EU applies primarily to large publicly listed companies and public interest entities (Cuomo et al., 2024), the sustainability disclosure has a significant positive correlation with corporate reputation (Pajuelo-Moreno et al., 2024). For example, recent developments in the making of self-preserving personal care cosmetics point to a promising transition to safer and more natural options for consumers.

From the literature emerges a push, mainly in Europe, towards the adoption of FAIR principles (availability, accessibility, interoperability and reusability) with the aim of making resources in the life sciences more sustainable through interdisciplinary collaborations, such as an open scientific culture in data management (David et al., 2023). The convergence of sustainability, biotechnological innovations, cosmeceuticals and data management proposes an integrated approach to improve practices in the field of health and beauty. The adoption of advanced technologies and sustainable practices is key to meeting the emerging needs of consumers and researchers, steering life sciences towards a more sustainable future.

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As in other sectors, there is a growing focus on the environmental sustainability of companies in this area, although tensions remain between profitability objectives and environmental issues in corporate strategies (King and Adel, 2024).

Based on this contribution, this study aims to explore how companies leverage sustainability disclosure as a communication tool, within their digital channels, which serve as a critical communication channel for companies (Alghizzawi, 2019).

We built a database starting from the companies belonging to the Tuscan Life Science Technology District (Pucci et., 2012). To further integrate this database, we have decided to include other companies defined as innovative SMEs and university spin-offs. The final sample includes 389 companies. Hence, the purpose of this preliminary study is to examine the following research questions:

- Q1: To what extent is sustainability-related content integrated into the digital communication strategies of firms operating within the Tuscan Life Sciences District?

- Q2: Is it possible to underline differences in digital communication strategies based on industry specific characters?

The information collected from corporate websites was categorized into three key dimensions of corporate communication: sustainability orientation, innovation orientation, and product orientation. Preliminary findings (as illustrated in the figure below) indicate that sustainability receives comparatively less emphasis, with innovation and product-related content emerging as the dominant communicative drivers. At the sectoral level, firms in the chemical-pharmaceutical, cosmeceutical, and nutraceutical industries demonstrated a relatively higher engagement with sustainability themes. In contrast, companies operating in the biotech and medical device sectors exhibited a notably lower degree of attention to sustainability.

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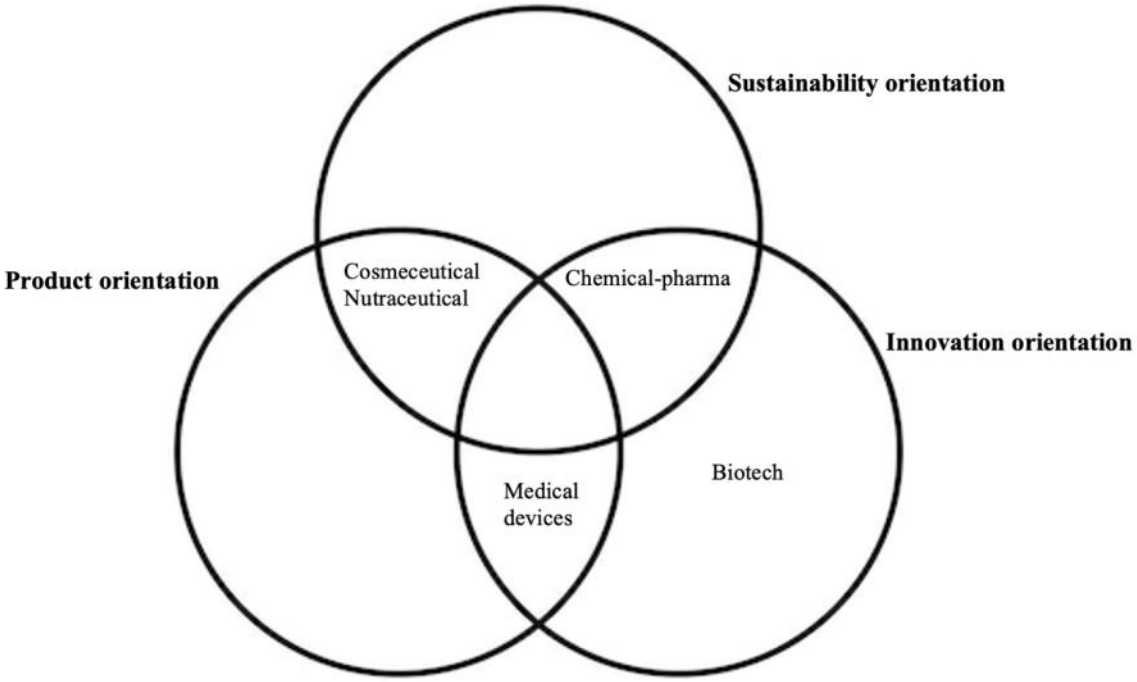


Figure 1. F*irst results from website analysis in terms of sustainability-innovation-product orientations*

To substantiate these initial findings, the final version of the paper will extend the analysis by identifying additional value drivers communicated by firms and which firm-specific characteristics influence them. Furthermore, we will conduct a content analysis of social media, focusing LinkedIn (formal disclosure) and Instagram (informal disclosure). This analysis will be complemented by a series of case studies aimed at providing deeper contextual insights into the communication practices of selected firms.

Keywords: life science, sustainability, biotechnology, nutraceutics, pharma, communication, medical devices.

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TOWARDS ACCOUNTABLE AI: IMPLEMENTING RISK-BASED AUDITS UNDER THE EU AI ACT

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ABSTRACT

In recent years, societal interest and investment in Artificial Intelligence (AI) have grown substantially, driven primarily by advancements in Machine Learning (ML) and Deep Learning (DL). These technologies have become powerful enablers of innovation, supporting the creation of novel applications across sectors such as healthcare, finance, transportation, and entertainment. As AI systems become increasingly embedded in critical aspects of daily life, ensuring their ethical development and understanding their broader societal implications has become essential.

For businesses developing AI systems, legal compliance—particularly with the EU Artificial Intelligence Act (AI Act or AIA)—is often the first step in governance. While the AI Act provides a robust, risk-based regulatory framework aimed at safeguarding fundamental rights and human well-being (Calvano et al., 2025), compliance alone does not guarantee the ethical deployment of AI technologies. As Westerstrand et al. (2025) argue, compliance with the AI Act alone is insufficient to ensure ethically sustainable AI. The findings highlight key limitations, such as the absence of mandatory fundamental rights impact assessments for many high-risk systems and the structural tension between profit-driven objectives and ethical responsibilities.

The AI Act, which came into force in 2024, is the world's first comprehensive, horizontal regulatory regime for AI. It classifies AI systems into four categories—unacceptable, high, limited, and minimal risk and mandates rigorous conformity assessments for high-risk applications. However, the AIA lacks a detailed methodology for assessing risk magnitude in real-world contexts, relying instead on broad application areas and static risk factors. These include systems deployed in areas such as medical triage, credit scoring, and critical infrastructure management. While these systems offer significant opportunities for scientific and operational advancement, they also pose ethical, legal, and societal risks, particularly when their internal decision-making processes remain opaque. While the AIA provides a broad risk-based framework with predefined categories, it lacks a detailed, context-sensitive methodology for assessing AI risks. Novelli et al. (2024) address this gap by introducing a

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semi-quantitative, scenario-based model that integrates proportionality and real-world risk determinants to enhance regulatory precision and support internal risk management, but it is not mentioned how such context-driven assessments can be operationalized consistently across diverse regulatory bodies and resource-constrained environments. Also, without robust methods to assess the societal and individual impacts of AI systems, the EU AI Act risks repeating the shortcomings of the GDPR, potentially resulting in fragmented and unclear implementation. Advancing research in Human-AI interaction is essential to support effective regulation and promote ethical, human-aligned AI development that is both innovative and socially responsible (Calero Valdez et al., 2024).

There is currently limited guidance on how to meet the requirements for high-risk AI systems under the EU AI Act. Many organizations are unsure whether existing regulations can help with compliance, as current standards do not fully address key aspects like transparency, lawfulness, and fairness. The authors refer to existing work (e.g., Kelly & Zafar et al., 2024), but the current mapping does not indicate how thoroughly each article addresses the relevant issues. At this stage, the purpose of the mapping is to show how quality models can help address AI system properties that are not covered by existing standards. Future work is expected to expand both the model and the methodology, as quantifying quality attributes remains a significant challenge.

In response to these challenges, this paper proposes an auditing methodology designed to operationalize the AI Act's requirements while maintaining adaptability for broader international use. The goal is to bridge the gap between regulatory compliance and ethical responsibility by fostering transparency, accountability, and trust in AI systems. A four-layered auditing framework is introduced:

- *Normative Foundation:* Building on concepts of reasonability and accountability, we frame auditing as a continuous governance practice that examines the full AI lifecycle—spanning data provenance, model training, deployment conditions, and stakeholder engagement.

- *Risk-Aligned Standards Architecture:* To address fragmentation in compliance practices, we propose a unified set of principles—transparency, proportionality, robustness, and inclusiveness—aligned with the AI Act's risk taxonomy and translatable into domain-specific audit protocols.

- *Hybrid Evidence Toolkit*: Our methodology integrates multiple forms of evidence (direct, indirect, circumstantial) and corresponding techniques, including white-box analysis,

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behavioral testing, interpretability probes, and socio-technical reviews. This ensures auditability even under conditions of limited system transparency.

- *Human-Readable Scoring and Certification*: We design a rubric-based assessment model that converts technical audit results into ordinal compliance scores, accompanied by documentation and escalation procedures, enabling comparability across sectors and jurisdictions.

The framework integrates ethical foundations, regulatory obligations, and operational audit mechanisms, enabling the early detection of systemic risks and reinforcing institutional accountability across the AI lifecycle. Collectively, this structured approach advances a scalable and adaptive model for AI oversight—one that not only supports regulatory compliance with the EU AI Act but also enhances public trust and sustains responsible innovation across diverse technological and sectoral contexts. This work is currently in progress; the proposed methodology will be implemented prior to the conference, where the final results will be presented.

Keywords: European Union; AI Act; Regulatory Compliance; AI Governance; Artificial Intelligence; Auditing.

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A FRAMEWORK FOR CITIES' SUSTAINABILITY GOVERNANCE

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ABSTRACT

1. INTRODUCTION

A city, like any other organization, is an open system operating in a complex and dynamic environment and performing a transformation process of given and limited inputs into predefined outputs (Angelis and Dimaki, 2011). The primary inputs consist of human, natural, financial, social and cultural resources. The required outputs are the city's liveability, investibility and visitability, the three basic components which in effect determine the wellbeing of the city's stakeholders, residents, investors and visitors (Kotler et al., 1999) but their mix maybe different depending on the type of the city. A schematic representation of the city's transformation process is shown is Figure 1.

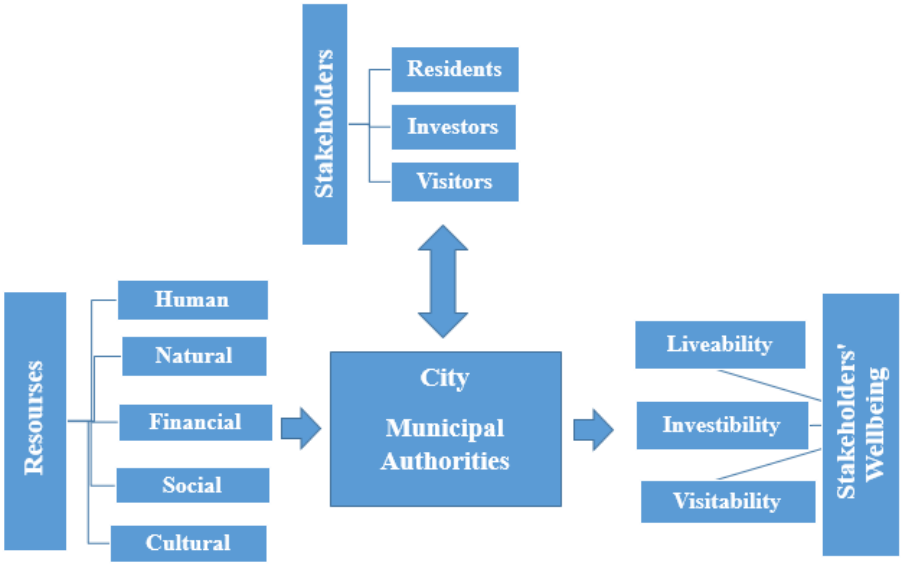


Figure 1: A city's transformation process

2. THE NEED FOR A NEW CITIES' GOVERNANCE MODEL

The present article focuses on the transformation process or in other words on the city's governance model employed to improve the wellbeing of its stakeholders in the most effective and efficient way, safeguarding at the same time the city's attractiveness, sustainability and resilience. The Sustainable Development Goals (SDGs) adopted by the 2030 Agenda for sustainable development and their

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subsequent localisation (UN DESA, 2023), provide a framework for cities to establish a sustainability governance framework so as to address a holistic sustainable development.

The need for a Cities' Sustainability Governance (CSG) framework stems from the fact that no European city has achieved the SDGs so far and there is a gap between targets set and those achieved. The main reasons for that seem to be that the prevailing governance models do not deliver the desired results and moreover it is difficult to have everyone's consent for the course of a city's development. Looking deeper into these issues we find that the root causes of the observed gap include lack of both sustainability culture and sustainable development understanding, inadequate ways to engage community in the city's transformation process and limitations in holistic thinking and communication among the parties involved (Heikkilä, 2024).

3. SUSTAINABILITY GOVERNANCE FRAMEWORK: A BRIEF OUTLINE

The sustainability governance builds on the city's policy development which determines what needs to be done so that the city moves from where it stands to where it should be and sets the time frame as well as the goals, the measures to be taken and the milestones. In the words of Meuleman (2022) "if policy is about what and when (goals, measures, milestones), the governance is about how (tools, processes) and who (actors, stakeholders)". According to Raco (2020) "urban governance is primarily concerned with processes through which government is organized and delivered in towns and cities and the relationships between state agencies and civil societies – a term that is used to include citizens, communities, private-sector actors, and voluntary organisations". Sustainability governance implies looking into the way cities can produce better results using the SDGs as a common framework improving both internal processes and relations with the stakeholders (Raco, 2020). Hence, working on governance means finding out what cities want to achieve - defined by the SDGs - and how to achieve it, aiming to bridge the gap between ambitions set and actions taken to attain them. More specifically the sustainability governance focuses on both the way policy development will be implemented and the basic actors involved in it, by looking at the processes required, the participation of the various agents and the tools and mechanisms needed (Meuleman, 2018).

Going a step further we may say that sustainability governance is based on four pillars: *Policy Development, Organisational development, Multi-actor collaboration. Multi-level collaboration* (Heikkilä, 2024), which are depicted in Figure 2.

Policy Development. It refers to what cities should achieve using SDGs as a guiding framework to set a shared vision locally. In this context many cities incorporate SDGs in the drawing-up, implementation and follow up of their long-term strategies and plans. An important strategic tool for using SDGs in policy making at a city level is the Voluntary Local Review (VLR), which is carried out by local and

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regional governments, of their own local SDG work. A large and continuously increasing number of local and regional governments worldwide have so far produced at least one VLR (UN DESA, 2023).

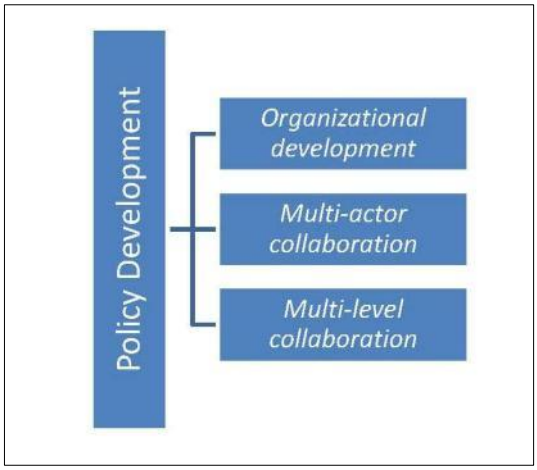


Figure 2: The four pillars of Sustainability Governance

Organizational development. It refers to the need of encouraging the municipality staff to make sustainable development part of their daily routine. This requires a deeper understanding of sustainable development, a redefining of the principles and values and the setting-up of structures and processes aiming at removing the interdepartmental barriers and facilitating closer cooperation (Meuleman, 2018; Frei and Morris, 2023).

Multi-actor collaboration. It refers to the way cities can work better together with citizens, businesses as well as other local partners and stakeholders towards the attainment of the SDGs. It involves, among other things, the establishment of multi-stakeholder groups, the holding of citizens' assemblies, the drafting of participatory budgets as well as the promotion of a quadruple helix partnerships, innovations and ecosystems (Mazzurato and Collington, 2023).

Multi-level collaboration. It refers to the need for alignment and closer cooperation across both government and stakeholders. It involves the setting up of tools and mechanisms which would facilitate dialogue and working together but at the same time promote the cities' interests at regional, national, EU and UN levels regarding holistic city strategies towards the SDGs (UN-Habitat, 2022). Moreover, it involves increased engagement in stakeholder management and the creation of active city networks.

4. CONCLUSIONS

Summarising we may say that cities' failure to achieve the SDGs so far and the persisting gap between targets set and those met calls for an enhanced governance model. The proposed Cities' Sustainability Governance model presented is expected to align the ambitions set with the actions designed to achieve them. The four pillars of this framework, their interconnection and the main elements of each

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pillar have been briefly presented. This framework is currently applied, in the context of an URBACT Programme, in a network of cities located in various countries across Europe including, inter alia, Germany, Finland, Spain, Portugal and Greece (Heikkilä, 2024). The findings of this project will be a valuable source of information for further research on this issue.

Keywords: city, stakeholders, Sustainable Development Goals (SDGs), Voluntary Local Review (VLR), sustainability governance.

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IN PURSUIT OF A DATA-DRIVEN DECISION-MAKING CULTURE TO OPTIMISE CUSTOMER EXPERIENCE AND DECISION JOURNEY MAPPING

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ABSTRACT

***Objective**: explores how companies can develop a data-driven decision-making culture to optimise customer experience (CX) and decision journeys, leveraging Big Data Analytics (BDA) and socio-technical systems. It aims to provide actionable insights and strategies to enhance CX while addressing challenges in data integration and real-time analytics. **Theoretical Underpinning**: is grounded in Socio-technical Systems Theory, which examines the interplay between humans, technology, and organisational environments. It also draws from Dynamic Capability Theory and the Technology-Organisation-Environment (TOE) framework to understand how to integrate technological and human resources for fostering a data-driven culture to optimise CX. **Methodology**: A systematic literature review (SLR) was conducted following PRISMA guidelines to synthesise existing research on BDA, CXM, customer journey mapping, and socio-technical systems. Primary data was collected through semi-structured interviews and workshops, focusing on participants' experiences with BDA and CX technologies. **Empirical Findings**: identified significant gaps in current CXM systems, including poor integration and a lack of actionable insights. A case study highlighted the benefits and challenges of integrating AI tools into CXM, emphasising the importance of balancing human expertise with technological solutions. **Concluding Remarks**: The study underscores the importance of integrating BDA and socio-technical systems to improve CX and decision-making. It emphasises the need for a data-driven culture to foster long-term customer relationships and operational efficiency. **Implications and Future Research**: This study offers actionable recommendations for leveraging AI and omnichannel strategies in CX optimisation and advances Socio-technical Systems Theory. Future research should explore the implications of continuous data tracking on privacy and trust.*

Keywords: Data-Driven Decision Making; Customer Experience Management (CXM); Big Data Analytics (BDA); Socio-technical Systems; Customer Journey Mapping; Artificial Intelligence (AI).

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EXPLORATORY MOVES IN ASYMMETRIC GLOBAL COMPETITION

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ABSTRACT

In a recent review of competitive dynamics in international business, Yao et al. (2024) suggest an understanding of the phenomenon as "multi-arena, multi-player and multi-level". As is often the case, the crossing of national borders compound complexity of what is already a convoluted issue, raising the difficulty level for empirical study while presenting opportunities for uncovering dynamics beyond those observed in domestic settings.

In its aim to explain oligopolistic reaction across borders (Knickerbocker, 1973), research on competitive dynamics and multimarket contact in global strategy have paid less attention to asymmetries between rivals facing in both local and global markets. The international context has partly been accounted for in extensions of multi-market contact competition, defined by Karnani and Wernerfelt (1985, p.87) as "a situation where firms compete against each other simultaneously in several markets". While most studies have been confined to product markets in domestic settings, similar dynamics can be observed across geographic markets (Jayachandran et al., 1999; Yu & Cannella, 2013). In addition to taking on different markets, multinational enterprises match their rivals (Yao et al., 2024) as they compete for cost reductions associated with economies of scale, improved access to location-specific knowledge, and enhanced mutual forbearance among competitors due to the fear of retaliation (Edwards, 1955). Addressing the research question of how global and local competitive asymmetries influence the timing and scale of exploratory moves, we take on a fine-grained view of global competition and its strategy outcomes.

In this study, we argue that the key to deepen our understanding of global competition lies in unpacking the multiple asymmetries at hand. While earlier work has acknowledged competitive asymmetries even in oligopolistic industries where firms are few enough to be able to monitor each other's reactions (Caves, 1982; Flowers, 1976; Li & Guisinger, 1992), the foci and definitions of asymmetries remain inconsistent (Chen, 1996; Chen et al., 2010; Gómez et al., 2020; Mas-Ruiz & Ruiz-Moreno, 2011; Domínguez et al., 2023). Particularly, important nuances related to asymmetries across geographic levels and different types of competitive moves remain unexplored. Thus, we aim to amend this by contrasting not only the global size of multinational enterprises in oligopolistic-like competition, but also their relative presence across international markets

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It is not uncommon for domestic or regional firms, otherwise insignificant in the global scheme of things, to reign supreme in their home markets, edging out foreign behemoths. This challenges notions of the effects of absolute firm size for competitive dynamics, where findings have been mixed (Lavie et al., 2010). Thus, we propose a framework with two dimensions: one on global leadership and the other on local leadership (see Figure 1).

Figure 1. Competitive positions taken by global rivals in local markets.

Global presence				
	Leader	Cautious giant	Incumbent	Hegemon
	Non-leader	Challenger	Local champion	Local ruler
		Non-leader	Leader	Exclusive
		Local presence		

In terms of outcomes of rivalry, strategic management research has explained the different moves and countermoves that constitute competitive dynamics (Chen, 1996; Chen & Miller, 2012, 2015) between rivaling firms. Early research in international business focused mainly on uncertainty and risk aversion as multinational enterprises would pursue a "follow the leader" strategy (Knickerbocker, 1973) or react to foreign firms invading their home markets in the "exchange of threat" scenario (Graham, 1974). Moves related to the crossing of national borders include corporate actions such as foreign direct investments (FDI) and market entries (Ghemawat & Thomas, 2008; Klein et al., 2020; Rose & Ito, 2008; Yao & Li, 2016), exporting (Feinberg, 2013; Wang et al., 2014), and outsourcing (Hahn et al., 2009). Others also looked at pricing and marketing strategies (Fruchter & Kalish, 1997; Gross & Schmitt, 2000; Norman & Nichols, 1982; Tokatli, 2013), human resource training (Iriyama et al., 2016) and innovation (Berry, 2020; Sandström, 2016).

In this study, we shift the attention to how competitive asymmetries across global and local markets affect firms' exploratory moves. Our definition of exploratory moves follows that of explorative activities by Anand et al. (2009, p.802), who in turn refers to March (1991) when defining explorative activities as "those which entail searching for profitable opportunities in unknown and therefore highly uncertain environments" and exploitative moves as "those that capitalize on fairly certain revenue streams, based on known parameters". As argued by Anand et al. (2009), rivals are less likely to reduce uncertainties by imitating their rivals in exploration.

We formulate three hypotheses related to outcomes in terms of exploratory moves. First, we posit that firms that on a global scale are not in dominant positions yet large enough to participate in oligopoly-like competition are more likely to be first movers in making exploratory moves such as introducing innovative yet uncertain products. Thus, we expect:

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H1: Global non-leaders are quicker than global leaders in making exploratory moves.

Second, to account for global-local asymmetries in market presence, we suggest that the local leadership of a global non-leader will dampen their eagerness to engage in exploratory moves, as their geographically bounded leadership calls for a reliance on exploitation. Thus, we posit:

H2: Local leadership of global non-leaders negatively moderates the relative speed of their exploratory moves.

Lastly, we account for the role of local demand signals, which we argue will also reduce the gap between exploratory moves between rivals, as observable high demand reduces the uncertainties of innovative product types. Thus, we predict:

H3: Local demand signals negatively moderate the relative speed of exploratory moves by global non-leaders.

We plan to test our hypotheses, using novel data on the global rivalry between McDonald's and Burger King and their introduction of plant-based hamburgers from 2014 to 2025. Previous studies have already studied the rivalry between the two companies (Toivanen & Waterson, 2005; Yang, 2012), yet the scope of these studies was limited to the UK market. McDonald's and Burger King, however, face each other in multiple geographic markets. The context best fits to our study for the following reasons. First, because their relative presence differs depending on the country, while being the only two hamburger chains with a truly global reach, and forming oligopolies in some markets. According to the ranking of Most Valuable Quick Service Restaurant Brands Worldwide in 2024 by Statista, we can say that McDonald's was the global leader (top row in Figure 1), and Burger King was a global non-leader (bottom row in Figure 1). They alternate between dominant and non-dominant positions across different markets, despite one holding a leadership position globally. Second, compared to other industries such as consumer electronics, the product offered to customers in the fast-food hamburger industry seems to involve less innovation. For example, one of the iconic products in the industry by McDonald's, Big Mac, celebrated its 50th anniversary in 2018 with few changes being made since its introduction (McDonald's, 2018). In this seemingly less volatile industry, however, there are instances of firms introducing novel products to differentiate from their rivals. The focal product type, plant-based burgers, is an example of rare exploration in a market otherwise characterized by exploitation; an underresearched topic in global strategy. Due to the difficulty to keep high coverage in every geographic market and to manually collect data for our hypotheses, we focus to all countries where at least one of McDonald's and Burger King has a market presence. This will allow us to comprehensively understand the effect of their multimarket rivals on their actions.

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Data collection is currently in progress and data will be gathered mostly manually from current and archived websites by our research assistants.

Our study will provide a better understanding of how competitive interaction in the international context is a "multi-arena, multi-player, and multi-level" phenomenon (Yao et al., 2024). First, we show how competitive asymmetry in global and local markets both matter for strategy outcomes. The notion that interfirm rivalries in multiple countries may differ from the consequences of competitive dynamics explored in domestic settings has been suggested before (e.g., Chen et al., 2021) but not addressed in this detail. Second, while accounting for market entries, we study exploratory moves in an industry otherwise characterized by exploitation. As argued by Yao et al. (2024) in a recent review, applications of competitive dynamics in international business research have had a primary focus on market entries and FDI, with other competitive moves such as the introduction of novel and uncertain product types remaining underresearched.

In addition to these two contributions, our study addresses two suggestions for future research on international competitive dynamics raised by Yao et al. (2024). First, we incorporate more country-level factors in our analysis of firm-level interactions. While international business research has paid attention to country-level measures of institutional quality (e.g., Giachetti et al., 2024), our inclusion of host country interest in veganism serves as an issue-specific demand signal that we hypothesize to negatively moderate our main effect. Second, the chosen context of sustainable menu items is not merely an explorative move in the pursuit of financial gains but might serve other purposes such as sustainability efforts. Thus, part of restaurant chains' actions might be understood as non-market influences in market strategies, which are directed not only to consumers but also to other global and local stakeholders. While not an explicit part of our study at this stage, it is certainly relevant for the emerging literature on multimarket contact and corporate philanthropy (e.g., Long et al., 2023).

Keywords: global strategy, competitive dynamics, sustainability, hospitality, food

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THE HIDDEN RISKS OF USING AI IN BUSINESS PROCESSES: WHEN TECHNOLOGICAL PROGRESS REINFORCES OUTDATED BIASES

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ABSTRACT

Artificial Intelligence (AI) is widely recognized as a leading emerging technology, playing a pivotal role in the development of effective strategies and in sustaining competitiveness in the contemporary market landscape (Enholm et al., 2021). The rise of generative AI—particularly the advent of platforms like ChatGPT—has notably accelerated this shift (Davenport & Mittal, 2022; Kanbach et al., 2023). As AI adoption promises benefits such as increased revenue, improved efficiency, and enhanced operations (Makarius et al., 2020; Mikalef & Gupta, 2021), its influence on business functions is undeniable. In support of this, a recent Forbes study estimates that AI could affect up to 300 million jobs, positioning it as a key catalyst for societal transformation (Kelly, 2023). Similarly, a Harvard Business Review report indicates that AI has the potential to enhance, automate, or redefine the majority of business functions and over 40% of all work activities in the United States (Wilson & Daugherty, 2024). In short, the implementation of AI across work environments appears to be a strong contributor to value creation, and as such, is rapidly reshaping business processes at every level. However, not all that glitters is gold. The rapid, pervasive, and often uncontrolled integration of AI into organizational dynamics also presents unforeseen challenges (Benlian et al., 2022; Grundner & Neuhofer, 2021). While AI adoption has demonstrably improved performance, one pressing concern is how AI, rather than mitigating, may amplify human psychological limitations—specifically cognitive biases— inherent to human decision making (Ntoutsi et al., 2020). For example, the integration of AI into business operations, while promising increased efficiency and innovation, can inadvertently threaten both fairness and effectiveness. In fact AI systems often learn from historical data, which may contain embedded social biases (e.g., gender, racial, or age-related). If these biases go unaddressed, AI can replicate and even amplify unfair treatment in hiring, customer service, performance evaluation, lending, and more—undermining equity and inclusivity (Ntoutsi et al., 2020). The study of cognitive biases dates back nearly half a century, beginning with the influential work of Kahneman and Tversky (1974) through their "Heuristics and Biases Program." This research aimed to understand how individuals make decisions under conditions of uncertainty, ambiguity, and constrained resources. Since then, a vast body of literature has explored the pervasive influence of cognitive biases across diverse domains of human decision-making. While multiple definitions exist, there is broad consensus

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in the literature that biases are systematic errors in judgment—deviations from normative or rational standards (Haselton & Buss, 2000). Today, hundreds of cognitive biases have been identified, yet the role of AI in reinforcing these biases remains underexplored. In other words, despite the vast number of studies on cognitive biases and human errors in decision-making, evidence regarding the possibility (and above all the conditions) that advanced technologies created by humans might have inherited these limitations is still lacking.

RESEARCH OBJECTIVES

This study aims to fill key gaps in understanding the intersection of AI and cognitive biases. Specifically, it seeks to identify: (a) which types of bias (e.g., gender bias, confirmation bias) are most likely to be amplified by AI systems, and (b) the technological and human factors contributing to this amplification. In other words, it seeks to clarify which cognitive biases are most at risk of being reinforced by AI, and under what conditions such negative effects are likely to occur.

METHODOLOGY

To achieve this, the study will first conduct a comprehensive review of existing knowledge on cognitive biases in AI systems. . Following this, given the exploratory nature of the study and in line with recent related studies (Palmucci, 2024), an empirical investigation will be conducted—potentially through qualitative ethnographic methods in organizational contexts that have already integrated the use of AI into business processes (e.g. recruiting activities). Subsequently data will be analysed by following Gioia method (Gioia et al., 2013), allowing theory to be built from participants' experiences through a systematic and visually structured coding process that will give the possibility to identify the drivers of bias amplification in AI systems

EXPECTED CONTRIBUTIONS

From a theoretical perspective, this study aims to shed light on the amplification of bias in AI-driven recruitment algorithms**,** focusing on how AI systems may unintentionally perpetuate discrimination. Specifically, it explores: (1) the replication of human biases in hiring data, leading to unfair candidate exclusion (Ntoutsi et al., 2020); (2) the lack of transparency in AI-driven evaluations, which challenges procedural fairness; and (3) the reinforcement of stereotypes in performance management, disadvantaging non-normative employee profiles. The findings aim to help HR professionals and business leaders develop concrete strategies that balance organizational goals with employee well-

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being. By addressing risks such as surveillance-driven distrust and the loss of human judgment in sensitive decisions, the study propose actionable managerial and policy-level strategies to mitigate these unintended consequences promotes fairer, more mindful AI use in business practices.

In conclusion, AI's potential to perpetuate bias presents an urgent challenge that must be addressed. address. By exploring the limitations and discriminatory potential of AI platforms, this study seeks to offer both scholars and practitioners a solid foundation for promoting fairness and effectiveness in AI-driven business practices at individual and organizational levels. Future research will aim to validate these insights, enhancing our understanding of the broader implications of AI bias and helping to develop more robust frameworks for mitigating these risks in diverse organizational settings.

Keywords: Artificial intelligence risks; Algorithmic Bias; Fairness in AI; effectiveness in AI; Discrimination with AI

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DIGITAL MARKETING MEETS CHANGING CONSUMER BEHAVIOUR: A NEW ERA OF ENGAGEMENT

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ABSTRACT

In the post-Covid era, advanced tools like artificial intelligence (AI) (Verma et al., 2021) emerging digital platforms (Peter et al., 2020) and social tensions are reshaping the relationship between brands and consumers (Zhabin et al., 2016; Rego et al., 2022; Lou et al., 2023). But as technology accelerates, consumers are also changing pace: they are more informed, demanding, and attentive to sustainability, ethics, and transparency (Carrigan & Attalla, 2001; Hoffman et al., 2010). In this evolving and unpredictable scenario, marketing managers must constantly refine messaging, select tools and channels with precision and adapt strategies (Hunt & Madhavaram, 2020). The first balancing act is balancing personalization with respect for privacy, as consumers seek tailored experiences (Chandra et al., 2022), without compromising data protection (Martin & Murphy, 2017). Authenticity is equally critical—brands must demonstrate real commitment to sustainability, not just claim it (e.g., greenwashing) (Fang, 2024; Szabo & Webster, 2021). Also, choosing the right channels and tailoring content to a rapidly evolving jungle of digital platforms (Ziamou, 2002) demands constant upskilling, while managing the overflow of data (Acemoglu et al., 2022) and transforming it into actionable insights becomes essential to foster loyalty in an oversaturated media landscape. Other dynamics are redefining marketing: the rise of AI and the effects of the "post-Covid digitalized era" (Palmucci et al., 2025). In fact, AI and automation in marketing has boosted operational efficiency and analytics (Pedersen & Ritter, 2024), but if misused, risks eroding the human and relational component of communication (Kirk & Givi, 2025). The danger is turning interaction into a cold, impersonal process—lacking that creative and authentic touch that sparks empathy. In other words, emotions, intuition, and the ability to tell meaningful stories remain irreplaceable human qualities. Finally, the phenomenon of deglobalization (Butollo & Staritz, 2021) is shifting the global marketing paradigm. Geopolitical crises, trade tensions, supply chain disruptions, and growing global instability—is redefining the global role of businesses (Zhabin et al., 2016). As a result, marketing professionals must develop a new kind of strategic awareness: one focused on managing a delicate balance between globalization and localization. This duality—what some call "glocalization" (Svensson, 2001)—requires the ability to craft hybrid strategies that ensure global consistency and recognizability, while remaining deeply rooted in the cultural, ethical, and regulatory specificities of local markets (Rego et

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al., 2022). In other words, it's no longer enough to deliver a single, universal message. Brands must now reframe their storytelling based on local sensitivities, cultural imaginaries, and consumer expectations (Huang, 2023).

Considering all the above, current research often addresses challenges in isolation—focusing on technology, consumer behavior, or globalization separately—without offering an integrated framework that captures their interdependencies (Sheth, 2021). In other words, what overlooked is a cohesive perspective capable of mapping, prioritizing, and connecting the various forces shaping digital marketing today wherein a focus on new-age technologies involving AI (Chandra et al., 2022), socio-economical-political influences (Jungblut & Johnen, 2022) and new consumers' engagement (Wang, 2021). Such approach can contribute to set the foundations for a renewed and future-oriented profile of the marketing manager.

RESEARCH OBJECTIVES

This study aims to advance our current understanding of the evolving digital marketing area by (a) identifying and analyze the main challenges facing brands today—ranging from technological disruptions to shifting consumer expectations—and assess whether some pose more critical threats than others; and (b) outlining a comprehensive perspective of the modern marketing manager, capable of effectively navigating and responding to these emerging complexities. In doing so, this study aspires to provide a structured framework for both prioritizing these challenges and guiding the development of future-ready marketing managers.

METHODOLOGY

To achieve these goals, the study will utilize a qualitative approach to analyze the impact of market and organizational challenges on marketing strategy decision-making (Jarratt & Fayed, 2001). The data for this study will be analyzed using content analysis, following the approach described by Cooper & Schindler (2014). Researchers will systematically examine participants' interviews to identify key thematic units. These units will form the basis for addressing the study's guiding questions and will allow for comparisons with findings from previous research (Crouse et al., 2011).

EXPECTED CONTRIBUTIONS

Theoretically, this study aims to highlight new challenges facing marketing management in light of

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the paradigmatical technological, social and economic changes characterizing the post-covid digital era. The findings also aim to support marketing practitioners in developing concrete strategies to navigate today's busine landscape. By addressing relevant challenges such as AI usage and "glocalization management", the study will propose actionable strategies for engaging increasingly demanding consumers. In conclusion, given current constraints, modern marketing managers need to move like "acrobats", balancing on a wire stretched between technological innovation, emerging social sensitivities, and global economic pressures. To stay upright—and move forward—it seems they need balance, vision, and an impressive mental agility. Also, how brands manage this tension between global and local can significantly shape how legitimate and relevant they appear in the marketplace. Thus, navigating deglobalization cannot be approached with static or overly centralized approaches. It calls for flexible decision-making models, constant contextual awareness, and a broad capacity for intercultural learning. Further research will therefore explore the conditions that enable marketing managers to maintain these complex balances and, for example promote the use of AI as a strategic tool (not a substitute for the human dimension at the heart of marketing) to build real, lasting connections with audiences and also find compromises between standardization and adaptation of messages to address the growing tensions between global integration and local responsiveness.

Keywords: Marketing challenges; Consumer Engagement; Personalization in Marketing; New marketing; Globalization vs Localization in Marketing;

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EMPLOYEE INSECURITY AND COMMITMENT IN GREEK SOCIAL SERVICES: THE MEDIATING ROLE OF EMPLOYEE SATISFACTION AND THE MODERATING INFLUENCE OF INDIVIDUAL AND ORGANIZATIONAL FACTORS

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ABSTRACT

Employee insecurity is a critical challenge in contemporary workplaces, particularly within the public and social service sectors, where unstable employment conditions can significantly affect employee attitudes and behaviors (Morgan *et al.*, 2000; Clark & Postel-Vinay, 2009). Expanding earlier studies (Abidin *et al.*, 2010; Dalkrani & Dimitriadis, 2018), this study explores the relationship between employee insecurity and employee commitment in the context of a Greek social service organization, investigating the underlying mechanisms and boundary conditions of this association. The research adopts a mediation-moderation model Figure 1), examining the mediating role of employee satisfaction in the link between employee insecurity and employee commitment (Buitendach & De Witte, 2005). Furthermore, the study explores the moderating effects of age, employment relationship (permanent vs. temporary contracts), employment alternatives, and participation in decision-making on these relationships (Salami, 2008; Amangala, 2013; Callea *et al.*, 2016).

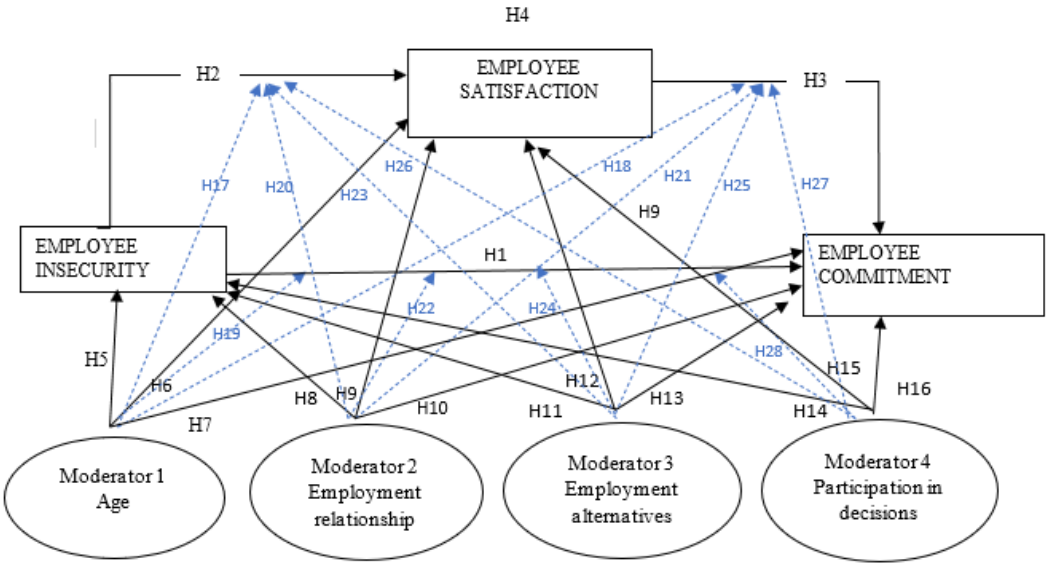


Figure 1. The research model

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Data were collected with simple random sampling from employees working in the Electronic Unified Social Security Agency (e-EFKA), the largest public insurance organization in Greece. Anonymous self-completed questionnaires were distributed to employees of the insurance organization of e-EFKA during the summer of 2020. The sample of our survey consists of 432 employees, who came from 17 branches of the organization, based in 5 Greek prefectures. The empirical research revealed high rates of employee insecurity resulted from the plethora of employee changes experienced by public sector employees due to the recent Greek economic crisis, as well as the reorganization of e-EFKA. The mechanism linking employee insecurity and employee commitment as well as the role of the mediator and moderators was investigated with structural equation modelling technique (Memon et al., 2019). The results of path analysis revealed that: (i) employee satisfaction mediates the impact of employee insecurity to employee commitment, (ii) age affects employee satisfaction and employee commitment and moderates the relation between employee insecurity and employee satisfaction, (iii) the type of employment relationship affects employee insecurity and moderates the relation between employee satisfaction and employee commitment, (iv) easiness to find another employer affects employee insecurity and employee satisfaction and moderates the relation between employee satisfaction and employee commitment, and (v) participation in organizational decisions affects all three main constructs (employee insecurity, employee satisfaction and employee commitment) and moderates the relation between employee satisfaction and employee commitment.

The findings of this study have both theoretical and managerial implications. First, the results challenge the stereotype of guaranteed job security in the public sector, confirming similar research (Gallie et al., 2017; Fischmann et al., 2023), which have also identified strong levels of quantitative and qualitative insecurity among public service workers, as a result of extensive strategic reforms and fiscal adjustments in the wake of the global economic crisis. In addition, the present paper reinforces and expands on the findings of other researchers (Callea et al., 2016; Chirumbolo et al., 2020) that tried to shed light on the interplay between employee insecurity and engagement, confirming the mediating importance of factors such as age, type of employment relationship and perceived employment alternatives. Overall, the findings suggest that employee insecurity, satisfaction and commitment may be strongly subjective in nature, and vary significantly between employees working in the same organization and under very similar objective working conditions, thus expanding on the findings of Näswall and De Witte (2003).

Furthermore, the study has practical implications for the management of public organizations. Clarifying the mediating role of employee satisfaction enables managers to enhance employee engagement by facilitating factors such as recognition of achievements and supportive leadership,

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even when the objective employee conditions cannot be altered. Moreover, clarifying the role of moderating variables equips managers with additional tools. For example, focus should be given to older and temporary employees who experience higher job insecurity and lower job commitment. Finally, encouraging employee participation in decision-making is crucial, since it can significantly improve both employee satisfaction and employee commitment.

Keywords: employee insecurity, employee satisfaction, employee commitment, participation in decisions, public sector, EFKA, Greece, path analysis

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IMPACT OF ETHICAL LEADERSHIP AND PHYSICAL WORK ENVIRONMENT ON EMPLOYEE CREATIVITY AND INNOVATIVE BEHAVIOUR

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ABSTRACT

This study challenges existing theoretical frameworks by examining the interrelations between ethical leadership practices, the physical work environment, and employee creativity and innovative behavior in the same context. Previous research underscores the pivotal role of ethical leadership and the physical work environment in cultivating employee creativity and innovation; however, further research is needed to understand the complex mechanisms and contextual factors shaping these relationships (Islam et al., 2024; Kearney et al., 2023; Sharma and Sharma, 2024). Previous studies have separately investigated the impact of ethical leadership on innovative work behaviors (Huang et al., 2023; Liu et al., 2023). Despite the importance of creativity and innovation in the contemporary economy, there is a notable lack of literature examining the interplay between ethical leadership, the physical work environment, and employee innovative performance, including the mediating influence of creativity.

The success of an organization depends on ethical leadership and a conducive physical work environment, which enhance employee well-being and drive innovation, conferring competitive advantage (Hamed et al., 2024; Islam et al., 2024; Liu et al., 2023). This study aims to contribute to the existing body of knowledge and provides novel insights for a contemporary perspective on the subject. A comprehensive literature review identified fragmented publications aligned with this study's aim, anticipating that the findings will contribute new insights to the existing knowledge corpus. The study aims to address the aforementioned gaps by employing a quantitative research method, utilising a survey questionnaire. The questionnaire was developed using scales from Brown et al. (2005), Sander et al. (2019), Zhou and George (2001) and Hu et al. (2009). Data from 185 anonymously completed questionnaires, obtained through a random sampling method, were analysed using IBM SPSS software to test the hypotheses as follows:

H1 – There is a positive relationship between ethical leadership and innovative behaviour (rejected).
H2 – There is a positive relationship between ethical leadership and employee creativity (confirmed).
H3 – There is a positive relationship between creativity and innovative behaviour (confirmed).
H4 – Creativity acts as a mediator between ethical leadership and innovative behaviour (confirmed).

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H5 – Physical work environment positively impacts employee creativity (rejected).

H6 – Physical work environment positively impacts employee innovative behavior (rejected).

The statistical analysis of the quantitative study data led to several conclusions and practical insights. First, this study uses an ethical framework to examine the impact of ethical leadership on employee innovative behaviors (Hamed et. al., 2024; Huang et. al., 2023; Liu et al., 2023). While research on leadership's effect on creativity has increased, most studies focus on leaders' influence on employee creativity, leaving a gap in understanding their impact on innovative work behaviors. Second, this study explores the relationship between ethical leadership and employee innovative behavior, highlighting creativity's mediating role. Empirical evidence shows that employee creativity mediates the link between ethical leadership and innovative work behavior. Third, researchers emphasize the importance of physical work environments and their optimal use by organizations. Understanding their impact on employees is crucial, as these environments influence organizational activities and outcomes. Scientific literature highlights various factors, such as walls, plants, and temperature, that comprise the physical work environment (Islam et al., 2024; Kearney et al., 2023; Sharma and Sharma, 2024). For optimal adaptation, a comprehensive consideration of these elements is essential. Fourth, this study highlights the crucial influence of ethical leadership and the physical work environment on employee creativity and innovation. However, further research is needed to understand the complex mechanisms and contextual factors shaping these relationships.

Our research has several managerial implications. Firstly, ethical leadership plays a pivotal role in shaping employee engagement in innovative practices. Prior research shows that employees' positive conduct is influenced by their leadership environment. Organizations should recognize the importance of employee creativity and facilitate its development. Ethical leaders can encourage creative employees to behave more innovatively. Secondly, the physical work environment significantly impacts employee creativity and innovative behavior. Organizations should prioritize creating visually appealing and engaging workplaces to enhance employee satisfaction, behavior, productivity, and engagement. This approach fosters an environment where employees can effectively implement and integrate innovative ideas.

Keywords: ethical leadership, physical work environment, employee creativity, innovative behaviour

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IMPACT OF ETHICAL LEADERSHIP AND PHYSICAL WORK ENVIRONMENT ON EMPLOYEE CREATIVITY AND INNOVATIVE BEHAVIOUR

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THE EFFECTS OF ORGANISATIONAL AND FAMILY SUPPORT ON MOMPRENEURSHIP INTENTIONS: THE MEDIATING ROLE OF FEAR OF FAILURE

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ABSTRACT

INTRODUCTION

Mompreneurship as combining motherhood and entrepreneurship (Abdelsalam et.al., 2021) can be described as the creation of a new business venture by a woman who identifies as both a mother and a business woman. As women become mothers, adverse organizational family support policies are likely to encourage working mothers' intentions to become mompreneurs (Agnihotri and Bhattacharya, 2020). In the same way, the effect of family demands is precisely the driving force for entrepreneurship, but could also limit the entrepreneur's time and dedication, thereby impacting success negatively (Cabrera and Mauricio, 2017). While previous research has shown that organisational and family support has an impact on entrepreneurial intentions, less attention has been paid to the role of fear of failure as a mediating factor, particularly in relation to mompreneurship intentions. Because of fear of failure as a psychological factor inhibiting entrepreneurship women might be afraid to start a business, but such fear often is not enough to stop the willingness to become an entrepreneur (Sousa-Filho *et al.,* 2023). The aim of this study is to examine the direct and indirect effects of organisational and family support on mompreneurship intentions with fear of failure in a mediating role. The study contributes to the existing knowledge field by providing support for the contention that fear of failure performs a mediating role in the link between mompreneurship intentions and family support.

METHODOLOGY

A research model was constructed and hypotheses were developed as to whether perceived organizational and family support influence mompreneurship intentions when mediating on fear of failure. A questionnaire was developed based on related and suitable studies and measuring tools from the literature to develop a survey that covers all the variables in this research. Mompreneurship intentions were measured using Thompson's (2009) widely used six-item scale of individual entrepreneurial intentions. The family support scale (five items) adapted from Truong *et al*. (2022) and

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the perceived organizational support (9-items scale) based on Agnihotri and Bhattacharya (2020). The fear of failure was measured with 7-item scale adapted from Van Gelderen *et al*. (2015). The sample of this study was women aged 22-55 years, raising children up to 12 years. The survey of mothers was carried out in 2024 in the months of April-May. 208 filled in questionnaires were obtained, and data from these were submitted to further analysis.

FINDINGS

This study tested the proposed research model and proved the mediator role of fear of failure between family support and mompreneurship intentions (but not organisational support). The results confirmed the direct positive impact of family support and fear of failure on entrepreneurial intentions. It also found a direct effect of family support on mothers' fear of failure. No direct effect of organisational support on either entrepreneurial intentions or fear of failure was found. The results show that family support is much more important than organisational support in the context of mothers' entrepreneurial intentions to reduce fear of starting a business.

IMPLICATIONS AND LIMITATIONS

From a theoretical perspective, our findings contribute to an increased understanding of the mompreneurship. From a management perspective, a clearer understanding of the impact of organisational support on mothers' entrepreneurial intentions can help the management of the organisation to adopt better strategies for retaining mothers as employees, support their aspirations to build families and work balance. This study has some limitations that allow for future research. Firstly, that all measurements were based on self-reported data and reflected the subjective perceptions of the respondents. More detailed results can be obtained using more objective measures. Secondly, our study is limited both geographically and culturally, as only residents of the Republic of Lithuania participated. Thus, results from other Eastern European countries may reveal more convincing aspects of the problem.

Keywords: Mompreneurship intentions, Organizational support, Family support, Fear of failure

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IMPACT OF FINANCIAL KNOWLEDGE, FINANCIAL ATTITUDE, AND FINANCIAL BEHAVIOR ON FINANCIAL LITERACY: INSIGHTS FROM THAI SOCIETY

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ABSTRACT

This study examines the impact of financial knowledge, financial attitude, and financial behavior on the financial literacy of individuals in Thailand. Financial literacy has become increasingly significant in the modern economy, as it empowers individuals to make informed financial decisions, manage resources effectively, and achieve long-term financial stability. The research adopts a quantitative approach, utilizing a structured questionnaire based on a validated instrument from prior studies. Responses were collected from a diverse sample of participants across Thailand, and the data were analyzed using structural equation modeling to identify relationships among the variables. Financial knowledge was found to be a strong predictor of financial literacy, particularly among males, individuals with higher education, high-income earners, and urban residents. Financial attitude emerged as the most consistent and significant predictor of financial literacy, with positive attitudes toward financial management strongly correlating with higher financial literacy, especially among females and those with higher education. In contrast, financial behavior exhibited limited or non-significant influence on financial literacy, with rural residents showing a marginally significant effect. The study also reveals demographic patterns, emphasizing how socioeconomic and geographic factors shape financial capabilities in different population segments. The findings highlight the importance of financial knowledge and attitudes in promoting financial literacy and suggest that financial education programs should prioritize enhancing access to financial education, fostering positive financial attitudes, and integrating practical financial behaviors, particularly in underserved groups such as rural and low-income populations by contextualizing financial literacy within Thailand's socio-economic landscape, this research contributes to the understanding of how various demographic factors influence financial literacy and offers insights for developing more effective financial literacy interventions.

INTRODUCTION

Financial literacy has emerged as a vital competency in today's increasingly complex global economy. It encompasses the knowledge, attitudes, and behaviors required to make sound financial decisions,

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manage personal resources effectively, and plan for long-term financial security. In Thailand, financial literacy has become an important issue due to rising household debt, the growing complexity of financial products (Endress, 2024).

Despite governmental initiatives, such as the Financial Literacy Development Plan in 2017, studies indicate that Thailand's financial literacy rates remain low. Only 27% of Thai adults demonstrated basic financial literacy in the 2018 Standard & Poor's Global Financial Literacy Survey (Klapper, Lusardi, & Van Oudheusden, 2018). Low financial literacy, particularly among rural populations, the elderly, and low-income groups, is associated with poor financial planning, high debt, and increased financial vulnerability. Urban-rural disparities further widen the financial literacy gap, as rural residents often lack access to formal financial education and digital financial services.

This research examines the impact of financial knowledge, financial attitude, and financial behavior on the financial literacy of individuals in Thailand. Adopting a quantitative approach, the study uses a structured questionnaire adapted from validated prior research and analyzes the relationships among variables through structural equation modeling. Building on (Banthia & Dey, 2022) study conducted in India, this research investigates whether similar patterns exist within Thailand's unique financial and cultural environment.

The objectives of the study are fourfold: (1) to assess the levels of financial knowledge, attitude, and behavior among participants; (2) to examine the relationships among these factors; (3) to analyze their collective impact on financial literacy; and (4) to identify differences between rural and urban populations.

Findings from this study are expected to offer valuable insights for policymakers, educators, and financial institutions, informing the development of targeted financial literacy programs. Enhancing financial literacy in Thailand is essential not only for improving individual financial well-being but also for fostering inclusive economic growth, reducing income inequality, and enhancing national economic resilience.

HYPOTHESIS DEVELOPMENT & RESEARCH METHODOLOGY

This study seeks to establish the connection between financial literacy and its constituent factors: financial knowledge, financial attitude, and financial behavior within the context of Thailand. Extending the study conducted by Banthia & Dey (2022) in India, this research applies the developed

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model to the Thai population while considering Thailand's distinct cultural, economic, and technological environments.

An additional contribution of this study is the examination of financial literacy differences between rural and urban populations in Thailand. By comparing these groups, the research aims to identify targeted areas for future financial education programs and policy interventions.

The study aligns its objectives, research questions, and hypotheses to systematically explore financial literacy and its key determinants. Figure 1 illustrates the linkage between financial literacy and its key determinants.

This study adopts a quantitative research approach to examine the impact of financial knowledge, financial attitude, and financial behavior on financial literacy in Thailand. Quantitative methods allow for the systematic collection and statistical analysis of numerical data, providing reliable and generalizable findings (Creswell & Plano Clark, 2017). The survey-based research design uses a structured questionnaire adapted from (Banthia & Dey, 2022). It measures four key areas: Financial Knowledge, Financial Attitude, Financial Behavior, and Self-Assessment of Financial Literacy. The survey also collects demographic and socioeconomic information to contextualize the findings. A sample size of 385 participants was determined based on Thailand's population (~71.7 million), a 95% confidence level, and a 5% margin of error, ensuring statistical significance.

Structural Equation Modeling (SEM) is employed for data analysis using RStudio, enabling the study of direct and indirect relationships among the constructs. Ethical considerations are rigorously followed, including informed consent, confidentiality, right to withdraw, non-harmful procedures, and secure data storage. Data will be retained for six months post-study completion. This research aims to deliver actionable insights for policymakers, educators, and financial institutions to design targeted financial education programs and improve financial decision-making among Thailand's population.

DISCUSSION AND CONCLUSION

A. Financial Knowledge and Financial Literacy

The results suggest that financial knowledge is most impactful among groups with greater exposure to financial information and resources. Males, for instance, may benefit from workplace-based financial experiences and exhibit greater confidence in financial decision-making, which can enhance

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their ability to translate knowledge into practice (Lusardi & Mitchell, 2014; OECD, 2022). Similarly, individuals with higher educational attainment are better positioned to understand complex financial concepts and engage in long-term financial planning (Lusardi & Tufano, 2015; OECD, 2020).

Moreover, income level plays a crucial role in enabling the application of financial knowledge. Medium- and high-income earners are more likely to encounter financial products that require informed decision-making, such as investments, insurance, and retirement planning, making financial knowledge more relevant and useful to them (OECD, 2022; Xu & Zia, 2022). Urban residents benefit from greater access to digital financial tools, institutional services, and educational programs, further reinforcing the connection between knowledge and literacy (Atkinson & Messy, 2012; Agarwal et al., 2021). These results underscore the necessity of developing financial education strategies. Targeted interventions are needed to close the financial literacy gap among rural residents, low-income earners, and those with limited education. Financial literacy programs should be inclusive, easily accessible, and tailored to the needs and lifestyles of underserved populations.

B. Financial Attitude and Financial Literacy

This study reaffirms that financial attitude is a key determinant of financial literacy, with significant and consistent predictive power across diverse demographic groups, especially females, individuals with higher education, and medium- to high-income earners. These results emphasize that a positive financial mindset, including preferences for budgeting, saving, and long-term planning, contributes meaningfully to individuals' ability to manage personal finances effectively. Among female respondents, the strong link between financial attitude and literacy aligns with prior research showing that women often prioritize responsible financial behaviors such as budgeting and saving, which are foundational elements of financial literacy (Hung & Parker & Yoong, 2012; OECD, 2022). In the Thai context, cultural and social influences may further reinforce these patterns, particularly where financial responsibilities are shared or led by women in households.

Educational attainment also plays a crucial role in shaping financial attitudes. Individuals with a bachelor's degree or higher were more likely to exhibit forward-looking and disciplined financial attitudes, which directly correlate with higher financial literacy. This supports the view that higher education not only imparts knowledge but also cultivates values and confidence conducive to sound financial decision-making (Xiao & Porto, 2017; OECD, 2020). Furthermore, among medium- and high-income earners, financial attitudes often reflect a long-term focus on wealth accumulation, investing, and risk management—elements essential to financial capability (Lusardi & Tufano, 2015; Agarwal et

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al., 2021). The study's findings suggest that in groups with more financial resources and exposure, financial attitude bridges the gap between theoretical knowledge and practical financial behavior.

C. Financial Behavior and Financial Literacy

This study found that financial behavior had a limited or non-significant influence on financial literacy across most demographic groups, with only rural residents showing a marginally significant relationship. This result underscores a persistent disconnect between individuals' financial behaviors and their actual understanding of financial principles, which supports the notion that behavior alone is not always a reliable indicator of financial literacy.

The marginal significance observed among rural participants suggests that in resource-limited settings, basic financial actions such as saving, borrowing, and informal budgeting may serve as more direct indicators of financial engagement and understanding. In these environments, individuals may rely more heavily on practical experience than formal education, making behavior a slightly stronger proxy for literacy (OECD, 2020; Xu & Zia, 2022). However, in urban or more affluent populations, behaviors such as consumption, credit use, or risk-taking may reflect habits or social norms rather than informed choices (Atkinson & Messy, 2012).

These findings align with research indicating that behavioral patterns do not necessarily imply comprehension of the financial tools or systems being used. For instance, an individual might regularly save money but may not understand inflation, interest rates, or investment options, thereby limiting their financial literacy (OECD, 2022). Financial education programs that focus exclusively on behavior modification without reinforcing foundational knowledge and attitude may therefore have limited long-term impact.

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INVESTIGATING THE DIMENSIONS OF PRECARIOUS WORK: THE CASE OF THE GREEK HOTEL INDUSTRY

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ABSTRACT

Temporary contracts and part-time employment as dimensions of precarious work dominate the hospitality sector. The hospitality industry often relies on a flexible, low-paid and low-skilled workforce with limited job security and limited career prospects leading to precarious employment conditions (Kaushal and Srivastava 2021, Livanos and Tzika, 2022). Workers in these sector are also subject to seasonal fluctuations, where demand may decrease in certain months, leading to layoffs or reduced working hours. Gender inequality is also widespread in the industry (Costa *et al.*, 2017). In addition, the covid-19 pandemic had a devastating impact on hotel workers in Greece, with widespread job losses, financial insecurity, health concerns, and mental health issues. According to a report from the Greek Tourism Confederation the hospitality sector saw a drop in revenue of over 70% during 2020 (Insete, 2020).

The purpose of this paper is to examine the dimensions of precarious work in the Greek hotel industry before and after the pandemic era. Specifically, this study examines part-time and temporary hotel workers in relation to gender, age and educational level. Furthermore, this study correlates the Gender employment gap index for part-time and temporary contract employees in Greece with part-time and temporary hotel employees. This paper uses the most recent available data from the Eurostat database covering the period from 2014 to 2023 to study the phenomenon of precarious work in the Greek hotel industry. The frequency of data is available on an annual level.

The authors applied the Markov Switching regression model (Frühwirth-Schnatter, 2006) in order to investigate the impact of gender, age and educational level on part time and temporary hotel workers during the low (first period, 2013-2019) and high (second period, 2020-2023) volatility regimes. In addition, the authors propose a model of relationships between part-time and temporary workers in hotels and the gender employment gap index. This index measures the difference between the employment rates of men and women aged 20 to 64 in the Greek workforce. The gender gap is calculated by subtracting the female rate from the male rate.

The Markov-switching regression estimation results showed that the 15-24 age group and the tertiary education had the largest contribution to part-time workers, which was stronger in the second period, with an expected statistically significant positive sign. Furthermore, the age levels

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15-24, 45-54 and the secondary education had the largest contribution in the temporary workers, which the effect being weaker in the second period, with an expected statistically significant positive sign. For part-time women, the age level 15-24 and tertiary education had the most positive impact, which was stronger in the second period. In addition, the results exhibit a negative significant impact of the gender employment gap on both part-time and temporary workers. Moreover, the findings showed a particular interest. The above relationship for temporary workers was clearly stronger and decreased in the second period.

An explanation of these findings could be that as gender equality in the workforce improves, women may be moving into more permanent roles or better-paying opportunities, thereby reducing the overall share of women in temporary work in the hotel industry. In addition, young people (15-24) with tertiary education are more likely to engage in part-time employment, particularly in industries such as hospitality, where there is a higher demand for flexible work, especially after pandemic. The findings could also reflect the labor market segmentation theory, where there is a division between temporary and permanent jobs. The present study contributes to existing theory by examining the relationship between age, education, gender, and employment type (part-time and temporary) in the hotel industry, especially with respect to the Markov-switching regression model. The practical implications for employers and policymakers include offering flexible, long-term opportunities for women and younger. Moreover, educated workers can enhance labor market outcomes and promote a more inclusive, gender-equal workforce.

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Keywords: precarious work, part-time, temporary, gender gap, Greece, hotel industry, covid-19

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MENTAL HEALTH IN YOUTH FOOTBALL: A SYSTEMATIC REVIEW OF RISK AND PROTECTIVE FACTORS

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ABSTRACT

RESEARCH BACKGROUND

Mental health in athletes was for many years overlooked due to stereotypes of resilience (Gwyther et al., 2024). However, high-profile cases like Álvaro Morata's openness about depression have challenged this view (McInnes, 2024). Since 2010, research and institutional attention have grown significantly (Gorczynski et al., 2021). The International Olympic Committee (IOC) has emphasized the prevalence of mental health disorders among elite athletes and the need for evidence-based care and destigmatization (Mountjoy et al., 2023). The European Association for Sport Psychology (FEPSAC) stressed that mental disorders in athletes are comparable to the general population but often go unrecognized due to sport-specific stressors and varied healthcare systems (Moesch et al., 2018). The International Society of Sport Psychology (ISSP) further advocates a holistic, multidimensional approach, calling for sport-specific assessments, psychologically safe environments, and multidisciplinary teams led by mental health officers to support early detection and interventions like CBT, mindfulness, and digital tools (Schinke et al., 2024). Although several reviews address mental health in football, most of them focus on adult players, specific disorders (e.g., depression, burnout), particular events (e.g., career termination), or the post-COVID-19 period (Andrade et al., 2024). However, there is limited research specifically on youth football players. To address this gap, this systematic review aims to explore relevant studies on mental health and well-being in youth football players, for the ages 12 to 19, identify the relevant factors, assess validated measures, and recommend evidence-informed strategies to mitigate the problem.

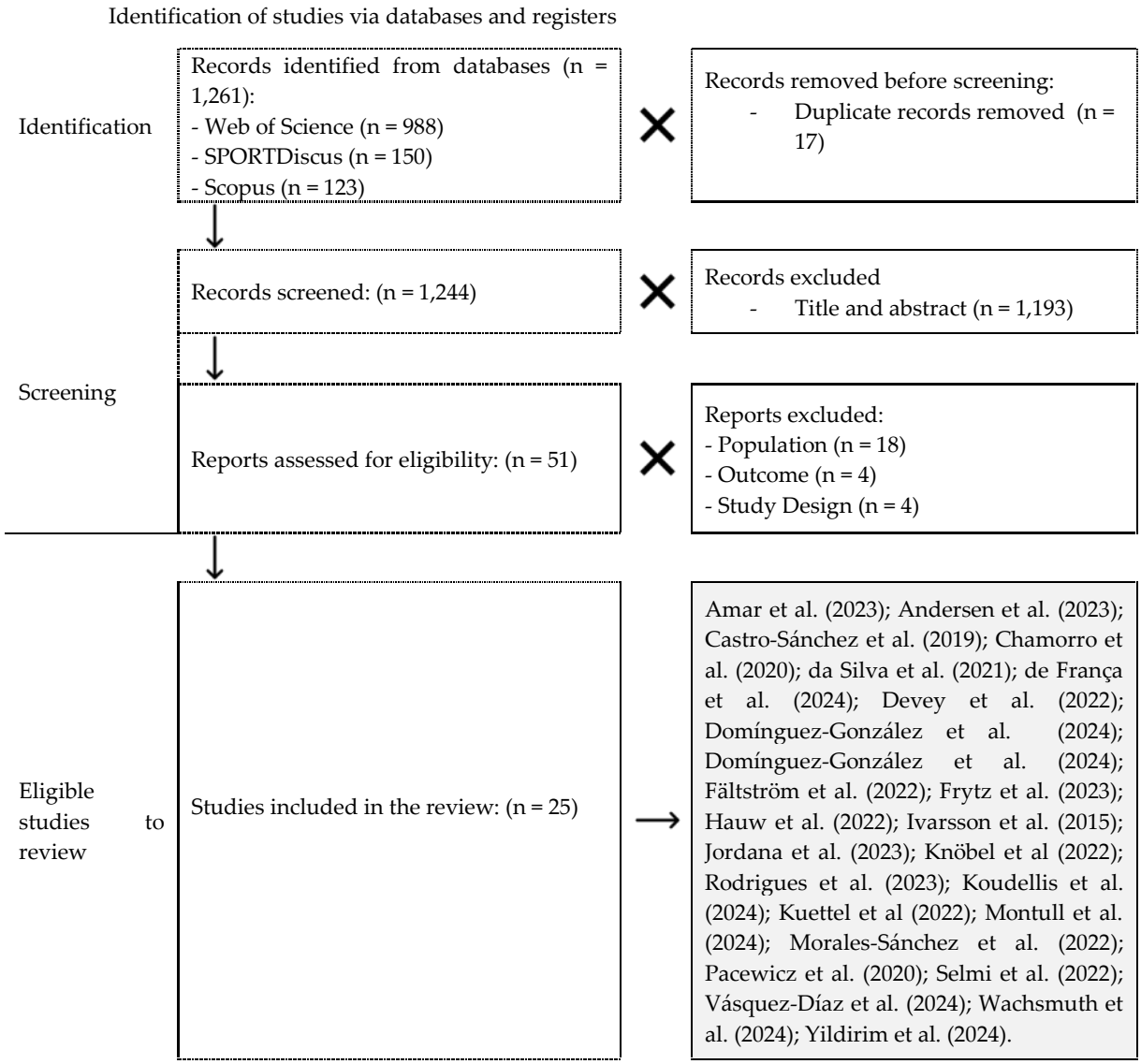
REVIEW STRATEGY

The study focuses on studies from the past ten years [2015-2025], following Gouttebarge et al.'s (2015) call for increased awareness of common mental disorders in football and the use of longitudinal designs to understand causal relationships. This time frame also captures changes before and after the COVID-19 pandemic, offering a broader perspective on evolving mental health challenges in youth football.

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This systematic review followed the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The systematic search was conducted on Web of Science, EBSCOhost (SPORTDiscus), and Scopus in January 2025. The search keywords were: "*youth" OR "adolescen*, AND "soccer" OR "football", AND "mental health" or "well-being"*. The search revealed 1261 studies, of which 25 were eligible to be included in the review (Figure 1).

Figure 1. Flow diagram according to PRISMA 2020 Guidelines



FINDINGS

The study reveals that youth football players experience mental health issues such as anxiety, depression, burnout, disordered eating, and distress. Additionally, these are demonstrated with

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higher rates in female football players and older players, and during key transitions. To better conceptualise the findings, they are categorized into six thematic categories:

- **Prevalence**: Anxiety [11-28%], depression [6.5-40%], disordered eating [11-22%], burnout, distress, and impaired well-being [17-40%] are common, with higher rates in females and during key transitions (e.g., junior to senior).

- **Environment**: Task-oriented and empowering motivational climates characterized by coach support, autonomy, and clear development goals correlate with greater emotional intelligence, self-confidence, and reduced anxiety, whereas ego and controlling climates impair those outcomes.

- **Contextual and Situational Factors**: Elite players demonstrate superior physical fitness, lower anxiety, and higher resilience compared to sub-elite and non-elite peers; international camps, intensive training blocks, and away matches elevate stress, fatigue, and mood disturbances.

- **Basic Psychological Needs and Irrational Beliefs**: Satisfaction of autonomy, competence, and relatedness served as a protective factor, while irrational self-determination beliefs, perfectionistic concerns, and obsessive passion predict poorer mental health outcomes.

- **Personality**: External locus of control predicts higher anxiety and lower self-confidence, whereas internal locus and conscientious traits support resilience; dispositional deficits in emotional stability and conscientiousness highlight varied support needs.

- **Other Outcomes**: Effective coping strategies, flow states, interoceptive awareness, executive function variations, and sleep quality disruptions are linked to mental health, underscoring the multifaceted nature of youth footballers' well-being.

RECOMMENDATIONS

The study offers a number of recommendations, to mitigate the mental health issues in youth football, such as regular monitoring of mental and physical health, coach education to foster supportive environments, psychological skills training, and broad mental health promotion. Specifically, the following evidence-informed strategies are introduced:

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- **Systematic Monitoring** of psychological states (e.g., anxiety, burnout, mood, etc.), lifestyle factors (e.g., sleep, nutrition), and physical states (e.g., training load), particularly during high-stress periods.

- **Coach Education** to cultivate task-oriented and transformational leadership climates, emphasizing constructive feedback, autonomy support, and gender-sensitive approaches.

- **Psychological Skills Training** such as relaxation, goal setting, self-talk, etc. should be integrated into daily routines and tailored to individual needs.

- **Mental Health Promotion** via workshops to improve mental health literacy, destigmatize help-seeking, and provide early intervention pathways.

- **Multidisciplinary Support** involving mental health professionals, sport psychologists, medical and nutritional experts, coaches, and parents providing holistic, context-sensitive care, is vital for early detection and effective intervention.

CONCLUSION

This review found that youth football players face mental health challenges and reduced well-being at rates similar to other youth athletes. Common issues include anxiety, depression, burnout, disordered eating, and distress, with higher rates in female and older players, especially during key transitions. Risk factors include irrational beliefs, disempowering climates, sleep issues, perfectionism, obsessive passion, and external locus of control. Protective factors include fulfilling basic psychological needs, empowering climates, transformational leadership, harmonious passion, and internal locus of control. Recommendations for clubs include regular monitoring of mental and physical health, coach education to foster supportive environments, psychological skills training, and broad mental health promotion. A multidisciplinary support system, engaging coaches, medical staff, parents, and schools, is vital for early detection and effective intervention.

Keywords: Mental health; Well-being; Youth football.

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EFFECT OF RIVALS' LABOR UNIONS ON EMPLOYEE TREATMENT

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ABSTRACT

Prior literature abundantly documents the influences of labor unions on a firm's compensation and benefits (Blanchflower et al., 1996; Bova, 2013) and disclosure behavior (Chung et al., 2016; Hilary, 2006; Scott, 1994; DeAngelo and DeAngelo, 1991; D'Souza and Jacob, 2001). However, little is known about how *rivals'* labor unions affect firm behavior. To this end, I examine whether *rivals'* labor unions affect corporate employee treatment by exploiting the setting of U.S. unionization.

In a unionized industry are unionized firms and non-unionized firms. Collective bargaining between unionized firms and labor unions often results in outcomes favorable to unions and employees at the cost of firms. When *unionized rivals'* collective bargaining is disclosed, *non-unionized* firms' employees may feel dissatisfied and, in turn, leave (Mobley et al., 1979; Price, 2001). To pre-empt employee turnover, firms may improve the treatment of their dissatisfied employees. Therefore, firms have strong incentives to implement employee-friendly policies that could preclude employee dissatisfaction and turnover. Consequently, I predict that *non-unionized firms* improve workforce treatment around the time of *unionized rivals'* collective bargaining agreement disclosures.

Using a fixed effects regression, I find that when *unionized rivals* disclose collective bargaining agreements, *non-unionized firms* in unionized industries treat their employees better, consistent with my prediction. My result contributes primarily to the literature on unionization, disclosures, and human capital relations.

Keywords: labor union; employee relations; collective bargaining

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AN ANALYSIS OF THE ECOSYSTEM OF WOMEN-LED TEXTILE HANDICRAFT MICROENTERPRISES BASED ON SDGS 5 AND 8: THE CASE OF CHINCHERO, CUSCO, PERU

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ABSTRACT

This research aimed to describe and analyze the ecosystem and stakeholders involved in the activities of women-led textile handicraft microenterprises in the district of Chinchero, province of Urubamba, Cusco region, Peru. This study, grounded in the concepts of microenterprise and gender, respectively aligned with SDG 8 on economic growth and SDG 5 on gender equity, describes and analyzes the characteristics of women-led microenterprises engaged in handmade textile handicrafts. It examines the social, cultural, economic, and political environments that influence business operations and highlights the roles of various stakeholders in the ecosystem, including government, the private sector, NGOs, academia, financial institutions, churches, and others. This research follows a qualitative approach, utilizing in-depth interviews, focus groups, and participant observation as key tools for data collection and analysis. This methodology is well-suited for the exploratory nature of the study, which seeks to gain a deeper understanding of the experiences and perspectives of women microentrepreneurs engaged in handicraft production (Bansal & Corley, 2011). For data collection, the methodologies proposed by Krueger (1991), Charmaz (2000), and Hays and Singh (2011) were followed. A total of 11 in-depth interviews were conducted with key stakeholders in the ecosystem of women-led textile handicraft microenterprises in the district of Chinchero, province of Urubamba, region of Cusco. The study identifies three types of artisan microentrepreneurs, detailing their characteristics and needs. Additionally, this research proposes a sustainable business model for artisan microentrepreneurs and provides recommendations for the various stakeholders in the ecosystem.

Keywords: Microenterprises, artisans, women, sustainable businesses, SDGs.

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THE HYPE AND HOPE OF HYDROGEN: NAVIGATING MARKET CHALLENGES FOR GLOBAL GREEN HYDROGEN ECONOMIES

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ABSTRACT

Innovative and disruptive technologies take a meandering and often truncated path to limited successful commercialisation and is viewed from technological factors understood through "readiness levels" and economics. Alongside these pathways the market development of novel solutions undertakes a wandering path influenced by a confluence of institutional, cultural, environmental, and historic forces. These novel solutions require definition and understanding through a marketing and market shaping lens, whilst commercialisation requires an understanding of the complex networks of actors and agents. Applying such frameworks to a particular technological development such as green hydrogen, is a valuable means to better understand, and potentially predict, emergence of new technological successes. Framing the emergence of hydrogen as a market shaping challenge, with actor networks in a socio-technical framework can thus lead to innovative strategies and mechanisms.

This research, in its initial stages, first looks to define the market (Sissors, 1966), the hydrogen economy, looking at product definition, geographic market, a demographic description of customers and their social-psychological characteristics and building on previous definitions. These definitions ensue from product development and production perspectives, for example the use of language of colour, such as green, blue or pink hydrogen, as a differentiator of product options and their relative costs and benefits (Ball & Weeda, 2015).

Further, drawing on aspects of socio-technical systems (Kivimaa et al., 2022) we see that industries and markets emerge through social, technological and economic factors, with many of these being linked to environmental responsibility for the climate, pollution and circularity, for example product preferences for responsible consumption and premiums for abatement.

This work follows a qualitative semi-structured interview methodology. Interviewing experts in systems, business and policy to understand the socio-technical dynamics of a hydrogen economy. Interviews target diverse stakeholders across the network – from policymakers and industry leaders to potential end-users and community representatives.

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The semi-structured format allows for a flexible conversation guided by socio-technical and market shaping ideas. This then includes market definitions, influences of environmental responsibility and economic viability, and other non-technical drivers such as policy and agency.
In some cases the questions lead to recognition of participants' levels of understanding of the 'hydrogen economy,' including perceived benefits and barriers. Similarly, attitudes towards responsible consumption and ideas are linked to leadership and challenges.

This approach aims to capture nuanced perspectives by understanding levels of awareness and possible existing inertia, for example from leaders in fossil-based industries. The goal is rich qualitative data illuminating the human, political, and social dimensions alongside the technical and economic aspects.

This can be explored further considering planes of agency, such as political, and geo-political aspects, historical contexts and emotional responses (Granovetter & McGuire, 1998).
The research provides a better understanding of the interplay and inertia of political will and economic viability against socio-cultural acceptance, which then confirms the need for strategic network development, for example to nurture attitudes for responsible consumption and address societal readiness. It also helps to show how these innovations are variously located within the Gartner Hype Cycle (Fenn & Raskino, 2008). The proposal is that the global actors within the hydrogen economy should be considered through a proactive, collaborative, and systems-oriented approach, rather than combative and territorial approaches. This should lead to a recognition of hype while investing in hope.

Additionally, the market-shaping view shows that the hydrogen economy is a complex system involving interconnected actors. The non-technical drivers which can support shaping this market include governmental collaboration and support, infrastructure development, and standardisation. Of course, this must go alongside requirements for technological breakthroughs and thus cost reductions.

These socio-technical systems perspective, enhanced by Actor-Network Theory, can help to explain and expand the complex interplay between technology and society and map the relationships (Granovetter, 1985).

The outcomes of this work, using a qualitative interview approach will reveal diverse definitions of the hydrogen economy market. These are dependent on variations in political support, with many countries having published their hydrogen strategies for example BEIS 2022.
There are signs of limited societal readiness, suggesting opportunities for improvements in fostering

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collaborative networks. It is likely that management priorities would differ regionally. These could be focusing on securing funding, building infrastructure, or addressing social acceptance. Overall, these issues highlight the complex interplay and inertia of political, economic, and socio-cultural factors identified in the research framework, highlighting the necessity of tailored, systems-oriented strategies.

Then there can be a better understanding of market dynamics, in general including aspects of regional policies, inspirational leadership, and both consumer inclinations and antagonisms. Overall, this opens avenues for identifying collaborative and innovative opportunities. This conceptualisation could be applied to other disruptive technology areas such as AI and healthtech (Liljenberg, 2022).

Keywords: Socio-Technical Systems, Market Shaping, Hydrogen Economy, Innovation

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THE KEYWORD ANALYSIS OF ASP COSENZA ITALY AND NHS EAST KENT UK: EVOLOVING TREND IN GOVERNANCE NARRATIVES

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ABSTRACT

This study discourse changes at two public health institutions—NHS East Kent (UK) and ASP Cosenza (Italy)—through sub-keyword and longitudinal keyword analyses of performance reports from 2015 to 2022. Beyond traditional evaluations concerning value creation, the research analyzes how institutional efforts indicate shifted strategic priorities, administrative capacity, and public accountability. Thematic patterns in the textual contents of the reports are extracted and analyzed in KH Coder using computational content analysis. Sub-keyword clustering reveals major fields of interest, such as digital innovation, sustainability, workforce skill development, and compliance, while longitudinal trend analysis allows for following their persistence or disappearance over time. NHS East Kent's discourse seems structured and prospective, aligning well with policy reforms and long-term objectives, whereas ASP Cosenza discloses more fragmented and reactive themes, mostly tied to short-term worries and regional-scale policy constraints. This comparative investigation highlights the communicative dimensions of public governance in healthcare, unravelling how institutions promote their identity, handle public expectations, and relate to reform mandates through narrative framing. By treating institutional texts as data, the study offers a replicative methodology to evaluate strategic communication in the public sector. The findings give articulated suggestions to both scholars and policymakers concerning the next step.

INTRODUCTION

There is increasing scrutiny upon public healthcare institutions not only for operational efficiency but transparent governance (Kepler *et al*., 2024). Acting as stewards for public resources and as frontline service delivery agencies, these institutions ought to be more explicit concerning their strategies, challenges, and measures concerning reforms, to be comprehensible and held accountable in the sight of their wider stakeholder communities. In this way, performance reports act as an essential mechanism toward institutionalizing the discourse of institutional behavior, through content and form, including rational decisions and discharge of policy mandates.

This study contributes to this fledgling area of analysis of textual governance using some longitudinal and sub-keyword analysis applied to performance reports of two different public healthcare systems: NHS East Kent in the United Kingdom and ASP Cosenza in Italy. These bodies were chosen because

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of their different administrative set-ups, funding mechanisms, and regional governance contexts. NHS East Kent works at a centralized-national-level set-up, maintaining very good policy coherence, while ASP Cosenza embodies the difficulties of a decentralized system, governed at the regional level.

METHODOLOGY

A qualitative content analysis supported by computational text mining methods is applied to decipher the evolving discourse on governance in health care. Sub-keyword and longitudinal keyword analyses study how themes in performance reports reflect institutional change, strategic priorities, and administrative consistencies. The concern is not only performance outcomes, but also how these themes are strategically framed during the years 2015 to 2022.

Sub-keyword Clustering Technique: Sub-keyword analysis was performed to identify frequently co-occurring terms. Co-occurrence networks were constructed to visualize thematic clusters such as governance, innovation, sustainability, and training. The strength of association between keywords was measured using Jaccard coefficients and cosine similarity, enabling the identification of persistent or emerging themes.

Longitudinal Keyword Trend Analysis Technique: Year-by-year frequency tables were generated for top keywords and their clusters. These trends were then plotted to illustrate changes in institutional focus over time. For example, an increase in the frequency of keywords like “compliance” or “digital” over multiple years may indicate a strategic shift toward regulatory rigour or digital transformation.

RESULTS

This section delivers the findings of a sub-keyword and longitudinal keyword analysis performed for NHS East Kent and ASP Cosenza over the period 2015-2022. KH Coder was used to track thematic emphasis patterns, the changes in discourse, and the consistency of institutional narratives. From the study, sharp contrasts have emerged between the discourse of governance priorities of the two institutions over time. Figure 3 demonstrates that NHS East Kent focuses more systematically and comprehensively, concentrating on advanced digital transformation, diverse environmental initiatives, and a wide range of health care professional training programs compared to Italy.

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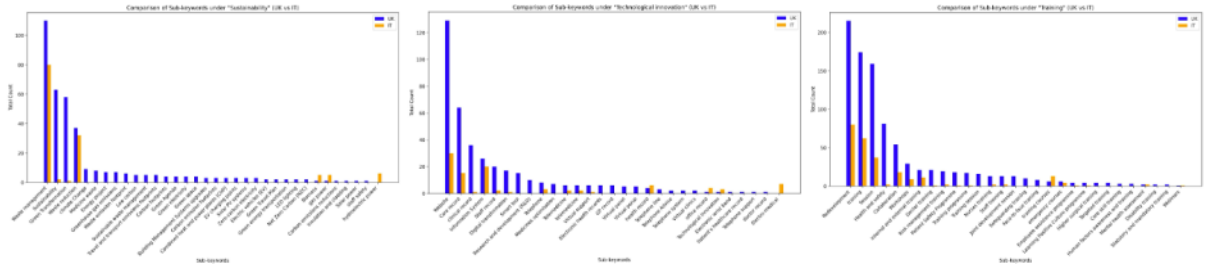


Figure 3: Sub-Keyword Analysis

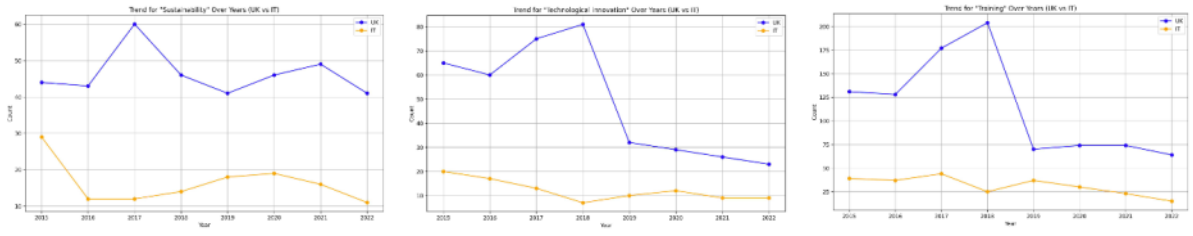


Figure 4: Longitudinal Trend Analysis

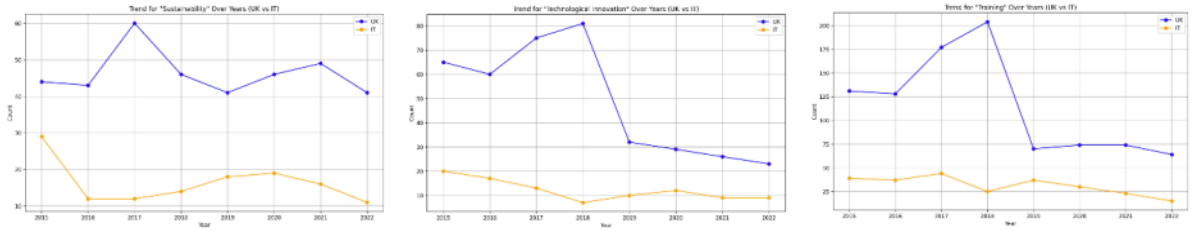


Figure 4 represents the longitudinal trend analysis, which shows NHS East Kent has more stronger institutional commitment, but in the post-COVID period, East Kent drastically declines due to shifting priorities and resource constraints. While ASP Cosenza revealed less engagement across all three themes. In short, both regions need to re-focus on these themes to ensure a long-term progressive, and resilient health care system.

CONCLUSION

The present study aimed to investigate the evolution of governance narratives within public healthcare organizations through sub-keyword and longitudinal keyword analysis carried out upon performance reports of NHS East Kent and ASP Cosenza. NHS East Kent shows a well-ordered and fully structured communication practice with an articulate thematic evolution along governance, sustainability, digital innovation, and workforce development. The consistency and systematic approaches are representative of the centralized and reform-oriented nature of the UK's NHS as well as its commitment to national-level strategic priorities such as the Net Zero carbon agenda or digital transformation. Conversely, ASP Cosenza exhibits fragmented and reactive patterns of discourse, with irregular occurrences of keywords and weak clustering of sub-keywords. Lastly, institutions can benefit from self-monitoring keyword trends to assess internal alignment and progress. Ultimately, this research affirms the value of institutional effectiveness as a strategic resource, providing a

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replicable methodology to enhance transparency, accountability, and governance learning in public healthcare systems.

Keywords: Healthcare System, Keyword Analysis, Sustainability, Technological Innovation, Training.

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INDIAN MILLENNIAL WOMEN: QUEST FOR EMPOWERMENT TO COUNTER PATRIARCHY

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ABSTRACT

The present study aimed to study the changing values of Indian millennial women to counter patriarchy, achieve empowerment in their careers, work, and families, and have a balanced life. Empowerment is both a value orientation for working in the community and a theoretical

model for understanding the process and consequences of efforts to exert control and influence over decisions that affect one's life, organizational functioning, and the quality of community life (Bailey (1992; Perkins & Zimmennan, 1995; Rappaport, 1981; Zimmennan & Warschausky, 1998). Traditionally, women socialized under patriarchal values (Lerner,1986) were happy to give up their careers in order to assume the role of the caregiver and homemaker. Patriarchy is a social system where men generally hold power over women in society. To enable the empowerment of women and to counter patriarchy, the Indian government has given a big thrust to the spread of education, started multiple schemes to empower women economically (collateral-free loans), socially (improving the Sex Ratio by ensuring education for girls), politically (reservation of elected seats for women)and educationally (Self Help Groups (SHGs) to become drone pilots to perform various economic activities like delivering medicines and groceries, skill development, digital literacy and getting employment). However, there are still many challenges, and the effect of patriarchy persists. Therefore, the present study was designed to determine if the values of millennial Indian women support their quest for empowerment and help counter patriarchy. The study was exploratory in design. It was divided into three parts:

Part 1 consisted of the use of a vignette (Atzmuller & Steiner, 2010) to understand the preferences of young women towards career and motherhood. The responses to the vignette were gathered on a 5-point scale: From the perspective of the themes in the first vignette, the woman gives up on her career in pursuit of motherhood. In the second vignette, the woman decides to pursue her professional career. In the third vignette, the woman decides to delay the pregnancy or not have a child to pursue her career.

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Part 2 consisted of gathering the responses on a Valued Living Questionnaire (VLQ) by Wilson et al. (2004) to understand the preferred values. The responses to the value scale were scored on a Likert scale of 1 to 10, with 1 representing little importance and 10 denoting high importance.

Part 3 consisted of rankings regarding the importance of the career and other aspects of life to explore women's value preferences further.

The sample consisted of 105 women from different parts of India, predominantly Mumbai. The ages of the women range from 19 to 32. Out of this, about 87 women fall in the age group of 21 to 25.

RESULT

Table 1 shows the percentage of responses for all three vignettes. The responses of scores 1 and 2 were combined. Similarly, the responses of 4 and 5 were combined. The neutral response (number 3) was kept separately. The results show that in vignette one, patriarchy had a greater influence. At the same time, the neutral responses were also the highest in vignette one. The high percentage of neutral responses show that the vignette created dissonance in the respondents' minds. This dissonance reflects the changing values towards strengthening empowerment and weakening patriarchy. Results of vignettes 2 and 3 were more in favour of work-life balance and delaying motherhood for a career, which is a sign of values favouring empowerment and weakening of patriarchy.

Table 1

	1- definitely wrong, 2=somewhat wrong,	3=neutral,	4=somewhat right, 5= definitely right.
Situation 1	12.40%	25.70%	61.90%
Situation 2	13.40%	10.50%	86.70%
Situation 3	3.90%	21%	75.20%

Table 2 shows the results of the value preferences of millennial Indian women. The fact that the top five values are focused on self, education, and family bonding (not marriage and parenting, fun, and work) shows that Indian millennial women prefer empowerment and are working towards it. Patriarchal values of marriage, child care and subordination to men are taking a backseat.

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Table 2

Value Category	Score Out Of 10
Self Care (Physical And Mental)	9.41
Education And Training	8.90
Family (Other Than Marriage Or Parenting)	8.64
Recreation And Fun	8.64
Work	8.55
Marriage/Couples/Intimate Relations	8.30
Friends And Social Life	8.15
Parenting	8.08
Citizenship And Community Life	7.37
Spirituality	7.32

The above conclusion also found support in part 3 of the study, where the respondents were asked two additional questions, as given in table 3

	Table 3	
1	Can you order the following according to their importance? (From most important and least important) Parenthood, Career, Marriage, Spirituality	65% of the participants started with Career, whereas 10% started with Parenthood.
2	Out of the following, what is a priority for you in the coming 2-3 years? Parenthood, Career, Marriage, Spirituality	102 participants started career as their only answer Only 3 participants did not say career

The responses show that millennial Indian women are imbibing empowerment over patriarchy

The study was exploratory, trying to understand how millennial women express empowerment. The question was relevant against the backdrop of multiple initiatives being taken by the government of India for the empowerment of millennial women. The experience of empowerment by women is the opposite of the belief and practice of patriarchy. In patriarchy, women are discouraged from crossing the boundaries of their homes and going out to work. Patriarchy also believes that childbearing and child-rearing are women's prime duties. The study shows that Indian millennial women are breaking the shackles of patriarchy and preferring to work and have an independent career, giving importance to self-care over other priorities like marriage and parenting. The study implies that Indian millennial women are directly or indirectly benefitted by the plethora of initiatives the Government of India unleashed towards the overall general upliftment of the disadvantaged segments and women in particular. This move will empower millennial women and also drive the country towards its dream of being a developed nation by 2047.

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The limitation of the study is that it is exploratory in design, and the sample size is primarily urban population. Future studies should focus on a more diverse population of Indian women and conduct qualitative studies to understand the factors supporting or inhibiting women's progress in India. A causal confirmatory research design can also further enable an understanding of future research directions for the study.

Keywords: Motherhood, Millennial women, empowerment, patriarchy

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PURCHASING VIRTUAL ITEMS IN VIRTUAL REALITY WORLDS: THE CENTRAL ROLE OF INTERS-SOCIALITY IN COMMUNITY BEHAVIORS

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ABSTRACT

The metaverse is a confluence of technological and community factors that transform user engagement and purchasing behavior, through novel virtual experiences. Yet the exploration of levers likely to reinforce engagement and purchase intention in the metaverse needs to be further explored by academic literature. To better understand how user engagement and intention to purchase virtual items develops in the metaverse, this study draws on the inter-sociality paradigm. Cross-sectional research was carried out with 267 players of online community games in virtual reality. Our results show that the combined influence of virtual reality and the community dimension strengthens the user's identification with his avatar and accentuates his commitment to his community. The user's commitment to his community encourages his intention to purchase virtual items in the metaverse. Our results invite professionals to deploy dynamic virtual interfaces capable of reinforcing sharing and collaboration between users. The aim is to promote hyperconnectivity to generate engagement, boost sales of virtual items and improve the profitability of businesses in the metaverse.

Keywords: Metavers, inter-sociality, virtual embodiment, community commitment, Purchase intention, virtual items.

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WHEN VIRTUAL REALITY BECOMES A LEVER FOR HUMAN CAPITAL DEVELOPMENT AND VALUE CREATION IN FIRMS

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ABSTRACT

While virtual reality (VR) is making inroads into the training and education sector, the literature does not study in detail its influence on the user's emotional and learning process. Yet these factors are essential to facilitating the use and dissemination of this technology among professionals in the sector. To better understand the influence of VR on user experience and learning, this study mobilizes the main theoretical foundations of self-determination and psychological well-being. Based on a sample of 186 continuing education employees in the industrial sector, our results show that VR enhances users' emotional involvement and confidence in VR training. These variables accentuate the perceived acquisition of skills and the intention to recommend the technology. Our results invite professionals to deploy this technology more widely in their training strategy and provide them with some concrete recommendations.

Keywords: Virtual reality, learning, emotional involvement, trust, recommendation.

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CO-CREATION AND CO-DESTRUCTION OF VALUE IN TOURISM SERVICES

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ABSTRACT

The tourism sector has undergone major transformations due to technological advancements (Lima and Brambilla, 2022), increasing consumer empowerment (Marques, Yamashita and Setefanini, 2017), and the centrality of experiences in value creation (Buhalis et al., 2020). In this context, value co-creation has become a widely accepted concept, especially within the service-dominant logic (S-D logic) proposed by Vargo and Lusch (2004). Co-creation in tourism allows tourists and providers to collaboratively shape experiences, adding value beyond the traditional supply-demand logic (Prahalad and Ramaswamy, 2004). However, recent literature highlights a neglected but equally critical dimension: the co-destruction of value (Echeverri and Skålén, 2021). Despite its relevance, few studies explore how interactions among stakeholders, particularly involving tourists, technology, and local communities, can lead to value degradation. Moreover, the duality of co-creation and co-destruction has not been sufficiently examined in terms of its impact on key behavioral outcomes such as electronic word-of-mouth (e-WOM) and intention to visit. This creates a critical research gap in understanding how these dynamics influence the perceived value of destinations and tourists' subsequent behaviors.

This study aims to empirically investigate the consequences of co-creation and co-destruction of value in the context of tourism services. Specifically, the study tests a structural model in which co-creation and co-destruction influence consumer-perceived value, e-WOM, and intention to visit. Studies have shown that negative experiences are more likely to be shared by consumers, whether in online reviews, social networks, or other electronic media (Dolan *et al*., 2019; Echeverri and Skålén, 2021). Co-destruction of value can generate negative ratings and unfavourable comments, negatively impacting e-WOM and influencing the image of the tourist destination (Arıca et al., 2022). The following hypotheses were tested:

H1: Co-creation positively affects perceived value.

H2: Co-destruction negatively affects perceived value.

H3: Co-destruction negatively affects e-WOM.

H4: Co-creation positively affects e-WOM.

H5: Perceived value positively affects intention to visit.

H6: Perceived value positively affects e-WOM.

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H7: Co-creation positively affects intention to visit.

H8: Co-destruction negatively affects intention to visit.

Rooted in the service-dominant logic, value is no longer viewed as embedded in products but co-created through interactions between providers and consumers (Vargo and Lusch, 2004; Akaka and Vargo, 2014). In the tourism context, co-creation can involve participative planning, personalization, or user-generated content, enriching the tourist's experience (Marques *et al*., 2017). Conversely, co-destruction can occur when expectations are misaligned or when digital or interpersonal interactions lead to dissatisfaction, loss of authenticity, or local resistance (Buhalis *et al*., 2020).

The duality between co-creation and co-destruction suggests that value is highly contingent and dynamic, shaped by context, interpretation, and stakeholder behavior. This complexity makes it essential to assess both positive and negative experiences and their impact on perceived value and downstream behavioral outcomes such as e-WOM and visit intentions (Dolan *et al*., 2019).

An online survey was developed and distributed via social media platforms (Facebook, Instagram, Messenger, WhatsApp) during March and April 2024. The final sample consisted of 215 valid responses. The study focused on tourists' experiences and perceptions regarding the city of Braga, Portugal. All data collection procedures complied with ethical research standards, ensuring full confidentiality and adherence to data protection regulations. Participants were informed about the voluntary nature of their participation, and all responses were anonymized and used exclusively for academic purposes. The questionnaire included two sections: one addressing demographic information and familiarity with Braga, and the other measuring the study variables using a five-point Likert scale. The measurement scales were adapted from validated sources: (1) Co-creation: Thoumrungroje (2014); (2) Co-destruction: Ogunbodede *et al*. (2021); (3) Perceived value: Netemeyer *et al.* (2003); (4) Intention to visit: Han *et al*. (2010); (5) e-WOM: Nysveen and Pedersen (2014). Data was analyzed using structural equation modeling. A five-point Likert scale was used to obtain information on the variables under study.

The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM), an approach suitable for exploratory research and complex models. Reliability and validity of the constructs were assessed and met the recommended thresholds in the academic literature. Composite reliability (CR) and average variance extracted (AVE) values confirmed internal consistency and convergent validity, while discriminant validity was verified using the Fornell-Larcker criterion and HTMT ratios.

Analysing the variables shows that the co-destruction variable is statistically significant and negatively influences e-WOM ($\beta = -0.091$, $p < 0.05$), and the co-creation variable positively influences e-WOM ($\beta = 0.297$, $p < 0.05$), both relationships being statistically significant. Hypotheses H3 and H4 are

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therefore supported. Perceived value is statistically significant and positively influences e-WOM ($\beta = 0.279$; $p < 0.05$), validating hypothesis H6. It also has a strong and significant positive effect on the intention to visit ($\beta = 0.525$; $p < 0.001$), confirming hypothesis H5.

Moreover, co-destruction significantly and negatively influences perceived value ($\beta = -0.091$; $p < 0.05$), while co-creation has a strong positive impact on perceived value ($\beta = 0.297$; $p < 0.001$), validating hypotheses H1 and H2. However, co-destruction does not significantly affect the intention to visit ($\beta = -0.049$; $p > 0.05$), and thus, hypothesis H8 is not supported. In contrast, co-creation positively influences the intention to visit ($\beta = 0.225$; $p < 0.05$), validating hypothesis H7.

These results underline the crucial role of perceived value as a mediator between the co-creation/co-destruction processes and behavioral intentions. Notably, co-destruction exerts a more limited direct effect on visit intention but significantly damages e-WOM, amplifying reputational risks.

This study contributes to tourism literature by integrating both co-creation and co-destruction constructs within a unified framework. It extends the service-dominant logic by confirming that not all interactions add value; some may degrade it, influencing perceived value and communication behaviors (e-WOM). The findings enrich our understanding of value as a contextual and relational outcome in tourism services.

Tourism managers must be proactive in facilitating co-creative experiences while identifying and minimizing touchpoints where co-destruction may occur, such as poor service, overcrowding, or technological failures. Enhancing co-creation through personalization, storytelling, and community involvement can boost destination value and visitor loyalty. Simultaneously, reputation management is vital, as negative e-WOM can undermine destination branding and influence potential visitors.

Keywords: Co-creation; Co-destruction; Intention to visit; Perceived value; e-WOM

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AI INFLUENCE ON ONLINE SHOPPING: A CONSUMER PERSPECTIVE

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ABSTRACT

Over the years, as consumer and business needs have changed and technology has developed, the concept of Artificial Intelligence (AI) has undergone a great deal of development (Hollebeek *et al*., 2014; Steinhoff *et al*., 2019; Bhbosale *et al*., 2020). The potential of AI technology extends to e-commerce. Introducing AI into online commerce strategies allows technology to optimise security, manage processes and perform repetitive actions without interruptions and failures, and improve the consumer experience (Kumar and Trakru, 2020). According to the literature review, AI is seen as an enhancer of customer satisfaction, reinforcing consumer retention and engagement. Thus, the adoption of intelligent systems is becoming increasingly important these days, and is a competitive advantage for companies to acquire (Song *et al*., 2024).

This study aims to understand how consumers react to the application of AI in e-commerce and how these technologies influence their feelings and behaviors. Although AI is increasingly integrated into e-commerce, there is a gap in understanding how security perceptions impact consumer engagement, satisfaction, and perceived value.

Consumer engagement is a very important concept in the field of marketing, as it refers to the extent to which consumers are involved and committed to a brand or product (Hollebeek *et al*., 2014). In the context of e-commerce, online consumer engagement is particularly noteworthy, as it is through the Internet that many consumers make their purchases and interact with brands, necessitating a good relationship between brands and customers (Vohra and Bhardwaj, 2019). By understanding the level of online consumer engagement, companies can take measures to improve the shopping experience, consumer satisfaction, and perceived value (de Vries and Carlson, 2014).

In accordance with the aim of this work, a set of research hypotheses were raised.

H1: Safety in AI applications (S) positively influences online consumer engagement (CE).

Hypothesis H1 suggests that security in AI applications positively impacts online consumer engagement. Engagement refers to users' active and positive involvement with an application or

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service (Hollebeek *et al*., 2014). Security is a crucial factor for online consumer engagement, as users want to protect their privacy and avoid risks related to the security of their personal data. When users realise that an AI application is safe, they feel more encouraged to interact and actively engage with the application. Security provides users with a sense of trust and peace of mind, which can result in increased engagement, such as carrying out transactions, interacting with advanced application features and sharing relevant information (Bhbosale *et al*., 2020; Adam *et al*., 2021; Lee and Xu, 2020). Therefore, the presence of security in AI applications can positively influence online consumer engagement.

H2: Safety in AI applications (S) positively influences online consumer satisfaction (CS).

Hypothesis H2 suggests that security in AI applications positively influences online consumer satisfaction. Security plays a key role in user satisfaction, as a lack of it can lead to privacy concerns, data breaches, or other security problems (Topol, 2019; Song *et al*., 2024; Adam *et al*., 2021). When users realise that an AI application is secure, they feel more confident in using it and trust that their data is protected. This contributes to a more satisfying experience since security is essential for continuous use and the user's sense of peace of mind (Pallathadka *et al*., 2022). Therefore, the presence of security in AI applications can have a positive impact on online consumer satisfaction.

H3: Security in AI applications (S) positively influences online consumer perceived value (PV).

Hypothesis H3 suggests that security in artificial intelligence (AI) applications positively impacts online consumer perceived value. Perceived value refers to the consumer's subjective perception of the benefits and usefulness that an application or service provides (Lee and Xu, 2020). Security is a crucial element for perceived value since users value the protection of their personal data and trust in using an application (Bhbosale *et al*., 2020; Song *et al*., 2024; Adam *et al*., 2021). When users perceive that an application with AI is secure, they attribute a higher value to it since they feel more comfortable using the application and trusting it to protect their personal information (Topol, 2019). The presence of robust security measures in AI applications can increase the value the online consumer perceives, leading to greater satisfaction and loyalty.

A quantitative methodology was employed through a structured online questionnaire, collecting 259 valid responses from diverse age groups. Online consumers in Portugal are the population to be studied. The sample covered the entire territory, with no limitations of any kind. The study tested three hypotheses: that safety in AI applications positively influences consumer engagement (CE),

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consumer satisfaction (CS), and perceived value (PV). Data analysis was performed using least squares estimation to verify these hypotheses.

The findings confirmed that security perceptions significantly enhance consumer engagement (β = 0,365, $p < 0,001$), satisfaction (β = 0,376, $p < 0,001$), and perceived value (β = 0,304, $p < 0,001$) in AI-driven e-commerce platforms. Consumers who feel secure using AI applications are more likely to engage with them, have higher brand satisfaction, and perceive higher value from the experience.

Theoretically, this study contributes to the literature by highlighting the pivotal role of security in AI applications in shaping consumer behavior in e-commerce. This study advances academic understanding by (1) filling a gap in AI and consumer behavior literature regarding the impact of security on consumer outcomes; (2) providing empirical validation of the security–engagement–value triad in AI-mediated e-commerce and (3) enriching the conceptualization of consumer engagement by integrating it with trust-based antecedents in AI contexts.

Managerially, the results underscore the importance of companies prioritizing robust security measures in AI tools to enhance customer engagement, perceived value, and satisfaction, ultimately driving brand loyalty and competitive advantage in the e-commerce landscape. Transparent communication of safety protocols, ethical data management, and reliable performance can significantly boost consumer confidence, enhance satisfaction, and increase perceived value — all of which contribute to stronger brand loyalty and competitive differentiation.

In a digital landscape increasingly shaped by AI, security perceptions are not merely technical features but strategic levers influencing consumer behavior. Future research could explore cross-cultural comparisons, longitudinal effects of AI trust over time, or the interplay between AI transparency and personalization in driving deeper consumer-brand relationships.

Keywords: Artificial Intelligence, Customer Engagement, Consumer Satisfaction, Perceived Value, e-Commerce

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IMPACT OF ACADEMIC, ADMINISTRATIVE, AND INFRASTRUCTURAL FACTORS ON STUDENT LOYALTY IN HIGHER EDUCATION: A COMPARATIVE INTERNATIONAL STUDY

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ABSTRACT

INTRODUCTION

Student loyalty refers to the extent to which students feel connected to the institution (Nesset and Helgesen, 2009), it is expressed through (positive) recommendations from students about their faculty and university, or active participation in extracurricular activities and commitment towards the institution (Snijders *et al.*, 2020). As a loyal student can support his or her academic institution financially, promote it by word of mouth or cooperate in other ways (Bui *et al*., 2023), interest in shaping loyalty to HEIs is not waning.

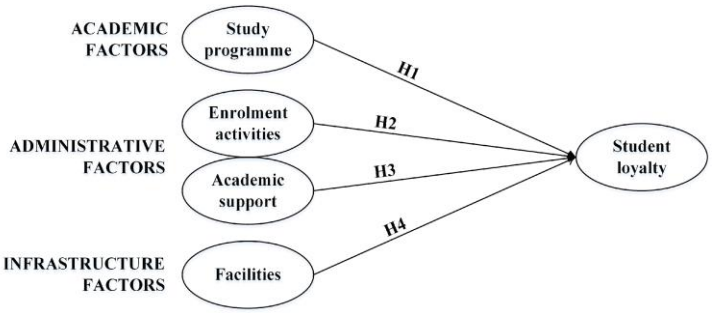
Many studies on student loyalty analysed various personal, psychological, social, or economic factors. From the managerial point of view there is a little sense just to know them without the possibility to shape them. Fewer studies (Shahsavar and Sudzina, 2017; Nguyen *et al.* 2024) analysed the impact of manageable factors of student loyalty, namely academic, administrative, and infrastructural factors. In addition, almost all such studies were based on a single sample. Notably, single sample research is not conducive to evaluating whether various determinants of loyalty are universal or whether they differ in diverse countries. As studies use different methodologies, questionnaires, and data collection tools, their results cannot be compared with any degree of accuracy.

Considering the mentioned research gaps this study aimed to assess and compare the impact of manageable (academic, administrative, and infrastructural) factors on the student loyalty in two countries, Lithuania and Portugal. By doing so, this study takes an original, purely managerial approach that could be of use to the administrators of HEIs.

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METHODOLOGY

We formulated four positive hypotheses. The conceptual research model addresses four direct effects, see Figure 1.



Source(s): Authors' own creation/work

Figure 1. Conceptual research model

To measure latent variables, the study relied on Wilkins and Balakrishnan (2013), Navarro *et al.* (2005), Annamdevula and Bellamkonda (2016), Hanssen and Solvoll (2015) and Snijders *et al.* (2020). We used a non-probability sampling method based on volunteer self-selection. Data were collected between May 2024 and September 2024, the surveys yielded 479 responses: 262 from Lithuania and 217 from Portugal. The analysis was based on structural equation modelling (SEM); we utilised IBM SPSS Amos v29.

FINDINGS

The results of the study indicated that the study programmes are a key determinant of student loyalty both in Lithuania and Portugal, see Table I.

		Lithuania				Portugal			
Hn	Path	Std. beta	T-value	p-value	Decision	Std. beta	T-value	p-value	Decision
H1	SPR ◎ LOY	0.542	5.645	***	Supported	0.630	6.468	***	Supported
H2	ENR ◎ LOY	0.099	1.417	0.156	Rejected	-0.014	-0.148	0.882	Rejected
H3	ASU ◎ LOY	0.112	1.685	0.092	Rejected	0.205	2.733	0.006	Supported
H4	FAC ◎ LOY	-0.072	-1.027	0.304	Rejected	0.102	1.298	0.194	Rejected

Note(s): SPR - study programme; ENR - enrolment; ASU - academic support; FAC - facilities; LOY – loyalty.
Source(s): Authors' own analysis based on CB-SEM results.

Table I. Hypotheses testing results: path coefficients

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Administrative support had a positive effect on students' loyalty in Portugal but not in Lithuania. In contrast, enrolment procedures and facilities had no impact on students' loyalty.

IMPLICATIONS

This study contributes to filling a gap in the research literature by highlighting the differences and similarities in the factors that shape student loyalty across the two culturally diverse countries, Lithuania and Portugal. While study programmes proved as the key factor for increasing student loyalty across the two contexts, investment into quality of study programmes should be a priority for managers of HEIs in both countries. Administrative factors as a driver of student loyalty emerged as a contextual factor and may be considered as a possible but not necessary quality investment. Facilities and enrolment procedures proved as not important factors for students' loyalty both in Lithuania and Portugal; they are the last in the investment queue. While the study indicated that the student loyalty in different countries may be shaped by differing factors, it is recommended that administrators of HEIs in various countries first consider managing the factors that shape student loyalty in their own country. Only after doing so, should they consider the experiences from other countries.

Keywords: Academic factors, Administrative factors, Facilities, Student loyalty, Comparative study

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MEETING THE NEEDS OF MULTIGENERATIONAL WORKFORCES: THE SOCIAL RESPONSIBILITY OF ORGANIZATIONS IN SATISFYING EMPLOYEES THROUGH SOCIAL MEDIA TECHNOLOGY

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ABSTRACT

In the context of Corporate Social Responsibility (CSR), social aspects have gained increasing meaning as organizations are required to distinguish the critical role of employee satisfaction in fostering positive both employee individual and organizational outcomes. With younger generations entering the workforce, organizations must adapt to meet their unique needs and preferences, especially in terms of new technology. Social media (SM) platforms, both private and public, offer valuable avenues for employees to express their emotions, build relationships, and share experiences—both positive and negative—regarding their organizations (Suprayitno, 2024). These digital venues not only fulfill socio-emotional needs but also allow employees to act as informal brand ambassadors, promoting their companies to external stakeholders.

The primary aim of this study is to explore how organizations can leverage social media to enhance employee satisfaction and address the socio-emotional needs of younger generations in the workplace. This research examines the role of social media in employee communication, focusing on the generational differences in social media engagement and the impact of satisfaction on employees' willingness to engage in positive employee eWOM (electronic Word of Mouth). The study will investigate how employees' emotional expressions and satisfaction with their organizations can influence their online behaviors and contribute to shaping the organizational image.

RESEARCH QUESTIONS

1. How does employee satisfaction influence the use of social media to promote an organization's reputation?

2. What are the socio-emotional needs of younger generations, and how can social media fulfill these needs in the workplace?

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3. To what extent does social media usage by employees impact organizational outcomes, such as employee branding, reputation, and customer satisfaction?

4. How do different social media platforms (private vs. public) affect the way employees share positive and negative experiences within an organization?

5. What are the generational differences in social media usage for employee satisfaction and organizational promotion?

METHODOLOGY

Both conceptual and empirical findings from previous research (Sakka and Ahammad, 2020; Sakka, 2021) indicate that employee satisfaction plays a pivotal role in enhancing employee branding behaviors. Nevertheless, these studies are mainly conceptual, or qualitative in nature. The results must be triangulated with further empirical research that will adopt mix-methodology. For this purpose, the study employs a mixed-methods approach, combining qualitative interviews and quantitative surveys to gather data from employees within Hospitality Industry. The survey will explore employee satisfaction levels, social media usage patterns, and their impact on organizational outcomes, while the interviews will provide in-depth insights into personal experiences and behaviors related to SM engagement. Participants will be grouped based on generational categories (Generation Y, Millennials, etc.) to identify both differentiations in social media usage and possible effects.

RELEVANT THEORIES

Generation Z, having grown up in a digital era, reveals a deep familiarity and comfort with technology. For this reason, they often prefer virtual and remote work environments, utilizing digital tools and platforms for collaboration. Their intrinsic motivation is closely connected to their ability to use technology to achieve work-life balance and autonomy. Organisations must comprehend how SM usage affects this generation's workplace ties and find innovative ways to take advantage of SM to fulfil their needs. This will help them to differentiate and obtain a sustainable competitive advantage in the modern workplace.

Under this vein, this research draws upon several theoretical frameworks to guide the investigation. The Social Exchange Theory (Blau, 1964) posits that employees engage in reciprocal relationships with their organizations, with satisfaction leading to positive behaviors such as the promotion of the organization. Additionally, the Social Media Usage Theory (Ngai et al., 2015) provides a basis for

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understanding the ways in which employees use SM for social interaction and expression in the workplace. The Employee Engagement Model (Kahn, 1990) also offers insight into how employees' emotional investment in their work impacts their actions online, while the concept of Employee Branding (King et al., 2016) underlines how satisfied employees actively engage in promoting their company through social media channels.

Satisfied employees are more likely to promote their organization on social media, contributing positively to the company's reputation (Sakka and Ahammad, 2020; Suprayitno, 2024; Ma and Zhang, 2025). However, dissatisfaction often leads to private, anonymous expressions of discontent rather than public negative e-WOM. Interestingly, younger employees (Generation Y) exhibit a higher propensity for using social media to share positive organizational experiences, while older generations tend to be more passive consumers of content (Sakka, 2021). This aligns with findings from previous studies (Bravo et al., 2017; Cervellon and Lirio, 2017) that show younger generations are more engaged in active social media behavior, such as posting, liking, and sharing content that reflects their satisfaction with their employers. Also, Naim and Lenka (2017) found that the use of social media in the workplace positively influences collaboration among Generation Y employees, leading to increased engagement. Their study suggests that social media serves as a platform for perceived learning, which in turn enhances employee engagement. Recently, research by El-Menawy and Saleh (2023) indicates that Generation Z actively manages their social media presence with employers in mind. This behavior reflects a strategic approach to personal branding, aiming to align with potential employers' expectations and enhance career prospects. Ma and Zhang (2025) suggest that further research is needed to unveil the connection among social media usage and work performance, as is still unclear. Emerging terminologies such as "social media wellness" have gained prominence in the digital era. It is now timely and necessary to explore this concept not only from the perspective of consumers but also through the lens of employees, considering its growing relevance in workplace dynamics and well-being (Mertz et al., 2024).

CONCLUSION

As organizations seek to engage younger generations that will dominate the workplace within the next years, social media emerges as a critical tool for fostering employee satisfaction and addressing socio-emotional needs. By providing platforms for employees to express themselves, both privately and publicly, companies can leverage positive e-WOM to enhance their reputation and attract top talent. This study offers valuable insights into how social media can be strategically utilized to fulfill

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the evolving needs of a technologically oriented workforce, emphasizing the importance of aligning corporate practices with the preferences and expectations of younger employees.

Keywords: Social Media, generations, social responsibility, employee engagement, employee satisfaction, employee ambassadorship.

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GENERATIONAL PERCEPTIONS OF SUSTAINABLE MARKETING: A SYSTEMATIC LITERATURE REVIEW ON GREENWASHING, CONSUMER SKEPTICISM, AND THE ROLE OF AUTHENTICITY

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ABSTRACT

As sustainability becomes a central pillar of corporate strategy, marketing practices increasingly reflect environmental and ethical values. Concepts such as sustainable marketing, ethical branding, and authenticity have surged in importance. Yet, despite growing academic and practical interest, a gap remains in understanding how different generational cohorts perceive and respond to such strategies. This systematic literature review seeks to explore how various generations interpret sustainable marketing practices, with a focus on issues like greenwashing and consumer skepticism, and the emerging significance of authenticity marketing and brand purpose.

Recent studies highlight that Gen Z and Millennials are more likely to demand environmental accountability and align their purchasing decisions with sustainability values (Goh and Balaji, 2023). In the same vein, Ham et al. (2022) investigated consumer green perceptions among the different generations from the lenses of consumer socialization and social intelligence to contribute to the scope of green marketing research. They discovered that older generations are more willing to purchase products from green companies than younger generations. Moreover, while the literature addresses greenwashing and consumer skepticism (eg. de Jong et al., 2020), few studies discuss how such skepticism varies intergenerationally. Similarly, although authenticity marketing has gained attention as a means to foster consumer trust (Morhart et al., 2015; Napoli et al., 2014), its specific role across different age groups remains underexplored (Drennan et al., 2021), and needs to be investigated further (Housni and Machrafi, 2024). Lastly, it is suggested that the variable of *green marketing channels* in relation to consumer behaviour must be analysed further (Alzu'bi and Kontor, 2023), as there are contradictory findings concerning the above 'green marketing issues' (Ham et al., 2022).

These gaps suggest an underdeveloped understanding of how sustainable messaging is received and interpreted differently across generations, particularly in light of increasing greenwashing practices. A generational lens is essential to uncover how brand purpose and authenticity can be communicated effectively to diverse consumer bases.

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AIM AND OBJECTIVES

The main aim of this study is to synthesize current academic knowledge on generational perceptions of sustainable marketing and identify gaps that can inform future empirical work. The key objectives are:

1. To examine how different generations (e.g., Baby Boomers, Gen X, Millennials, Gen Z) interpret and respond to sustainable marketing practices.

2. To investigate how greenwashing influences consumer skepticism across generational cohorts.

3. To assess the role of authenticity marketing and brand purpose in building intergenerational trust in sustainable brands.

4. To propose directions for more targeted and generationally sensitive sustainable marketing strategies.

RESEARCH QUESTIONS

1. How do perceptions of sustainable and ethical marketing differ across generations?

2. What role does greenwashing play in shaping generational consumer skepticism?

3. How does authenticity marketing mitigate skepticism and enhance trust in sustainable brands across different age groups?

METHODOLOGY

This study adopts a systematic literature review methodology, guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The review focuses on peer-reviewed academic literature published between 2014 and 2024. The search was conducted exclusively through the Scopus database to ensure high-quality and relevant sources. Keywords used in the search strategy include consumer behaviour, sustainability, ethical marketing, equity marketing,

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green marketing, sustainable marketing, brand purpose and consumer skepticism. The review process involved a structured screening and selection of articles based on relevance to the research objectives and alignment with inclusion criteria.

CONCLUSIONS AND EXPECTED CONTRIBUTION

This study aims to provide a clearer understanding of the intergenerational dynamics influencing consumer responses to sustainable marketing. By highlighting which marketing approaches resonate most with each generation and where skepticism prevails, the findings will support marketers in developing more effective, trustworthy, and transparent sustainability communications. Furthermore, the study will offer insights into how brands can navigate the challenges of authenticity in an era of increasing environmental scrutiny.

Keywords: Sustainable Marketing, Ethical Branding, Generational Perceptions, Greenwashing, consumer Skepticism, Authenticity MarketingBrand Purpose, Corporate Sustainability, Marketing Ethics

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THE ROLE OF BEHAVIORAL INTERVENTIONS IN PROMOTING PARTICIPATION AND SATISFACTION OF FEMALE UNDERGRADUATE STUDENTS IN STEM FIELDS, IN A GENDER EQUALITY LEADERSHIP PROGRAM: AN ORGANIZATIONAL STUDY.

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ABSTRACT

Although women comprise the greater part of students for all academic degrees in Israel, rates of female students in many fields of science technology, engineering, and mathematics (STEM) have grown but are still quite low. Therefore, female underrepresentation in the high-tech area, which usually requires workers to be educated in these disciplines, is estimated to carry on (Salton Meyer and Ein Dor,2021). This is especially reflected in their low rates in research and development roles, management positions and as CEOs of start-ups (Israel innovation Authority, 2025). Though comparable trends have been found in numerous European countries, Israel has often been rated below average in international assessments on various central measures of gender inequality in the academic area (Salton Meyer and Ein Dor,2021). Therefore, the current applied study conducted in a leadership program for female students in STEM fields, at a leading technological academic institution in the central area of Israel, aimed at promoting gender equality in the academia and industry is of special importance. After two years of running the program, its managers targeted two main behavioural challenges for change: First, although the program was perceived positively by students there was a meaningful gap between the number of students who were accepted and those who attended. Secondly, student's' active participation and involvement in the program sessions required further leveraging. Therefore, the current applied study strived to promote students' program participation and satisfaction by addressing the challenges described above. As behavioural economics is a scientific and practical field positioned at the connection of psychology and economics that utilizes understandings of how people make decisions to inspire them to make better choices including for themselves, approaches investigated in this study were from this relevant arena. Thus, the relationships between fitting behavioural interventions and students' participation in the program, their satisfaction and program completion were investigated. The research rationale is described below.

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The **status quo bias**, a cognitive inclination that directs individuals to favour the current state of matters, even when change could be valuable (Samuelson and Zeckhauser, 1988), can lead to missed opportunities and to selections that aren't ideal. One strategy found effective for supporting behavioural change in the face of this bias was setting a desired option as the default to support positive results (Benartzi and Thaler, 2007). As the program was positively viewed by students, we hypothesized that rates of program participation would be higher when students were automatically assumed to participate in the program but could opt out compared to the opposite condition. **Reminders** steer people's attention to a certain decision, often they can be an influential means to promote motivation and behavioral change. A trustworthy reminder can provide composure and reduce cognitive load (Gavert, 2022). The impact of reminders has been investigated in different organizational contexts. E.g. to promote student's motivation and achievement in online learning in higher education an investigation of the effectiveness of text messages that describe among others lecture content was conducted. Findings suggested that the reception of motivating SMS messages has a positive effect on students' examination outcomes (Brandt *et al.*, 2024). The relationships between reminders and attendance in different scheduled activities has been demonstrated in diverse contexts, e.g. a review and meta-analysis reveals that electronic text notifications improve appointment attendance and reduce 'no shows' in healthcare (Robotham *et al.*, 2016). Therefore, to address the second program challenge described above, in this study the association between reminders sent to students before program sessions and their participation and satisfaction were explored. We hypothesized that higher rates of participation and satisfaction would be linked to digital reminders describing sessions' contents and their future value for students' careers and studies, thus countering their possible **present bias** (People's tendency to be impatient; their preference to experience rewards soon and to postpone costs until later (O'Donoghue & Rabin, 1999) i.e. choosing immediate incentives at the expense of long-term benefits, thus impacting decision-making).

The research was undertaken between 2021-2023, at the start of each of the academic years 120 undergraduate female students accepted to studies in the STEM fields, were also admitted to the gender equality leadership program. It was conducted on Zoom, session topics were those that were regarded central to women's success in STEM, including effective networking, time management, public speaking, goal setting as well as lectures given by successful female leaders describing their experiences and factors contributing to their accomplishments. To address the first challenge described above this study investigated the links between default choices of program acceptance letters and students' participation. The default conditions were in one year of the program (2021) students were not assumed to be participants but could opt in, in the other year (2023) students were automatically assumed to participate in the program but could opt out. Also, different reminder

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formats were sent to participants before program sessions on the two years; in 2021 reminders included brief information on session topic, lecturer, time & Zoom link. In 2023 reminders also included information on the usefulness of the sessions' learnings for participants. Following each session surveys relating to participant's' satisfaction were completed including relating to ratings of usefulness, interest, relevance, importance etc. Data on participation was collected. Preliminary descriptive statistics reveal that as hypothesized following changing the default from opt in to opt out there were higher rates of accepted students' participation in the gender equality leadership program and of completing the full program. Data analysis is in progress; research results will be presented following completion.

The contribution of reminders and defaults to decision making and behavioral change that is beneficial to people has been demonstrated in some areas (e.g. healthcare, savings etc.), however the current study reveals the contribution of such behavioral interventions in a central context that has not been explored yet; i.e. promoting gender equality in STEM through students' effective participation in a leadership training program designed for their success in academia and in their future careers. The meaningful applied contribution of the current study is also in promoting understanding of effective methods for leveraging gender equality leadership programs in academia and leadership initiatives for social transformation. Moreover, significant theoretical contribution to research on default choices reminders for behavioural change is expected.

Keywords: gender equality, STEM, academia, hi-tech, status quo bias, present bias, reminders, applied research, organizations.

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THE DIGITAL LEADER: TECHNOLOGICAL REQUIREMENTS FOR VIRTUAL LEADERSHIP IN SUSTAINABILITY AND FLEXIBLE WORK ENVIRONMENTS

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ABSTRACT

Sustainability efforts are becoming a key factor when choosing to apply for a job at a certain company (Lin et al., 2024), posing challenges amid the skilled labor shortage and War for Talent (Christ and Tirrel, 2024; Lin et al., 2024). Green Human Resource Management (GHRM) plays a crucial role in promoting eco-friendly employee behavior (Kim, 2022) by fostering an environmentally responsible culture. Studies highlight that emotionally engaged employees are more likely to adopt sustainable workplace behaviors or raise awareness first (Afsar et al., 2020). GHRM focuses on recruiting sustainability-conscious employees, providing targeted training programs and using reward systems to incentivize eco-friendly behavior (Amrutha and Geetha, 2020; Saeed *et al.*, 2019).

Flexible work arrangements (FWAs) enable employees to choose when and where they work and have gained traction due to technological advancements, work-life balance demands as well as the COVID-19 pandemic (Babapour Chafi *et al.*, 2021; Hill *et al.*, 2008). FWAs provide advantages like higher motivation, performance and retention, negatively affecting absenteeism and turnover, but there are also disadvantages like more work-family conflicts or limited career development (Costantini and Weintraub, 2022; French *et al.*, 2024; Tirrel *et al.*, 2021). Recent studies highlight that leadership plays a key role in shaping corporate environmental performance and FWAs (Leroy et al., 2018; Singh et al., 2020). Leaders must meet technological requirements to appropriately lead flexibly working employees and integrate sustainability (Darics, 2020; Macciotta *et al.*, 2022; Tirrel, 2023; Tirrel et al., 2025). Charismatic leaders, with their strong presence and emotional influence, enhance motivation, trust, and commitment, driving meaningful organizational change (Jacquart and Antonakis, 2015).

Technology is crucial for environmental performance, minimizing resource consumption and reducing the ecological footprint. However, research on the social perspective is still limited (Kramar, 2022). Leadership and its technological requirements in virtual environments play a key role, yet research lacks insights into their impact (Tirrel, 2023; Tirrel et al., 2025). Moreover, the interplay of technology and leadership has so far only been analyzed by using transformational leadership and more knowledge is required on how other leadership styles are affected by using technology (Tirrel, 2023). This study aims to examine the influence of leadership and technology on environmental performance and FWAs. Therefore, the following research question is raised:

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RQ: How are charismatic leadership, technological requirements of virtual leadership, and GHRM affecting FWAs and corporate environmental performance?

To address this research question, a conceptual framework, based on the Flexible Firm Theory (Chatterjee et al., 2022; Rodgers, 1992) and the AMO (Ability, Motivation and Opportunity) framework (Appelbaum et al., 2000), will be developed and analyzed using Partial Least Squares – Structural Equation Modeling. The anticipated findings will probably reveal that charismatic leadership plays a crucial role in association with GHRM practices within organizations. As charismatic leaders are particularly effective at communicating values, inspiring commitment and fostering a shared sense of purpose, charismatic leaders support the internalization of sustainability goals among employees. Furthermore, the results will probably highlight that the successful implementation of FWAs depends not only on leadership style but also on leaders' ability to manage the technological demands of virtual collaboration. The nexus of charismatic leadership on flexible work is probably strengthened when leaders possess the digital competences needed to effectively lead and support remote working employees. Therefore, technological competences are a critical enabler in translating leadership vision into flexible as well as sustainable work structures.

This study extends the Flexible Firm Theory and AMO framework by showing how charismatic leadership and virtual leadership requirements shape GHRM, flexible work, and environmental performance. Theoretically, it offers a new lens on the intersection of leadership, HRM, and sustainability. Practically, it provides clear guidance for organizations on how to align digital leadership and HR practices to foster flexible, sustainable work environments in response to climate goals and talent market demands.

Keywords: Flexible work arrangements, FWA, green human resource management, GHRM, charismatic leadership, technological requirements of virtual leadership, TRVL, environmental performance, sustainability, PLS-SEM, Germany

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AIRBNB, ONLINE DATING PLATFORMS, UBER, AND ARTIFICIAL INTELLIGENCE: PARALLELS IN THE TRANSFORMATIONAL INFLUENCE OF AI?

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ABSTRACT

This study empirically examines the transformative impact of AI on three distinct online services: (1) Airbnb, (2) online dating platforms, and (3) Uber. Specifically, it explores three key aspects: first, the factors contributing to their success; second, the challenges and disruptions they face; and third, potential solutions to mitigate these issues. The research method consists of a comprehensive literature review and interviews conducted between 2021 and 2025 with 47 hosts, guests, neighbours, and real estate agents, as well as over 300 online daters and 30 Uber users. These were used for this particular research. Chosen by snowball system, to validate the findings. The research identifies, first, key success factors for Airbnb, Online Dating Platforms, and Uber; second, nuisances caused by them; and third, possible solutions to these nuisances. These factors include digitalization, AI, marketing, innovation, responsible leadership, and sustainability. However, challenges such as government regulations, behaviour control, and taxation pose risks to their long-term success.

The study emphasizes the significance of AI-driven responsible leadership, change management, and sustainable innovation, including government and other regulations concerning these three online services. By analysing their business models, the research enhances understanding of how they adapt to challenges while fostering resilience and customer satisfaction. The paper concludes with theoretical and practical implications, limitations, and recommendations for further research.

Keywords: Artificial Intelligence (AI), Airbnb, Online Dating, UBER

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INSTITUTIONALIZATION OF AGILE MANAGERIAL ROLES: COLLECTIVE MEANING FORMATION IN JOB POSTS

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ABSTRACT

RESEARCH BACKGROUND

Agile methodologies and practices have expanded beyond software development into broader managerial and organizational roles across various sectors, contributing to digital transformation, Industry 4.0 and responsiveness. Scholars have observed that organizations navigate turbulent and complex market conditions, the need for self-organization and strategic renewal has driven the widespread adoption of agile frameworks and practices to improve alignment with dynamic business environments (Ameen et al., 2024), enhance agility (Rocha et al., 2025, Ul Akram et al., 2024), and facilitates the use of Industry 4.0 technology in supply chains (Oliveira-Dias et al., 2025). Agile operations practices, such as iterative workflows, daily stand-ups, and cross-functional collaboration, have been widely studied in product, service operations and project management perspectives to foster flexibility and innovation. We argue that an important field has been less considered in agile operations research: the agile managers. The management of agile methods and practices has accordingly expanded from purely an ad hoc responsibility of general managers into formalized, explicit agile managerial roles, including *Agile Coach (Lead), Agile Project Manager, Agile Transformation Lead, and Agile Delivery Manager*. Besides, there are also managerial roles that do not contain the term agile but perform and are responsible for agile operations. Given this institutional ambiguity, there is a critical need to investigate how organizations define and position agile managerial roles within their structures. This study examines how job posts function as institutional artifacts, revealing tensions in meaning formation that slow the institutionalization of agile managerial roles.

METHODOLOGY

This study adopts a grounded integrated occupational approach, updated from Kossek and Perrigino (2016), to explore the institutionalization of agile managerial roles by examining collective meanings and tensions through occupational mapping. Agile-related job posts were systematically collected from Indeed, a widely used job search platform offering structured job descriptions suitable for content analysis. A total of 502 job posts were gathered in three rounds (January–March 2025) using

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search terms such as "agile AND manager," "scrum master," "agile coach," and "product owner" to ensure relevance to managerial roles. Posts were filtered to include only UK-based managerial roles, reflecting current industry practices. Job descriptions serve as institutional artifacts, embedding recruiting terminology and agile practice language, revealing implicit organizational expectations and the sensemaking process behind agile leadership roles. Data analysis was conducted using NVivo 14, facilitating thematic analysis adapted from Naeem et al. (2023), to identify explicit and implicit agile responsibilities across different managerial functions and levels. Thematic categories were developed based on job descriptions, highlighting contradictions and tensions that indicate varying levels of institutionalization across organizations. To enhance the credibility of findings, multiple coding iterations were conducted, with inter-coder reliability checks ensuring consistency in thematic identification. Additionally, O*NET 29.2 Database was used as an external validation mechanism, reinforcing the study's findings with a structured occupational reference. To assess the degree of institutionalization, we searched any agile managerial roles in the O*NET database, a widely recognized classification system for occupational roles and competencies. The database contains practitioners' ratings of occupations' task, skills, style, value and technology skills requirements. This mapping serves as a comparative benchmark, evaluating whether our findings on the agile managerial roles align with practitioners' reflections of the managerial occupations thus reflect collective meanings or infer that institutionalization of agile managerial roles remains emergent and loosely defined. While the study primarily relies on textual analysis, future research may consider triangulating findings with expert interviews or case studies to further contextualize institutionalization dynamics.

FINDINGS

In the institutionalization of Agile managerial roles, the process of collective meaning formation involves both shared meaning-making (convergence) and persistent ambiguities or contradictions (divergence) as organizations, industries, and practitioners negotiate shared understandings. First, agile managerial roles have gained some standardization. In our job post dataset, certain Agile roles (e.g., Scrum Master or IT Project Manager) become widely recognized with similar role design and responsibilities. Second, agile managerial roles gained in-depth institutional legitimacy as organizations and industries have designed a range of formalized positions with not just implementation tasks but governance and control responsibilities. Though the dataset has shown diverse interpretations of agile leadership and management practices, some harmonizations reflected from shared responsibilities on team facilitation and coaching which start aligning due to industry best practices, certifications, and academic discourse. Agile leadership expectations become embedded

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in norms, which include organizational cultures, industry standards, and job markets. Agile culture, value and transformation noted in the job posts imply that organizations have both methodological expectations and capacity requirements on agile managerial roles. However, divergences in collective meaning formation have also been noticed when we holistically view the conceptualized understandings of agile managerial roles. Short-term implementation of agile processes and practices has a thematic tension with the long-term organizational development focus that requires an essential amount of time on coaching others and leading changes. Some agile managerial roles are shaped by both traditional hierarchical management and self-organizing agile principles, causing inconsistencies in soft mindset advocating strategic agility versus hard delivery measurements embedded in process-driven execution. Some job posts have clearly noted that their organizations are flexible, agile or have an agile mindset. This kind of information indirectly reflects that agility has been top-down decided and informed. On the other side, coaching responsibilities and team autonomy reflected a bottom-up agility on team or project level.

Keywords: Agile managers, Agile Operations, Agility, Collective Meaning, Institutionalization, Roles, Responsibilities.

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EXPLORING SELF-LEADERSHIP AMONG GIG TUTORS IN COACHING CLASSES: A QUALITATIVE STUDY

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INTRODUCTION

In the rapidly growing education sector in India, gig tutors, especially those working with coaching classes, are expected to maintain their quality of work despite lacking the same benefits and protections as full-time tutors. Despite the lack of job security, inadequate infrastructure support, and irregular income, these gig tutors continue to pursue their profession despite the challenges. Their persistence raises an important question: What must they be doing to maintain their motivation, reduce stress related to various issues, including those in the classroom, and ensure the delivery of quality education in such situations? The coaching industry in India significantly contributes to the nation's intellectual capital by preparing students from higher secondary school to competitive exams. The market size of India's coaching classes sector is projected to exceed INR 1809.95 billion by 2030. A rise in the number of students seeking higher education and professional courses predominantly propels the Indian coaching classes market. Moreover, increasing parental preferences for superior education have fueled the demand for coaching centres in recent years (Infinium Global Research), underscoring a growing dependence on coaching for academic success and economic mobility. This expansion has deepened the sector's reliance on gig tutors, whose work remains critical but often underacknowledged in institutional and policy frameworks. While recent national data show that full-time schoolteachers are experiencing increased stress and burnout (NCERT, 2024), the invisible struggles of gig tutors, who lack even the most basic institutional safety nets, receive little attention in mainstream discourse. With India's gig economy projected to grow exponentially in the coming years (NITI Aayog, 2022), coaching classes have become key contributors to this shift, increasingly relying on gig tutors who are hired not for permanence but for performance and are often judged solely on short-term results. This study examines the way self-leadership, which involves the conscious control of one's thoughts and actions, enables gig tutors to meet performance standards without relying on external sources. This study employs semi-structured interviews to understand the way gig tutors remain resilient, emotionally stable, and effective teachers. Some of the strategies they employ include humour, cognitive reframing, and goal orientation. These early results enrich ongoing discussions about gig work and mental health, offering a culturally relevant perspective on the way the underexplored group of gig tutors adapts to their work.

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LITERATURE REVIEW

Self-leadership, introduced by Manz (1986), marked a conceptual shift from external control to internal self-regulation, positioning individuals as active agents in shaping their performance. Building on this foundation, Harari et al. (2021) conducted a comprehensive meta-analysis of over two decades of research, finding that self-leadership strongly predicts job performance, job satisfaction, and affective commitment across various sectors and work structures. These findings underscore the significance of self-leadership in contemporary work environments, particularly those without formal supervision. In gig economy environments, where workers operate independently and often in isolation, self-leadership has gained renewed importance. Salmah et al. (2024) observed that flexibility, support, and community involvement are key drivers of psychological resilience among gig workers. Mao et al. (2024) added that even design elements like gamification can foster self-leadership by encouraging goal setting and intrinsic motivation. Within academic gig work, Nelson et al. (2020) highlighted the way adjunct faculty, despite being marginalised institutionally, report high satisfaction when autonomy and peer support are present, paralleling conditions faced by gig tutors. Bringing the focus closer to home, Shukla and Shaheen (2024) found that Indian freelancers derive the most significant performance benefits from behaviour-focused self-leadership strategies, such as self-goal setting and self-monitoring. Finally, Knotts and Houghton (2021) demonstrated that self-leadership enhances affective commitment, which in turn strengthens engagement, a dynamic particularly relevant to tutors who operate outside traditional employment structures. Taken together, these studies suggest that gig tutors, working with minimal institutional support and high accountability, rely heavily on internal self-regulation strategies to stay effective, resilient, and emotionally engaged in their work.

METHODOLOGY

A qualitative exploratory approach was adopted. Semi-structured interviews were conducted with four gig tutors from Mumbai, India. Brief profiles of these gig tutors are as below:

Participant No.	Years of Teaching Experience	Subject Specialization	Student Level Taught (as Gig Tutor)
1	24	Organization of Commerce and Secretarial Practice	Stad XI & XII Commerce
2	18	Mathematics and Statistics	Stad XI, XII and CA Foundation
3	20	Mathematics and Statistics	Std XI, XII and CA Foundation
4	30	Mathematics and Statistics	Stad XI, XII and CA Foundation

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Interviews were conducted in English and Hindi, transcribed verbatim, and thematically analysed. Key codes that emerged include self-motivation, rapport building, humour, stress management, trapped career path, and desire for institutional entry, among others.

FINDINGS AND THEMATIC MATRIX

The thematic matrix below illustrates the way gig tutors enact self-leadership in practice:

Theme	Key Patterns Observed	Illustrative Examples
Self-Motivation	Gig tutors maintain energy by treating each lecture like their first; internal drive keeps them engaged despite repetition.	"I imagine every session is my first. That's how I stay fresh."
Personal Goals	Gig tutors aim for student understanding, not just syllabus completion. Benchmarks are tied to clarity, not formality.	"My goal is clear concepts. Once that's achieved, students don't need to memorize."
Content Adaptation	Teaching style changes across batches based on learning level, pace, and engagement.	"If a batch is weak, I adjust my delivery. Some need hints; others just need to start the sum."
Interactive Engagement	Engagement through dialogue, questioning, and checking understanding mid-lecture.	"I ask at least 10–12 questions every class. Keeps them awake and active."
Use of Humour	Strategic use of jokes during dull topics to regain attention and reduce fatigue.	"Sometimes the jokes are silly—even I don't like them—but they help."
Technological Upgrading	Gig tutors embrace digital tools (e.g., sketching pads, projectors) to keep teaching dynamic and face the class.	"I switched to a digital pad so I could face the crowd and still write clearly."
Stress Management	Emotional and time pressure handled through prior planning, batch mapping, and time-bound strategies.	"Stress comes from time limits. So I plan ahead—this sum in class, that one for homework."
Theme	Key Patterns Observed	Illustrative Examples
Emotional Bonding	Strong personal follow-up, availability outside class hours, and deep care for student well-being.	"They call me even at midnight. I tell them—don't worry, I'm here."
Learning from Students	Gig tutors accept feedback, observe student reactions, and evolve based on classroom energy.	"Even after 25 years, I revise before class. Students ask questions I hadn't thought of."
Sense of Service	Gig tutors see themselves not just as educators but as service providers to students, parents, and institutions.	"I think of myself as a service provider. Content is just one part. Rapport matters equally."
Institutional Limitations	Policies restrict pay, mobility, and often don't reflect the effort gig tutors contribute.	"We bring the revenue, but administrators get full salary. Teachers are undervalued."
Career Path Trapped	Despite experience, gig tutors feel stuck—no formal growth, no lateral opportunities, minimal recognition.	"After years here, I've grown, but in a corporate I would've been far ahead."
Desire for Institutional Entry	Gig tutors hope for more inclusive policies—access to academic or corporate systems that currently seem closed off.	"What option do we have? Can institutes just open doors at any point for people like us?"

MANAGERIAL IMPLICATIONS

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In a system where gig tutors are hired for performance rather than tenure, cultivating self-leadership is both beneficial and necessary. Coaching classes, as active participants in India's growing gig economy, must invest in behavioural competencies that enable tutors to manage stress, sustain instructional quality, and prevent burnout. Embedding self-leadership development into onboarding—through structured mentoring, reflective goal-setting, and humour-based pedagogy—can support tutors in regulating both performance and emotional well-being. Peer-led forums and communities of practice offer vital support for tutors operating without formal institutional backing. These low-cost, high-impact interventions can foster resilient, self-driven gig tutors who thrive in independent roles. For seasoned gig tutors seeking more stable employment, private sector organisations could be encouraged to open pathways through policy incentives. Coaching classes, in turn, may consider post-retirement engagement models or basic financial protections such as insurance or pension-like schemes to acknowledge long-term contributions. While some progress has been made in formalising protections for gig workers in other domains, there remains a strong case for extending statutory benefits to gig educators, ensuring they receive support comparable to that of full-time employees in the education sector.

CONCLUSION

This study demonstrates the way self-leadership enables gig tutors to navigate both the emotional demands and instructional complexities of their roles. Humour, cognitive reframing, and personal goal-setting emerge as practical tools for maintaining motivation and managing stress in low-support environments. As coaching classes increasingly rely on gig-based teaching models, cultivating self-leadership must be seen as a structural necessity rather than an optional advantage. These findings suggest the need for a broader inquiry across regions, educational levels, and institutional types to deepen our understanding of the way self-leadership supports sustained engagement in the evolving educational ecosystem.

Keywords: self-leadership, humour in pedagogy, gig tutors, emotional well-being, psychological resilience, coaching classes, cognitive reframing, trapped career path, desire for institutional entry

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PSYCHOLOGICAL CAPITAL AND READINESS FOR CHANGE: EXAMINING DEMOGRAPHIC DISPARITIES

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ABSTRACT

In an era of rapid and continuous organizational transformations, a key challenge organizations face is supporting employees in adapting to change (Naamati-Schneider, 2023; Ybarra, 2023). A critical approach to addressing this challenge is strengthening employees' psychological resources, particularly psychological capital (PsyCap) (Sen et al., 2024) and readiness for change (RFC) (Meria, Yohana & Purwohedi, 2023).

PsyCap is defined as *"an individual's positive psychological state of development"* (Larson & Luthans, 2006, p. 8). As conceptualized by Luthans et al. (2007) within the framework of Positive Organizational Behavior (POB), PsyCap encompasses a set of positive emotional assessments of one's own abilities, which enhance an individual's capacity to cope with hardship, overcome adversity, and effectively navigate obstacles. PsyCap consists of four dimensions: optimism, hope, self-efficacy, and resilience. As a state-like and malleable construct, PsyCap can be developed through targeted, short-term interventions (Sigal & Michon, 2024). Enhancing PsyCap not only improves employees' well-being but also serves as a crucial enabler of change readiness, ultimately fostering organizational resilience and agility (Luthans et al., 2007).

The relationship between PsyCap and readiness for change (RFC) has been explored in the organizational context. Lizar et al. (2015) examined the effect of PsyCap on individual's RFC, emphasizing that change readiness is a key precursor to successful organizational transformation. RFC is defined as *"a cognitive state that occurs when organization members have positive attitude, belief, and intention toward change*" (Lizar et al., 2015, p. 3). The process of change readiness is often conceptualized in three progressive stages: (1) **Pre-Contemplation** – individuals neither recognize the need for change nor express willingness to engage in it; (2) **Contemplation** – individuals acknowledge the potential necessity of change but have not yet taken action; (3) **Action** – individuals demonstrate readiness and willingness to adapt by actively engaging in behaviors that enhance adaptability.

A preliminary cross-sectional study based on data from the Israeli Social Survey highlights significant demographic disparities in PsyCap levels and RFC stages (Sigal & Michon, 2024). Notably,

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statistically significant cultural differences were observed between employed Arab minority women and their Jewish majority counterparts. Additional variations emerged based on religiosity levels and marital status, with distinct patterns among married and single women. These disparities, in turn, influence employees' readiness for change, underscoring their role in shaping workforce adaptability. Poor PsyCap levels were found to significantly correlate with lower stages of RFC, whereas higher PsyCap levels were associated with advanced RFC stages (Sigal & Michon, 2024).

These findings raise important questions regarding the universality of such disparities across different cultural and national contexts and their implications for employees' adaptability within organizations. To further investigate these dynamics, a follow-up study is currently underway, examining the impact of additional demographic factors on PsyCap and RFC. This research aims to deepen our understanding of the relationship between demographic diversification and workforce adaptability, providing valuable insights for organizational strategies and interventions tailored to diverse population segments.

Keywords: Psychological capital, Readiness for change, employee adaptation, organizational change, Human resources.

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SEEING, FEELING, MEASURING ECOSYSTEM SERVICES: TRANSFORMATIVE LEARNING FOR THE NEXT GENERATION OF BIOECONOMY PROFESSIONALS

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ABSTRACT

As higher education institutions increasingly face the challenges of transitioning to a sustainable bioeconomy, the development of pedagogical models that integrate ecological literacy, emotional engagement, and empirical reasoning becomes essential. Bioeconomy education must move beyond narrow sectoral training to embrace systems thinking, interdisciplinary collaboration, and experiential learning (Paris et al., 2023; Cardozo Ruíz Díaz et al., 2024). For students of landscape architecture and environmental sciences, who are future stewards of sustainable land use, this transformation requires educational approaches that engage both sensory perception and scientific understanding (Horova, 2025; Santos et al., 2025).

The concept of ecosystem services (ES), although well established in scientific discourse (Costanza et al., 1997), has yet to permeate mainstream societal awareness and everyday practice. Broader recognition and integration of ES into urban planning may depend on whether designers and environmental managers have a deep understanding of specific ecosystems and the benefits they provide (Palacios-Agundez et al., 2022). These professionals play a key role in communicating and implementing nature-based solutions, holding considerable potential to influence public perception and environmental behaviors (Helfand et al., 2006).

One of the major obstacles to advancing sustainable urban green infrastructure lies in the limited knowledge of ecosystem services among both practitioners and citizens. In contemporary participatory planning, ES can serve as an effective tool for assessing the multifunctionality of green spaces and facilitating inclusive, sustainable design processes (Terêncio et al., 2021). Researchers and educators therefore play a crucial role in training these professionals and, indirectly, in enhancing public ecological awareness.

Our study aimed to investigate how different stakeholder groups perceive typical urban ecosystems. While perception-based assessments of green spaces among citizens have been conducted

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(Xinyuan et al., 2024), few studies have compared these perceptions to quantified ecological values. We sought to identify which ecosystem characteristics are positively or negatively correlated between perceived (subjective) and measured (objective) ecosystem services in urban environments.

To this end, we formulated three research questions: (1) How do residents perceive ecosystem services in cities based on survey data, and how do these perceptions compare to ecological measurements? (2) How do students of landscape architecture and environmental sciences perceive ES, and how do these perceptions align with measured values? (3) Which ecosystem features should be emphasized in ES education to enhance both perceived and actual ecological performance?

We conducted a large-scale pedagogical experiment involving 489 first-year students enrolled in an introductory course on ecosystem services. The educational intervention combined field-based perceptual learning with empirical ecological assessment across ten different urban green space types in Warsaw, including managed parks, riparian forests, secondary woodlands, meadows, lawns, and informal wastelands. At each site, participants completed standardized Likert-scale questionnaires assessing a range of perceived ecosystem services (e.g. air purification, thermal regulation, water retention) alongside subjective impressions such as aesthetic quality and emotional inspiration. These responses were then compared with ecological data collected by instructors using field-based indicators, such as vegetation structure, canopy cover, and functional traits relevant to ecosystem regulation (e.g. particulate matter capture, evapotranspiration potential).

The findings revealed notable discrepancies between perceived and measured ecosystem services, particularly with respect to regulating functions, which were frequently undervalued by students. Recreational and thermal services were more accurately identified, suggesting that visible and directly experienced features are more readily acknowledged. Rather than interpreting these mismatches as deficits, we regard them as fertile ground for transformative learning (Mezirow, 1997). By confronting intuitive perceptions with ecological evidence, students are guided toward a deeper awareness of often-invisible ecosystem processes and a more robust ecological literacy.

Complementing the student-focused experiment, additional data were gathered through parallel surveys administered to urban residents and professional landscape designers. The results reinforce the importance of biodiversity in shaping positive evaluations of green space quality among both user groups. Naturalistic areas with dense vegetation, such as wetlands and woodland groves, were highly rated for their ecological value and experiential richness. The findings also underscored a preference for hybrid landscapes—spaces where wild and designed elements are integrated—though the emphasis differed by group: designers prioritized functional infrastructure, while residents

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favored naturalness. Informal green spaces (e.g. urban wastelands), despite their unregulated character, were valued by both residents and professionals for their potential to offer intimate recreation and biodiversity support. However, awareness of ecosystem services remained generally low among residents and only modestly higher among professionals, highlighting the need to strengthen educational interventions that target both groups.

Our study concludes that better alignment between perceived and actual ecosystem services can be achieved through design strategies that explicitly incorporate both ecological function and social resonance. For educators, these findings provide actionable insights into the features and metrics that matter most to students, supporting curriculum reform that advances ecological literacy and empowers the next generation of bioeconomy professionals.

Keywords: Ecological literacy, Field-based learning, Curriculum innovation, Student perception, Sustainability education

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STATE PLATFORM CAPITALISM: TOWARDS A DIGITAL DECOUPLING IN THE GEOPOLITICAL COMPETITION?

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ABSTRACT

This research contributes to a deeper comprehension of the implications of platform capitalism for democratic governance, individual rights, and geopolitical competition.

Digital transformation has radically changed the way we live and work, making information society services, and in particular intermediary services, essential elements of our everyday lives (Regulation (EU) 2022/2065). Some crucial data clearly capture the pervasiveness of the digital transformation at a global level: in January 2024, 5.35 billion people (66.2% of the world's population) were connected to the internet; 5.04 billion people (62,03% of the world's population) regularly used social networking platforms and 5.61 billion people (69.4% of the world's population) communicated via smartphones (We are social and Metlwater, 2024). The evolution of information technologies, including big data and cloud computing, is rapidly transforming how we access and utilise information across social, political, and cultural domains (Qi and Wang, 2021). As giant digital platforms become more and more pivotal mediators of economic, political and cultural relationships, they increasingly concentrate a huge techno-infrastructural power on users widely meant (individuals, businesses, institutions, public administrations, etc.). This centralisation of power is further compounded by digital decoupling, where diverging policies across geopolitical borders lead to a fragmented global digital landscape. Digital decoupling not only fragments the global digital landscape but also recalibrates geopolitical alignments. As States align their technological infrastructures with domestic and regional security policies, giant digital platforms are increasingly co-opted into broader strategies of geopolitical influence and competition, heightening tensions and fostering new forms of digital diplomacy and conflict. This new landscape configures veritable 'platform capitalism' (Barile, Simone *et al*., 2022) that affects, among others, the role of the State. In fact, beyond labour-related changes, the rise of platform capitalism reflects broader social and political changes as well as economic ones (Liang *et al*., 2022). Platform capitalism is sustained by complex ecosystems characterised, among others, by an intertwined nexus of digital algorithms, submarine cables, and satellite systems that make billions of daily online interactions possible (Zhang *et al*., 2024). Therefore, the powerful and deep expansion of giant digital platforms makes them crucial infrastructures capable of decisively affecting the institutionalised social order (Cuppini, 2023). Because of their deep integration into the social and technical settings that already exist, they frequently become transparent and undetectable (Shen and He, 2024). In this

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scenario, the symbiotic relationship between States and giant digital platforms has led to the emergence of 'State Platform Capitalism' (SPC) (Rolf and Schindler, 2023), a concept used to shed light on how governments increasingly leverage giant digital platforms for their own political and economic agendas.

Moving from those premises, the purpose of this paper is to critically analyse the relationships between the States and the giant digital platforms in terms of techno-infrastructural power. As giant digital platforms increasingly permeate all aspects of society, they progressively gain crucial techno-infrastructural power. This is provoking a shift of power from public institutions towards private corporations, involving profound geopolitical implications in terms of competition among different and rival macro areas. Through the inherent capability of digital platforms to profile users, information warfare, propaganda, and disinformation, the States are increasingly leveraging giant platforms for their own economic and political aims, such as citizen surveillance and control. When the States are unable to implement their functions, they rely even more on giant digital platforms. States or cities can indeed exploit platform algorithms for governance purposes. This is a significant novelty insofar as the actors who have the capacity to implement them are primarily private companies (Frapporti, 2023). Those scenarios raise serious concerns regarding privacy, security, and the erosion of democratic values. On the one hand, huge concerns arise from the increasing hybridisation of the economic power with the political one. On the other hand, the increasing reliance on giant platforms for governance, coupled with their inherent power to shape information flows and influence public discourse, presents significant challenges to national security (Van Dijck *et al.*, 2019). Giant digital platforms act as agents of the new political order because of their exclusive use of technology and control over public data; their owners frequently take on the role of unelected politicians in government (Ergen *et al.*, 2024). Indeed, US and Chinese platforms increasingly collaborate with their respective governments in surveillance and policing, creating tension with States (Rolf and Schindler, 2023). TikTok, owned by Bytedance, exemplifies this, raising US concerns about data sharing with China (Gray, 2021; Muratore, 2025). Thus, giant platforms have specific characteristics that make them geopolitical actors, and both China and the US actively seek to use and mobilise platforms for geopolitical and economic purposes. 'State platform capitalism' describes this State-platform symbiosis.

Moving from a wide literature review and selecting eloquent examples taken from the US, China, and Europe, firstly, this paper analyses the multifaceted implications of the abovementioned shift of power; secondly, it provides a taxonomy that identifies and describes three different kinds of State Platform Capitalism pertaining to diverse geopolitical macro areas: the US, China, and Europe. In the US, State Platform Capitalism is characterised by a twofold approach: domestically, the State supports the growth of US platforms through *ad hoc* policy interventions, while abroad, it promotes their continuous

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expansion. This interplay enables US platforms to operate as both crucial market actors and levers that the State exploits to spread its power across multiple domains, such as the economic, diplomatic, military, and intelligence spheres (Rolf and Schindler, 2023; Coveri *et al.*, 2024, 2025). In China, State Platform Capitalism follows a State-driven model in which the government plays a central role in orchestrating the development of Chinese platforms: on the one hand, it protects domestic platforms from foreign competition; on the other hand, it works to integrate them into the State's systems of governance, surveillance, and social control (Jia and Winseck, 2018; Tse and Pun, 2024; Yuan and Zhang, 2025). Finally, in Europe, lacking giant homegrown platforms, the State platform relationship takes the form of a regulatory strategy. The EU mobilises legislative measures, such as the P2B Regulation, the Digital Services Act, the Digital Markets Act, and the AI Act, to mitigate foreign platform dominance and regain strategic influence in the emerging geopolitical scenario (Hulkó *et al.*, 2025).

The original taxonomy developed by this research not only clarifies the diverse configurations of State Platform Capitalism but also serves as an insightful framework for analysing the evolving power asymmetries across diverse geopolitical macro areas. These findings are expected to support future research aiming to explore State Platform Capitalism and the geopolitical tensions it involves.

Keywords: State platform capitalism; giant digital platforms; techno-infrastructural power; geopolitical competition; digital decoupling.

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FLEXIBLE WORKING ARRANGEMENTS (FWAS) IN THE PUBLIC SECTOR: A SCOPING REVIEW

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ABSTRACT

Flexible Working Arrangements (FWAs) are increasingly recognized as key drivers of organizational innovation, employee well-being, and efficiency in both private and public settings. Rooted in the idea that work is not necessarily constrained by standard schedules or physical offices, FWAs encompass practices such as teleworking, remote work, smart working, and agile working (AW), among others (Den Dulk and Groeneveld, 2013; Loia and Adinolfi, 2021). Although initially adopted on a limited scale, these arrangements have gained momentum in recent years due to rapid advancements in digital technologies and evolving managerial philosophies that emphasize autonomy, flexibility, and trust (Allen et al., 2023; Bednar and Welch, 2020).

This scoping review was undertaken to synthesize current knowledge on FWAs, with a specific focus on their adoption and impact within public sector organizations. The review draws upon a range of scholarly publications addressing diverse aspects of FWAs, including their theoretical underpinnings, empirical outcomes, and the challenges of integrating flexible models into existing administrative structures (Giacomini and Palumbo, 2024). By examining peer-reviewed articles, policy reports, and empirical case studies, the review aims to provide a comprehensive map of the literature, highlighting the evolution of FWAs and the conditions under which these practices foster both organizational performance and employee well-being in government settings (Palumbo et al., 2024).

A prominent stream of research focuses on the relationship between FWAs and productivity, indicating that eliminating commutes and providing flexible schedules can enhance efficiency and reduce operational costs (Bloom et al., 2014). Nonetheless, job characteristics, supervision needs, and teamwork requirements play a crucial role in determining how effectively FWAs translate into performance gains (Dutcher, 2012). A second strand investigates the influence of FWAs on employee satisfaction, stress levels, and work–life balance, showing that flexible practices may increase autonomy yet also blur the boundaries between work and personal life (Morea et. al, 2023). Researchers underscore that managerial support, transparent metrics, and adequate digital tools can help mitigate potential downsides, such as overwork or isolation (Kelly et al., 2014; Allen et al., 2023).

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In public sector contexts, the adoption of FWAs is often shaped by pre-existing bureaucratic norms, hierarchical oversight, and accountability pressures (Weber, 1922). While the COVID-19 emergency accelerated experimentation with remote and hybrid solutions, many agencies confronted limited technological readiness and resistance to change (Cellini et. al., 2021). Despite these hurdles, emerging evidence suggests that AW principles, emphasizing goal-oriented collaboration and decentralization, can offer a path toward modernizing public administration, provided that leaders champion cultural reforms alongside structural adjustments (Giacomini and Palumbo, 2024; Niersbach, 2021).

Overall, this scoping review indicates that FWAs have considerable potential to enhance performance and employee well-being, although their outcomes vary depending on organizational culture, leadership styles, and technological capacity. In the public sector, overcoming rigid administrative protocols remains a significant challenge, but targeted investments in training, digital infrastructures, and trust-based leadership can pave the way for more agile and citizen-responsive services. Future research is encouraged to examine longer-term trajectories of FWA adoption in government agencies, with particular attention to how flexible models become institutionalized, or encounter persistent barriers, over extended periods.

Keywords: Flexible Working Arrangements (FWAs), Public Sector, Smart Working ,Telework, Remote Work, Agile Working (AW), Employee Well-Being, Organizational Performance, Bureaucratic Culture , Cultural Transformation.

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RETAIL BARGAINING POWER AND ITS EFFECTS ON FOOD PRICES: INSIGHTS FROM THE POLISH FOOD SUPPLY CHAIN

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ABSTRACT

Since 1995, the food retail trade in Poland has undergone substantial transformations. New store formats have emerged, and the concentration and significance of retail chains have increased. The above could potentially result in a bargaining power imbalance in trade relations between the actors in the food chain, thereby encouraging anti-competitive behavior.

Theoretical models demonstrate that imperfect competition and the exploitation of power may lead to distortions in the vertical transmission of food prices (incomplete, delayed, or asymmetric price response in the chain). This has been confirmed through several empirical studies (e.g., Meyer and Cramon-Taubadel, 2004; Rudinskaya and Boskova, 2021), but some research has contradicted it (e.g., Peltzman, 2000). Hence, in the present study, an attempt is made to answer the following research question: Is there a relationship between the degree of concentration and its changes over time, and the magnitude, speed, and asymmetry of price adjustments in the agri-food chain?

The research problem will refer to the theory of imperfect competition and oligopoly. The basis for the analysis is an assumption that non-competitive market structures, expressed by a higher level of concentration, translate into an increase in the market power of actors, which in turn affects the processes of price transmission in food chains, consisting, among others, of asymmetric price reactions.

METHODOLOGY

The initial stage of the research was an examination of price transmission, with a particular emphasis on asymmetry of price signal flow. Asymmetric price transmission consists of a different (often stronger) reaction of prices in one stage of the chain to price increases than to price decreases in another stage (Tapatta, 2009). To this end, I utilize the ARDL-ECM model with a bound-testing proposed in the work of Pesaran and Shin (1995). This approach has the advantage of being applicable regardless of the degree of integration of the time series. An analysis, based on monthly price data from the Central Statistical Office, was conducted for 2000-2022, with transmission characteristics estimated for sub-periods of six years (i.e., 2000-2005; 2001-2006; 2002-2007, etc.). This allows for

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assessing changes in price transmission over time and highlights differences between food markets (meat, dairy).

In the second stage of the study, indicators illustrating changes in concentration (CR_4) in the agri-food chain and economic potential (average revenues per the four largest players) were calculated.

In the final stage of the research, regression models will be used to illustrate changes in concentration and their impact on the formation of prices. The price transmission characteristics calculated in stage 1 (i.e., the magnitude of the price transmission, the distribution over time of price responses, and the asymmetry) will be used as the dependent variable. As an independent variable relative indicator showing concentration processed between stages of the agri-food chain will be used, e.g., CR_4 food industry/CR_4 retail trade or average revenue per company in a given food industry/ average revenue per company in retail trade. Following the extant literature, control variables will be employed to ascertain the impact of other factors, e.g., changes in market intervention, on the magnitude, speed, and asymmetry of vertical price transmission. The quantitative analyses will be supplemented by qualitative ones.

RESULTS

By 2015, three of the sectors surveyed (meat, dairy, and retail trade) could be considered fragmented, with CR_4 below 40%. As of 2016, the level of concentration in the dairy industry indicated a loose oligopoly ($40\% \leq CR_4 \leq 60\%$), as did the level in retail as of 2020. However, despite ongoing consolidation in each level food chain, retail enterprises demonstrated a notable economic advantage during the study period.

Table 1. CR_4 ratio and average revenues of the four largest firms in 2000-2022

Specification	2000	2005	2010	2015	2020	2022
CR4 retail trade [%]	6	10	23	29	38	46
CR4 meat industry [%]	10	16	22	23	32	34
CR4 dairy industry [%]	18	25	38	40	52	58
Average revenues of the four largest retail firms vs. the four largest meat firms	4.14	3.81	5.23	5.20	4.82	4.40
Average revenues of the four largest retail firms vs. the four largest dairy firms	4.79	4.55	5.59	7.00	6.76	5.37

Source: own calculations based on [GUS 2025, Rzeczpospolita 2023]

As for the processes of transmitting price signals between meat companies and retailers, in the longer term, changes in producer prices for pork loin were fully reflected in retail prices with no asymmetric

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reactions. However, positive asymmetry became apparent in the case of cooked ham. Asymmetric reactions also occurred in the case of drinking milk and butter, but these weakened in subsequent sub-periods. Therefore, it is not possible to state that changes in the level of concentration have affected the process of price transmission.

The study's results do not provide a clear answer regarding the abuse of market power by retail chains. Despite progressive concentration processes at both the retail level and within the meat and dairy industries, it seems that competition between entities remains strong. However, the data suggest that the economic potential of retail chains is significantly greater than that of meat and dairy firms, so the risk of imposing unfair terms for suppliers arises. The above indicates that competition policy should remain vigilant and prevent any reduction in competition.

It is anticipated that the conclusion of the third phase of the study will facilitate the establishment of more precise conclusions. The results obtained may enrich the state of knowledge on the functioning of contemporary agri-food markets. Moreover, the recommendations emerging from the study may be useful for developing countries undergoing political and economic transformation.

Keywords: food retail, competition, concentration, CR_4 ratio, bargaining power, food prices

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SCIENCE MAPPING ON BUSINESS ANGELS: EMERGING TRENDS AND FUTURE DIRECTIONS

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ABSTRACT

Business angels (BAs) constitute a vital funding source for early-stage entrepreneurial ventures, yet research on the subject remains fragmented (Maxwell et al., 2011). This study employs a science mapping approach to systematically examine key research trends, intellectual structures, and existing knowledge gaps in business angel studies between 2020 and 2024. Through a bibliometric analysis of 148 academic publications indexed in Web of Science (WoS) and Scopus, dominant themes, theoretical perspectives, and evolving directions are identified. The analysis reveals an increasing focus on investment strategies, syndication, decision-making biases, and post-investment involvement (Bonini et al., 2023). However, theoretical fragmentation persists, with limited integration of agency theory, signaling theory, and social capital theory (Harrison, 2022). Research remains heavily concentrated in North America and Europe, thereby limiting broader applicability to emerging markets (Bellucci et al., 2024). Additionally, studies on the implications of artificial intelligence, blockchain, and digital platforms for angel investment remain scarce (Rusydiana, 2021). By synthesizing macro and micro-level factors influencing angel investment decisions, this study highlights the interplay between financial strategies, psychological attributes, network dynamics, and risk assessment. The findings provide an agenda for future research, emphasizing the need for longitudinal analyses, cross-regional comparisons, and deeper behavioral inquiries. By bridging financial and psychological dimensions in entrepreneurial finance, this study contributes to the theoretical and empirical understanding of business angels.

METHODOLOGY

The research employs two complementary review methods: a systemic review of 85 papers on business angels published between 2020 and 2024, and a bibliometric methodology to examine main themes and their reoccurrence in those studies. The review includes condensed description of each of the 85 publications, consisting of the journal in which each paper was published, year of publication, authors, main findings, theoretical framework and location-geographic focus (Van Eck & Waltman, 2010). The bibliometric data were retrieved from WoS and Scopus, ensuring coverage of high-impact academic sources. The methodology encompasses data collection, bibliometric mapping, content

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categorization, and trend analysis. Articles were filtered based on relevance to business angel investment, ensuring a focus on investment strategies, decision-making biases, theoretical frameworks, and geographic distribution. Bibliometric mapping was conducted using VOSviewer software to identify key research clusters, co-citation networks, and thematic structures. Content analysis categorized the studies into dominant themes, capturing investment strategies, post-investment involvement, and theoretical advancements.

RESULTS

The thematic analysis reveals the growing importance of risk assessment and portfolio diversification in angel investment decisions. Business angels often rely on cognitive heuristics—such as overconfidence and emotional bias—balancing quantitative data with qualitative impressions. Syndication remains central to risk mitigation, yet post-investment engagement varies widely: some angels offer mentorship, others act only as funders. Investment decision-making is shaped by both macro investment strategy factors (e.g., profit, risk reduction, impact) and micro psychological attributes factors (e.g., personal risk tolerance, confidence, cognitive bias), all embedded within a broader geopolitical context. These dimensions intersect—many angels reduce risk through portfolio diversification and syndicate participation, benefiting from pooled resources and shared expertise. Social networks also play a role in enhancing decision quality and success potential. Diversity and inclusion emerge as additional themes. Gender and ethnicity influence investment behavior and portfolio composition, with female investors and founders often facing unique barriers. A more inclusive investment ecosystem can promote innovation and diversification in funding strategies. Despite theoretical advances, only 20% of the 85 reviewed papers applied an explanatory framework. The field remains fragmented, with limited interdisciplinary integration. Dominant theories—such as agency theory (Botelho & Mason, 2024), signaling theory (Blaseg & Hornuf, 2024), and social capital theory (Skalicka et al., 2023)—are seldom unified. Furthermore, few studies explore the influence of emerging technologies like AI, blockchain, and digital platforms on angel investing.

FUTURE AGENDA

Existing gaps and future research directions in business angel studies present key challenges, including achieving theoretical cohesion, expanding geographic scope, and integrating emerging technologies. Our findings underscore the need for longitudinal studies to track business angel behavior across economic cycles and cross-regional comparisons to develop globally applicable investment models. Future research should prioritize a more integrative theoretical approach that captures the interplay between financial, behavioral, and network factors (e.g., Solodoha et al., 2023).

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Additionally, the role of technological advancements in reshaping business angel investment warrants further exploration. By addressing these research gaps, the field of business angel studies can evolve into a more structured and impactful discipline, contributing to a deeper understanding of early-stage entrepreneurial finance.

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NOT WITHOUT IT? EXPLORING THE PERCEIVED VALUE OF 'FREE-FROM' PRODUCTS ACROSS HEDONIC AND UTILITARIAN CATEGORIES

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ABSTRACT

The rapid rise of the 'free-from' food segment—excluding ingredients like gluten, lactose, sugar, alcohol, salt, and GMOs—responds to growing concerns over chronic illness, allergies, and sustainability (de Magistris and Gracia, 2014; Zhang and Chan, 2025). Valued at $92 billion in the U.S. alone in 2023, this market continues to grow, driven by health-conscious younger consumers (Verified Market Research, 2024; Rai *et al.,* 2025). Yet, consumer acceptance is uneven: while utilitarian products like gluten-free bread often gain approval (Klerks *et al.,* 2022), hedonic items such as sugar-free chocolate or alcohol-free wine face resistance (Shaw *et al.,* 2023). This resistance hinges on how consumers evaluate product value. Hedonic goods are primarily judged affectively—based on taste, pleasure, and authenticity (Loebnitz and Grunert, 2018)—whereas utilitarian products are evaluated cognitively, focusing on health and functionality (Cramer and Antonides, 2011). Reformulations that remove central hedonic attributes, such as alcohol in wine, may disrupt a product's identity, triggering perceptions of inauthenticity (Uribe *et al.,* 2020; Cheon *et al.,* 2024). These reactions are shaped by culturally embedded "taste regimes" that reinforce conventional expectations about indulgence and authenticity (Schneider-Kamp, 2021).

To explain these perceptions, we introduce attribute centrality (Sloman *et al.,* 1998; Gershoff and Frels, 2015): the extent to which a feature defines a product's category. Removing central attributes may lead consumers to question the product's authenticity or legitimacy (Shaw *et al.,* 2023). This concept is especially relevant in "natural" or "green" consumption contexts, where essentialist beliefs dominate (Cheon *et al.,* 2024). We build on the functional theory of attitudes (Katz, 1960) to explore how consumers' reactions differ depending on the goals their attitudes serve—whether instrumental (e.g., health), value-expressive (e.g., identity), or ego-defensive. In utilitarian categories, removing a central component may align with instrumental goals (health), enhancing perceived value. In contrast, in hedonic categories, such removal compromises symbolic and sensory pleasure, reducing appeal. A key moderator in this dynamic is health orientation—the degree to which individuals are motivated by personal wellness (Iversen and Kraft, 2006). Health-oriented consumers are more likely to positively interpret ingredient removals as acts of self-care (Zerbini *et al.,* 2024), while those low in health orientation may reject these products due to compromised pleasure or authenticity (Loebnitz

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and Grunert, 2018). Our central question is: *How does the removal of a central versus peripheral attribute affect perceived value and purchase intention in hedonic versus utilitarian products, and how is this moderated by health orientation?* We pursue three objectives: (1) examine the impact of attribute centrality across product types; (2) investigate how health orientation influences interpretation of attribute removal; and (3) explore how consumers recalibrate functional and sensory value in free-from contexts. We adopt a mixed-methods design. In phase one, 30 semi-structured interviews explore consumer interpretations of reformulated products (e.g., NoLo wines), focusing on authenticity, identity, and compensatory mechanisms. These findings inform a 2×2 between-subjects experiment (N=300) varying: product type (hedonic vs. utilitarian) and attribute centrality (central vs. peripheral). Participants are segmented by health orientation (Hong, 2009). Key dependent variables include: functional and sensory perceived value (Aurier *et al.,* 2004) and purchase intention (Ajzen, 1991). This study makes four key contributions: (1) it introduces the concept of attribute centrality to reformulation research (Cheon *et al.,* 2024); (2) applies the functional theory of attitudes to explain goal-driven acceptance of product modifications (Rai *et al.,* 2025); (3) highlights health orientation as a critical moderator in free-from evaluations (Foroni *et al.,* 2022); and (4) examines how reformulations reshape symbolic, emotional, and cognitive value perceptions (Perrea *et al.,* 2023). Our anticipated findings suggest that integrated reformulation, communication, and segmentation strategies are essential. Sensory innovation may support acceptance of hedonic free-from products (Bucher *et al.,* 2020). Dual-value framing—highlighting both health and pleasure—could preserve authenticity (Shaw *et al.,* 2023), while segmentation should consider health orientation to tailor messaging (Zerbini *et al.,* 2024).

Keywords: free-from products, hedonic products, utilitarian products, attribute centrality, perceived value, health orientation, product authenticity, sensory experience, food marketing, NoLo Wine

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RETHINKING STRATEGY: A PERSPECTIVE ON COLLABORATION AND VALUE CO-CREATION

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ABSTRACT

This conceptual exploratory paper challenges dominant strategy paradigms, such as Porterian and resource-based views, which emphasize firm independence and market competition (Barney and Clark, 2007; Porter, 1980). Instead, it advocates for a complementary cooperation-based perspective, highlighting the strategic significance of inter-firm collaboration, alliances, and networked business environments (e.g., Hakansson et al. 2009).

The paper advocates for a more integrated strategic approach, recognising competitive and collaborative advantages in an evolving business landscape (Dyer, 2000; Porter, 1985). Drawing from interdisciplinary insights, mainly industrial marketing, it underscores the role of interconnectedness, positive-sum games, and relational value creation (Baraldi, 2008; Dyer and Singh, 1998). The discussion contrasts the traditional competition-driven strategy with a cooperation-based view, emphasising that firms are embedded in complex networks and ecosystems where cooperation often yields superior outcomes (Adner et al. 2013).

The paper suggests that businesses should not only focus on outperforming rivals but also seek strategic partnerships to enhance resilience, innovation, and long-term success. It contributes to the development of a more comprehensive strategic theory that accommodates both competitive dynamics and collaborative synergies. Ultimately, it calls for a rethinking of the notion of strategy beyond mere rivalry, embracing a nuanced perspective where firms leverage cooperative interactions for mutual advantage in today's interdependent corporate ecosystem.

Keywords: strategy, competition, cooperation, advantage, relational value, business ecosystems, business networks, partnerships, alliances

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BULLYING AND ITS MANAGEMENT IN HEALTHCARE

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ABSTRACT

INTRODUCTION

Workplace bullying is recognized as one of the most stressful phenomena in today's workplace, which affects both companies and employees (Bayighomog et al., 2023). Bullying has been documented as an increasing problem in the workplace, and this problem is more salient within the healthcare industry, as bullying tends to occur more frequently in healthcare than in other industries (Medina-Craven and Ostermeier, 2020). There is a great need for organizational management interventions to address bullying (Salin et.al, 2020). Although previous research has shown that employers can play an active role in preventing and addressing workplace bullying (Catley et al., 2013), research on this important topic is lagging behind (Escartin, 2016). Research shows that bullying management measures can reduce bullying (Bayighomog et.al, 2023; Djurkovic et.al, 2021; Einarsen et.al., 2019). However, little research has been done on the measures as a whole. While most research on bullying management in healthcare has focused on nurses as a separate and the most affected group (Ribeiro and Sani, 2024), other groups of healthcare workers also need attention. A critical question is whether bullying management tools work equally for different groups of healthcare workers. This study aims to assess the impact of bullying management measures on the perceived exposure to bullying by employees in Lithuanian healthcare institutions.

METHODOLOGY

We used a survey-based cross-sectional quantitative approach. The sample comprised 851 doctors, resident doctors, nurses and other healthcare employees. The data were collected between November 2024 and February 2025. To analyse the data, we employed a confirmatory factor analysis and a CB-SEM multiple regression analysis; we utilized IBM SPSS Amos v29.

FINDINGS

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Table I indicates the number (mean) of various types of bullying incidents. The data suggests that exposure of doctors, resident doctors, nurses, and other healthcare employees to various types of bullying differs. Nurses are the most exposed to spreading gossip and rumours, doctors are the most exposed to withholding information, residents mostly face criticism, and others are the most exposed to being shouted at. The number of total acts of perceived bullying is the highest for nurses and others, and it is the lowest for doctors.

The study of the management of bullying analyzed if healthcare institutions have a specific anti-bullying policy, incorporate staff in the process of developing and implementing the anti-bullying policy, and have a procedure for employees for making and investigating (informal or formal) complaints on bullying and other measures.

Bullying type	Doctors	Residents	Nurses	Other
Someone withholding information which affects your performance	4.18	2.91	3.87	5.13
Spreading gossip and rumours about you	3.59	3.30	5.40	3.54
Being ignored or excluded	3.84	3.56	3.85	3.70
Having insulting or offensive remarks made about your person …	2.32	2.13	2.82	2.51
Being shouted at or being a target of spontaneous rage	2.05	3.45	3.83	5.39
Repeated reminders of your errors or mistakes	1.84	1.75	3.14	2.06
Being ignored or facing a hostile reaction when you approach	2.14	3.65	3.34	2.92
Persistent criticism of your work and effort	2.65	3.86	3.61	2.87
Practical jokes carried out by people you do not get along with	1.46	1.48	2.92	2.53
TOTAL NUMBER of perceived bullying acts	23.88	26.03	32.26	30.55

Source (-s): Authors' own work

Table I. Exposure to bullying in different professional groups

The hypothesis testing procedure indicated that the impact of bullying management measures on the perceived exposure to bullying for professionals differs. The managerial measures would be most effective for nurses (estimate = 0.450) and others (estimate = 0.427).

IMPLICATIONS AND LIMITATIONS

From a theoretical perspective, our findings contribute to an increased understanding of the bullying management measures on perceived exposure to bullying. From a management perspective, managers need to manage gossip and rumours, not withhold information, and communicate it clearly using various channels, learn to provide constructive criticism, and develop communication skills in order to maintain a respectful tone when communicating with employees. The bullying management

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can provide specific management measures aimed at reducing bullying among specific groups. This study has some limitations, as all measurements were based on self-reported data and reflected the subjective perception of the respondents.

Keywords: Exposure to bullying, Bullying management, Healthcare institutions

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USE AND PROMOTION OF PROPHYLAXIS HEALTHCARE PROGRAMMES: QUANTITATIVE ANALYSIS

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ABSTRACT

This study investigates the complex reasons behind Lithuania's lack of prophylaxis programs. Despite the known benefits of these programs in preventing the progression of non-communicable diseases, participation rates remain low. The statistical analysis reveals that approximately 40% of the target population actively engages in preventive programs. Our study identifies various factors that could encourage the uptake of preventive healthcare services.

INTRODUCTION

Promotion can target individuals, groups, and organisations. Promotional actions can be diverse and tailored to specific audiences or organisations. A healthy society reflects a nation's well-being, and the quality of human capital is an essential contributor to economic growth (Chadha *et al.*, 2007). The limited number of preventive programmes indicates the incomplete execution of preventive healthcare and health promotion tasks (Augustynowicz *et al.*, 2017). Effectively encouraging patients to take up preventive health programmes is important to improve health status, increase satisfaction with care, reduce costs and even improve the experience of doctors.

Health promotion activities include systemic regulatory, political, educational, and organisational actions that result in conditions conducive to individuals, groups, and communities (Caron *et al.*, 2023). The usefulness of preventive health programmes should be discussed during the medical training process. Digitalisation and innovative teaching must be included in the educational programmes for health promotion and disease prevention (Patja *et al.*, 2022).

Health Promotion involves changing behaviour at multiple levels. To initiate change, one must understand and apply the widely used models to empower people to make healthy choices (Dobe, 2012). Maria E. Fernandez and others (2019) describe Intervention Mapping, a framework for theory- and evidence-based health promotion program planning that addresses this challenge by providing a systematic and step-by-step approach to planning interventions.

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To enhance the effectiveness and scale of community-based preventive health programmes, policymakers should prioritize integrating preventive health strategies into existing healthcare systems (Alharbi *et al.*, 2024). Researchers demonstrated a significant increase in the coverage of preventive services and emphasised the range of old and new challenges confronting this healthcare system (Gutiérrez *et al.*, 2010).

METHODOLOGY

The research method selected for this study is a quantitative survey. The questionnaire comprises seven sections: introduction, demographic characteristics (age, sex, marital status, education, and place of residence), five questions related to the use of preventive programmes, six statements regarding the affordability of preventive programmes, five statements on communication and awareness, five statements on respondents' opinions of the programmes, and six statements concerning the incentives for using the programmes. Survey data were collected between September and November 2024, with a total of 446 observations in the survey sample. In terms of age, the majority of respondents belong to the 35-59 years age group (69.3%). Regarding gender, most respondents are female (68.4%), while 30.5% are male, and 1.1% did not respond.

Cronbach's alpha was used to assess the reliability of the questionnaire. The Kolmogorov-Smirnov and Shapiro-Wilk tests evaluated the normality of the data. Descriptive statistics, Spearman's correlation coefficient, the non-parametric Mann-Whitney U test, the Kruskal-Wallis test, and post hoc tests were utilised for data analysis.

RESULTS

The study formulated four hypotheses. As the availability of prevention programmes decreases, the uptake of prevention programmes also declines, resulting in H1 being accepted. As the availability of prevention programmes diminishes, the uptake of prevention programmes decreases, leading to the acceptance of H2 as well. As the perception of prevention programmes improves, the use of prevention programmes declines, hence H3 was rejected. There is no statistically significant correlation between incentives and the use of prevention programmes, so H4 was also rejected.

Statistical analysis shows that women are more aware of and utilise prevention programmes than men, while men hold a higher opinion of these programmes than women. Older individuals (60-74) tend to have higher scores across all incentives for participating in prevention programs compared to

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younger respondents (25-59). Furthermore, older individuals are more likely to engage with prevention programmes than their younger counterparts. Additionally, it was found that single individuals have a more favourable view of prevention programmes than those who are in relationships or married. Lastly, respondents residing in larger cities tend to have a better opinion of prevention programmes than those living in smaller ones.

A post-hoc test revealed that respondents with a bachelor's degree from a college or less had greater incentives to use prevention programmes than those with a university degree. It was also noted that respondents with a university bachelor's degree or higher held a lower opinion of prevention programmes compared to those with a college bachelor's degree or less.

Conclusion

Increasing the uptake of preventive health care programmes requires improving their accessibility and placing a greater emphasis on promoting them in society. Information about preventive programmes should be provided to clients by their family doctors. Notifications from health authorities, such as calls, SMS, or letters, would be the most effective way to encourage the use of preventive health care programmes. Financial incentives or fines would not promote the uptake of preventive health care programs.

Keywords: prophylaxis programmes, promotion, health behaviour, program participation.

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BEHAVIORAL DRIVERS AND PREDICTIVE MODELING OF CRYPTOCURRENCY PRICES: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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ABSTRACT

The cryptocurrency market has marked a pivotal moment in the global financial landscape due to its decentralized nature and highly dynamic characteristics. Due to high profit potential and significant volatility, forecasting cryptocurrency price movements has attracted investors, policymakers and academics from the perspective of both quantitative and behavioral finance. While recent research focused on econometric modeling and technical operations, psychological and behavioral aspects of cryptocurrency price development are underexplored in a systematic way (Bouteska *et al.*, 2024; Dunbar and Owusu-Amoako, 2023; Goodell *et al.*, 2023).

This research paper presents a systematic literature review and meta-analysis to examine behavioral and psychological drivers of cryptocurrency prices and to evaluate trends and accuracies of prediction model architectures that incorporate behavioral data.

A systematic literature review and meta-analysis are conducted following the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The search for relevant articles is performed on five significant academic databases: ProQuest Central, Directory of Open Access Journals, Elsevier Science Direct, Business Source Ultimate, and Springer eJournals. In total, 37 peer-reviewed articles that were published in a Thomson Reuters ranked journal from 2009 until late 2024 are included. The selection is based on predefined inclusion and exclusion criteria. The systematic literature review is centered around identifying behavioral drivers for directional price development, while the meta-analysis appraises the predictive accuracy of model architectures that integrate behavioral proxies using mean absolute error and root-mean-square error as their main performance measures.

Findings reveal that certain behavioral biases such as herding behavior (Lobão, 2022; Stavroyiannis and Babalos, 2019; Wanidwaranan and Termprasertsakul, 2023), fear of missing out (Kala *et al.*, 2023;

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Wang *et al.*, 2023), and aspects from the prospect theory (Chen *et al.*, 2022) are considered. Personality traits such as risk tolerance (El-Chaarani *et al.*, 2023; Veerasingam and Teoh, 2023) and (over-)confidence (Sudzina *et al.*, 2023), social norms (Gong *et al.*, 2023), and cultural influences (Abraham *et al.*, 2019), as well as collective emotions (Bourghelle *et al.*, 2022; Huynh and Phan, 2023) and their impact on market behavior are explored.

The first forecasting models derived from traditional regression-based analysis such as autoregressive conditional heteroskedasticity (ARCH) models. Machine learning techniques including support vector machines (SVM), random forest and K-nearest neighbor, improved the handling of the non-linear cryptocurrency data. Deep learning approaches such as long short-term memory (LSTM), convolutional neural network (CNN), and gated recurrent unit (GRU) further improved computational power and enable nearly real time forecasting also for lower timeframes. The latest models leverage multimodal learning and explainable artificial intelligence (XAI) to further refine model robustness and to increase data interpretability. Despite some attempts to embed price dynamics within theoretical behavioral finance frameworks like the prospect theory, empirical operationalization remains limited due to the indirect nature of behavioral observation and a lack of variety and robustness of behavioral proxy variables, limiting interpretability, theoretical depth and model accuracy.

This systematic review contributes a conceptual framework for behaviorally driven cryptocurrency price formation and identifies significant research gaps. It offers valuable insights for the design of more comprehensive and holistic datasets to train algorithms and enhance predictive models. Thereby, trends in predictive architecture are revealed and guidance towards selecting promising approaches for behavioral data driven forecasting is provided. These findings can be utilized by practitioners and researchers to improve investment decision-making processes and deepen the understanding of behavioral finance aspects within the context of digital currency markets.

Keywords: Cryptocurrency, Behavioral Finance, Price Prediction Models, Investor Behavior, Systematic Literature Review, Meta-Analysis, Psychological Drivers, Machine Learning in Finance, Digital Markets

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ARTIFICIAL INTELLIGENCE: AN ETHICAL DILEMMA OF HUMANIZATION

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ABSTRACT

Twenty years ago, McVea and Freeman (2005) introduced the "Names-and-Faces Approach," a conceptual shift that transformed Stakeholder Theory (Freeman *et al.*, 2010) . By moving beyond abstract stakeholder roles, this perspective highlights the unique characteristics of individuals, challenging traditional firm-centric views that reduce stakeholders to transactional roles. Rather than perceiving stakeholders as mere entities in economic exchanges, this approach encourages businesses to acknowledge them as individuals engaged in cooperation, ethical commitments, and shared value creation (Freeman and McVea, 2005; McVea and Freeman, 2005; Ramaswamy and Ozcan, 2013; Soundararajan and Brown, 2016, 2016; Sulkowski, Edwards and Freeman, 2018; Civera and Freeman, 2019). A fundamental philosophical foundation for this perspective is Kantian ethics, particularly the principle of "respect for persons." Kant asserts that any business practice treating individuals merely as a means to an end, akin to monetary value, is inherently immoral. Recently, this ethical principle has become particularly relevant and controversial when considering Artificial Intelligence (AI).

AI and its related technologies rapidly reshape society, with significant ethical implications. These transformative technologies influence stakeholders and organisational perspectives, often enhancing but disrupting traditional ethical paradigms. AI is frequently designed to simulate human intelligence through algorithms embedded in complex computing environments (Russell and Norvig, 2016; Xu *et al.*, 2021). The objective is to replicate and mime neural processing in human cognition, necessitating sophisticated computational systems, data management, and algorithms. AI-based algorithms enable machines to make decisions, recognise patterns, and draw conclusions, mimicking human intelligence (Rodgers, 2020). Although AI does not actually possess human-like cognition, recent works by Huang and Rust, 2018, 2022; Haenlein, Huang and Kaplan, 2022, and others suggest that the most advanced AI designs increasingly resemble human characteristics mimicking it. These AI systems are engineered to simulate human thought processes, emotions, and actions, raising critical ethical concerns regarding their shaping role in business and society. On the one hand, companies can use AI that mimes humans to mitigate ethics issues regarding implicit racial bias, such as in the case of Airbnb, where African American guests with particular ethnic names face biased booking issues (Edelman, Luca and Svirsky, 2017). On the other hand, AI can also be deployed by companies for

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employee surveillance, as seen in platforms like Status Today, which monitor staff activities by analysing email patterns, file access, and meetings (Aloisi and Gramano, 2019). This effort on surveillance alters the company's dynamic, positioning AI as a managerial mime that exercises control over staff behaviour, raising the ethical issues of companies that manage employees with AI technologies. Another instance of AI's human-like mimicry is the rise of AI influencers (Makrides, Vrontis and Christofi, 2020; Schouten, Janssen and Verspaget, 2021; Vrontis *et al.*, 2021; Huang and Rust, 2022). These digital entities attract substantial audiences and function as "trusted tastemakers" in various environments (De Veirman, Cauberghe and Hudders, 2017). While AI influencers replicate and mimic humans in appearance and behaviour, their ethical impact on stakeholders' perceptions remains fragmented and necessitates further exploration. Research indicates that consumers exhibit mixed reactions to AI-mimic humans. For instance, AI in service settings, such as hotel robots, can evoke unease due to ethical and security concerns (Jia, Chung and Hwang, 2021; Jia, Chi and Lu, 2024). Furthermore, AI that mimics influencers elicits lower trust levels on social media, given the ethical concerns surrounding their use and suggestions that AI that mimics influencers can give (Sands *et al.*, 2022). Thus, stakeholders may raise physical acceptance issues based on the physical aspect of AI that mime influencers. AI that mimes humans in hospitality may generate discomfort and ethical issues. These findings underscore the complexities of integrating AI into stakeholders' interactions and the ethical implications concerning its human design and conception (Yu, 2020; Choi *et al.*, 2021; Vatan and Dogan, 2021).

Examining AI mimicked humans from a Kantian perspective raises significant ethical issues. Kantian ethics underscore the inherent dignity of individuals, advocating that humans should be treated as ends in themselves rather than as instruments for companies' gain. This principle aligns with Stakeholder Theory, reinforcing the need for ethical business practices that recognise stakeholders' different roles and names. *But, what happens if we consider AI mimicked humans? Does it have the dignity and the legitimacy of a human individual?*

Within this framework, companies function as moral communities, fostering ethical relationships between managers and stakeholders. Ethical business conduct, therefore, necessitates respecting all stakeholders' humanity and ensuring that organisations do not merely serve managerial or company interests. Treating firms as instruments for profit maximisation contradicts the "respect for persons" principle, which should guide all stakeholder interactions.

However, some scholars argue that the Kantian framework may not be entirely suitable for business and societal contexts that use AI-mimicked humans. Businesses operate differently from societal

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entities such as families or personal relationships, making the application of broad ethical theories challenging (Donaldson and Dunfee, 1994, 1995, 2002). Cultural diversity further complicates ethical decision-making, as different societies prioritise distinct values—some emphasising cooperation and collective innovation, while others focus on property rights and intellectual ownership (Swinyard, Rinne and Kau, 1990). This raises the question: *How should businesses and society reconcile these cultural variations when applying a Kantian-based ethical approach using AI technologies?*

In contemporary business, ethical challenges are particularly relevant to Stakeholder Theory, especially when considering AI's issues. AI's can perpetuate biases if they rely on flawed data, exacerbating social inequalities in hiring, lending, criminal justice decisions and other ethical issues. Moreover, AI's lack of transparency and accountability poses substantial ethical risks for organisations and society (Jobin, Ienca and Vayena, 2019). Stakeholder Theory, particularly the "Names and Faces approach," underscores the necessity of recognising the interests and concerns of all affected parties. This necessitates ethical AI design and implementation for companies and stakeholders using AI in organisational and societal processes.

Our study aims to conceptualise the ethical implications of AI mimicking humans. Specifically, we seek to advance conceptual discussions on AI's human role within firms and explore its ethical issues for stakeholders at multiple levels. We address the following research questions: *What characteristics must AI mimicking humans have to be accepted as a helpful tool that helps businesses and society? What moral obligations, if any, could AI mimicked humans hold? What social, economic, and environmental benefits arise for businesses and society using AI mimicked humans ethically? If AI mimicked humans were implemented, how would organisations and society need to adjust their interactions with it? Finally, what ethical considerations emerge when AI mimics humans and fully integrates into business and society operations?*

By exploring these questions, our paper contributes to the ongoing debate on AI ethics and its intersection with Stakeholder Theory. We respond to recent calls for research on the ethical challenges of AI integration in business and society, as highlighted in numerous studies (Haenlein, Huang and Kaplan, 2022; Laine, Minkkinen and Mäntymäki, 2024). Our study challenges existing perspectives and philosophical frameworks in the AI era, offering a conceptual model to better understand the ethical complexities of AI's integration into business and societal contexts.

Keywords: Artificial Intelligence, AI, Stakeholder theory, Business Ethics, Conceptual, Ethical practices

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INTEGRATING ESG AND SUSTAINABLE PRINCIPLES INTO MANAGEMENT EDUCATION: A QUANTITATIVE ANALYSIS OF PEDAGOGICAL EFFECTIVENESS WITHIN HIGHER EDUCATION CURRICULA

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ABSTRACT

The increasing emphasis on sustainable development and responsible business practices has elevated Environmental, Social, and Governance (ESG) principles to the highest level of management education (Ahmad, Yaqub & Lee, 2024). As organizations worldwide increasingly align their strategies with ESG frameworks and guidelines, higher education institutions, are requested to equip future leaders—especially those in business-related programs— with the knowledge, skills, and values necessary to navigate complex sustainability challenges (Annesi et al., 2025; Shih, Hsu & Chang, 2025). While the literature has extensively discussed the integration of sustainability into business curricula (e.g., Angelaki et al., 2024; Adib, 2024; Obrecht, Feodorova, & Rosi, 2022; Weiss, Barth, & von Wehrden, 2021) on a theoretical basis, there remains a significant gap in empirical research examining the preparedness, and pedagogical practices of faculty members responsible for delivering high quality education that corresponds to sustainability principles and standards (Leal Filho et al., 2024). This study addresses this gap by conducting a comprehensive quantitative investigation into the strategies of management academics across European business schools, with a particular focus on the factors that facilitate or hinder the effective integration of ESG and sustainability practices into teaching and learning.

The research is grounded in the recognition that faculty members are pivotal agents of change in the transformation of management education. Their expertise, attitudes, and instructional approaches directly influence the extent to which ESG principles are meaningfully embedded in curricula and, consequently, the degree to which students develop sustainability competencies and skills. Drawing on the theoretical frameworks of transformative learning (Mezirow, 1997) and institutional theory (DiMaggio & Powell, 1983), This study explores how individual and organizational factors interact to shape faculty engagement with, and implementation of, ESG principles. The research also builds on recent empirical findings that highlight the importance of faculty development, interdisciplinary collaboration, and institutional support in advancing sustainability education (Bonilla-Jurado et al., 2024; Podgórska & Zdonek, 2024; Abo-Khalil, 2024; Mokski et al., 2023).

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A structured questionnaire will be developed and distributed to a representative sample of approximately 200 faculty members from business schools across Europe. The survey instrument will be designed to examine multiple dimensions of ESG policies integration, including:

(1) Faculty members' self-assessed proficiency and confidence in teaching ESG-related content;

(2) The prevalence and perceived effectiveness of various pedagogical methods such as case studies, experiential learning projects, and industry partnerships;

(3) The availability and quality of institutional support mechanisms, including training programs, resource allocation, and policy frameworks; and

(4) Perceived barriers and enablers to the adoption of sustainability-focused pedagogy. Demographic and professional background data will also be collected to enable subgroup analyses and control for potential confounding factors.

It is anticipated that the data analysis will reveal a strong recognition among faculty of the critical importance of ESG and sustainability in management education, while simultaneously identifying gaps in confidence and preparedness to teach these topics effectively. Regression analyses are expected to demonstrate that participation in institutional training programs and engagement in interdisciplinary teaching collaborations will emerge as significant predictors of faculty confidence and perceived pedagogical effectiveness. These findings will likely align with existing literature emphasizing the role of organizational learning and professional development in fostering sustainability-oriented teaching. The study will also identify systemic barriers that faculty members face when integrating sustainability into curricula, such as fragmented institutional policies, limited access to up-to-date teaching resources, and insufficient recognition of sustainability in academic evaluations. Conversely, it is expected that strong leadership support and access to dedicated sustainability centers or networks will be associated with higher adoption rates of innovative teaching methods and more positive perceptions of student learning outcomes.

Based on the study findings, the research will propose a competency matrix for faculty development, serving as an evaluation framework that delineates the essential knowledge areas, skills, and attitudes required for the effective integration of sustainability into curricula. This framework will enable institutions to assess current faculty capabilities, identify development needs, and guide strategic improvements in sustainability education. This matrix will emphasize continuous professional

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learning, interdisciplinary collaboration, and reflective pedagogical practices. Furthermore, the research will offer scalable strategies for business schools aiming to enhance their institutional capacity for sustainability education, including the establishment of faculty learning communities, integration of ESG criteria into curriculum review processes, and provision of targeted incentives for innovative teaching.

In conclusion, this research will contribute to the evolving discourse on management education for sustainability by providing robust empirical evidence on the strategies and existing needs of business school faculty in Europe. By enlightening the interplay between individual agency and institutional context, the study will offer actionable recommendations for academic leaders, policymakers, and educators seeking to advance the integration of ESG principles into management curricula. Ultimately, the findings will underscore the critical role of faculty development and organizational support in preparing the next generation of responsible business leaders capable of addressing the pressing sustainability challenges of the 21st century.

Keywords: ESG, Sustainability, Higher Education, Pedagogical Effectiveness, Higher Education Institutes, Curricula

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SILICON SAMPLING – USING DATASETS GENERATED BY LARGE LANGUAGE MODELS IN HUMAN RESOURCE MANAGEMENT AND LEADERSHIP RESEARCH

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ABSTRACT

The introduction of generative artificial intelligence (AI) is transforming traditional research processes (Sarstedt *et al.*, 2024). One of the most prominent generative AIs is the GPT (generative pre-trained transformer) model (Brown *et al.*, 2020; OpenAI, 2023). This is a large language model (LLM) which mimics human behavior in terms of responses (Jeon *et al.*, 2024; Luo *et al.*, 2022) based on a priori training via input data like texts (OpenAI, 2023).

In some studies, human participation has been replaced by using samples generated by LLMs (cf. Argyle *et al.*, 2023; Demszky *et al.*, 2023; Dillion *et al.*, 2023). These can – but do not have to – be enriched by personal characteristics such as certain demographics (Sun *et al.*, 2024). Generating datasets via LLMs is called the silicon sampling methodology (Argyle *et al.*, 2023) or synthetic datasets (Sarstedt *et al.*, 2024). If demographic information is excluded, it is called random silicon sampling (Sun *et al.*, 2024).

There are open calls for generating more knowledge on how silicon sampling performs in certain research streams (Sarstedt *et al.*, 2024). Moreover, Sun et al. (2024) call for further analyses that are based on different studies to uncover similarities or differences when using silicon sampling. In addition, different ethnic or national backgrounds should be used to analyze if these affect the results (Sun *et al.*, 2024). The aim of this study is to discover whether samples generated by artificial intelligence and samples generated by human participants differ. Thus, this study contributes to filling the gap by answering the following research question:

RQ: How do results from silicon sampling data and data generated from real people differ in (1) HRM and (2) leadership research?

In order to answer the research question, the model on mindfulness, psychological strain and job satisfaction (Lohrmann and Tirrel, 2025) will be re-analyzed using two different silicon samples: (1) a random silicon sample without any information on personal characteristics, and (2) a silicon sample with the same personal characteristics as the original model based on the sample description. Both silicon samples will be generated by using the latest version of ChatGPT.

The three different datasets will be analyzed twofold: First, two new PLS-SEM models will be set up for both silicon samples to analyze similarities and differences with the original model. Second, to test for statistically significant differences, an analysis of variance (ANOVA) will be performed. Thus, the

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effects of the silicon samples are first analyzed with reference to the final results, i.e., the PLS-SEM model, and second regarding similarities and differences in comparison to the original dataset, enabling a conclusion to be drawn on whether these similarities or differences are statistically significant.

In addition, the organizational-level scale Technological Requirements of Virtual Leadership (Tirrel, 2023) will be analyzed by conducting an ANOVA. Thus, two analyses will be conducted; one on the individual and one on the organizational level to further evaluate whether silicon sampling performs differently on these two levels.

This study contributes to knowledge by exploring how close (random) silicon sampling comes to the original datasets and results on individual as well as organizational level. Therefore, the results of this study indicate whether or not silicon sampling can be used for data generation in human resource management as well as leadership research projects and therefore contributes to closing the gaps raised by Sarstedt et al. (2024) as well as Sun et al. (2024). It is assumed that the results will be mixed, as in current studies (Sarstedt et al., 2024; Sun et al., 2024). Since this analysis refers to two research areas, it might be possible that larger differences between the samples are obtained in one area and smaller differences in the other area. It is further expected that the differences between the samples will be reduced if the human sample is described in more detail in the artificial intelligence that is to be imitated.

Keywords: Generative artificial intelligence, AI, large language model, LLM, silicon sampling, sample, human resource management, HRM, dataset, demographics, random sampling

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HUMAN- AI INTERACTION MODELS IN ACADEMIC WRITING

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ABSTRACT

INTRODUCTION

The rise of AI as a research assistant has influenced academic writing and systematic literature reviews (SLRs). AI tools such as ChatGPT, Elicit, and Scite facilitate research processes by automating literature searches, summarizing articles, and even drafting sections of academic papers (Ngwenyama & Rowe, 2024). As AI becomes increasingly sophisticated, its role in academic writing is shifting from mere automation to interactive collaboration, leading scholars to conceptualize different levels of human-AI interaction (Tomczyk et al., 2024).

This study aims to answer the following research question: What are the different models of human-AI interaction in academic writing, particularly in systematic literature reviews? By categorizing these interactions, we aim to provide a clearer understanding of how AI is shaping the academic writing process and what challenges and ethical considerations arise from its use.

METHODS

This study conducted a systematic review of peer-reviewed studies retrieved from Scopus and Web of Science, two of the largest academic databases (Paul & Criado, 2020). The search strategy employed Boolean operators and relevant keywords, including "Automation," "Systematic Literature Review," and "Artificial Intelligence" (Alshami et al., 2023). The selection process involved filtering for review articles, journal articles, conference papers, and book chapters published in English.

To improve dataset coverage, additional sources were identified using AI-powered search engines such as Elicit and SciSpace. A backward and forward citation analysis further expanded the dataset, resulting in a sample of 120 studies. Each study was analyzed based on its discussion of human-AI interactions, focusing on decision-making and AI-human discussions. Articles that did not mention human-AI interaction were excluded, leading to a refined dataset of 113 studies categorized into three models of interaction.

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RESULTS AND DISCUSSION

Building on existing human-AI interaction literature, this study identifies three models of AI integration in academic writing: AI-Supported, Collaborative, and Partner-like. The AI-Supported Model treats AI as a tool for automating repetitive tasks, such as literature searches and data screening, with final decision-making left to human researchers (Spillias et al., 2023). The Collaborative Model envisions AI as a cognitive collaborator that assists in brainstorming, content structuring, and iterative refinement of research outputs (Jiang, 2023; Semrl et al., 2023). The Partner-like Model represents the highest level of integration, where AI participates in decision-making and content generation in a co-evolutionary system (Correia et al., 2023).

The AI-Supported Model (n=94) represents the most common approach, where AI is used primarily for automation but lacks interactive collaboration (Fatalla et al., 2023). While this model enhances efficiency by streamlining systematic reviews, it limits AI's role to that of a passive tool, offering no dynamic interaction with researchers. In contrast, the Collaborative Model (n=15) facilitates iterative human-AI discussions, allowing AI to suggest improvements while the researcher retains full decision-making authority (Lin, 2024). This model has been particularly effective in generating research ideas, structuring content, and improving writing clarity (Semrl et al., 2023).

The most advanced form of human-AI interaction, the Partner-like Model (n=4), extends beyond iterative refinement to include AI in research design, hypothesis generation, and decision-making (Correia et al., 2023). This deeper integration reflects the increasing trust in AI's capacity to manage complex academic tasks autonomously. However, it also raises ethical concerns regarding authorship, accountability, and transparency in AI-assisted research (Messeri & Crockett, 2024). While AI can significantly optimize research processes, maintaining human oversight remains critical to prevent biases and ensure academic integrity (Ngwenyama & Rowe, 2024).

CONCLUSIONS

This study categorizes human-AI interaction into three models—AI-Supported, Collaborative, and Partner-like—highlighting the evolving role of AI in systematic literature reviews. The findings suggest that while AI enhances research efficiency and creativity, ethical considerations surrounding decision-making and authorship remain critical. Future research should explore the implications of AI's increasing autonomy in academic writing and develop frameworks to ensure responsible AI use.

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Keywords: Academic Writing, Artificial Intelligence, Artificial Intelligence Models, Science Automation, Chatgpt, Scholarly Writing

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BLENDING WORLDS: HOW PHYGITAL STRATEGIES REVIVE INTANGIBLE CULTURAL HERITAGE IN TOURISM

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ABSTRACT

In recent decades, travel and tourism have witnessed transformative shifts driven by evolving consumer behaviors and technological advancements. The 21st-century traveler is no longer content with passive, standardized touristic offerings. Instead, tourists increasingly seek personalized, interactive, and immersive experiences that resonate deeply with their individual aspirations and cultural curiosity. This shift has prompted tourism and leisure operators to innovate by crafting authentic, participative, and inclusive encounters that bridge emotional, intellectual, and sensory dimensions.

The intersection between cultural heritage, both tangible and intangible, and modern technological capabilities has opened significant new avenues within tourism management. Museums, cultural venues, and tourist destinations are progressively becoming spaces for creative exploration and interactive engagement. Central to this evolution is the concept of "phygital reality" – the strategic blending of physical environments with digital technologies. By integrating traditional cultural elements with digital interfaces and mixed realities, tourism experiences become dynamically enriched, offering visitors novel ways to interact with heritage.

Phygital approaches are particularly effective in enhancing intangible cultural heritage, encompassing traditions, rituals, performances, crafts, and other cultural expressions that, by nature, lack physical form yet carry significant symbolic value. Through immersive digital technologies – such as virtual reality (AR), 360º immersion, and interactive storytelling – tourists can actively engage with intangible heritage, deepening their understanding and emotional connection with local traditions.

Simultaneously, the strategic deployment of phygital experiences complements and strengthens marketing territorial strategies. Effective place branding involves creating unique, compelling narratives that communicate a region's distinct cultural and historical identity. When destinations employ phygital strategies, they reinforce their competitive positioning by combining authenticity and innovation, attracting culturally curious and digitally sophisticated travelers.

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For example, cities or regions known for specific intangible heritage elements, such as folklore, cuisine, or traditional festivals, can leverage digital technologies to offer participative experiences that extend beyond conventional boundaries. Visitors can virtually engage in traditional crafting classes or use augmented reality applications to explore urban spaces enriched with intangible heritage elements. These innovative strategies not only enhance visitor satisfaction but also amplify a territory's cultural visibility, economic appeal, and international profile.

Moreover, the integration of phygital realities in cultural tourism aligns strongly with broader trends in sustainable tourism development. By focusing on digital interactions, destinations can manage visitor flows more sustainably, reduce pressures on physical sites, and distribute economic benefits more evenly across different communities. This approach supports a balanced, culturally respectful, and economically beneficial form of tourism that preserves and revitalizes intangible cultural heritage

This research pondered if *the University of Coimbra – Alta and Sofia*'s intangible cultural heritage blended into information and communication phygital technologies could enhance the tourism experience. For this purpose and by asserting the student community, we sought to comprehend the importance of combining phygital reality with the intangible cultural heritage of the University of Coimbra, the UC Identity, the World Heritage property's tangible and intangible outstanding universal value, and the new relocated and modernized Academic Museum as tourist experience enhancer. Additionally, UC Student's contributions will supply decision-makers with valuable information as this study falls under a turn-off moment for the Academic Museum and the *University of Coimbra – Alta and Sofia*'s heritage and tourism investments.

The research conducted an online inquiry – resorting to LimeSurvey – entitled *Tradition and Innovation: The Academic Museum as Collective Memory Space*, addressed to UC Students of Courses Granting an Academic Degree. The output (461 participants) allowed us to elaborate an exploratory research project – analyzed through the SPSS software applying hypothesis testing and non-parametric tests such as the Kolmogorov-Smirnov Test or the Spearman's Rho Correlation Coefficient Test – weaving an new approach to preferences, values, behaviors, and future opportunities for the asset as a tourist attraction, the Academic Museum as a renewed museological outline, and the University of Coimbra as an institution of reference in education and science. The results also demonstrated the importance of phygital reality and the Academic Museum as a *University of Coimbra – Alta and Sofia* tourist enhancer, as a vital asset for the UC Community (students and Alumni), and the University of Coimbra in the national and international framework. Outcomes also allowed us to conclude that if an average of 50% of UC Students have never experienced immersive technologies, then their

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introduction to the museum context is essential when wanting to grant democratic access to (diverse) knowledge, (different) experimentation, and (mind-opening) perspectives.

Keywords: Place Marketing, Immersive Technologies and Innovation, Phygital Heritage, Intangible Cultural Heritage, Tourism Experience, World Heritage property, University of Coimbra – Alta and Sofia

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HOW VERBAL AND NONVERBAL COMMUNICATION IMPACT INFLUENCER MARKETING EFFECTIVENESS

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ABSTRACT

BACKGROUND AND RESEARCH OBJECTIVE

In today's digital marketing landscape, firms are increasingly leveraging social media influencers to drive consumer engagement and extend brand visibility (Campbell and Farrell, 2020). Influencer marketing has become a dominant strategy, with a growing share of advertising budgets being allocated to collaborations with online personalities (Influencer Marketing Hub, 2024). While prior research has largely focused on the impact of content characteristics (e.g., color complexity, message hedonic value; Foroughi et al., 2024; Kanuri, Hughes and Hodges, 2024) and influencer attributes (e.g., expertise, follower count; Hughes, Swaminathan and Brooks, 2019; Beichert et al., 2024) on endorsement effectiveness, a critical yet understudied dimension is how influencer messages are delivered.

To fill this gap, this research aims to investigate how verbal and nonverbal aspects of message delivery affect the visibility and user engagement of influencer-sponsored content on social media platforms.

Drawing from the Ecological Theory of Social Perception (McArthur and Baron, 1983), which posits that individuals perceive and interpret cues in their environment through a combination of contextual and behavioral signals, hypotheses are advanced on the role of both verbal and nonverbal cues in shaping the reception of the message. Specifically, for the verbal component, this work focuses on analyzing the valence of the message, while for the nonverbal elements the main emphasis is on the role of the influencer presence throughout the content and on proxemics (i.e., the management of space and distance during communication; Bonoma and Felder, 1977).

METHODOLOGY

The research involved the empirical analysis of a large dataset comprising real-world influencer-sponsored videos posted on Instagram, in the form of reels, and TikTok. Through image and textual analysis, verbal and nonverbal delivery features were coded and related to campaign performance, expressed by the total number of visualizations (i.e., impressions) and the level of engagement (i.e., likes and comments).

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With respect to the verbal component of message delivery, a key variable is represented by the valence of the message, which was measured as the emotions (e.g., positive or negative) conveyed through the posts' descriptions. On the nonverbal side, relevant measures were the distance of the influencer from the camera and the extent of their presence throughout the video. A number of relevant covariates were also controlled, including follower count, brand category, posting time, and background setting (e.g., indoor vs. outdoor).

RESULTS AND CONTRIBUTIONS

The findings of this study underscore the critical role of message delivery in the effectiveness of influencer marketing. In this regard, both verbal and nonverbal cues were found to significantly influence campaign outcomes.

For the verbal dimension, emotions conveyed by the posts' caption were found to exert a significant impact on posts' performance. Among the nonverbal elements, a particularly salient factor was the facial presence of the influencer, measured as the extent to which they appeared on screen. This variable was positively and significantly associated with higher posts impressions, supporting recent findings on face presence in social media marketing (Wang, Ding and Hu, 2025).

By highlighting the role of expressive behavior and spatial dynamics in driving digital engagement, this study contributes to a more nuanced understanding of what makes influencer campaigns succeed. In doing so, this research advances the influencer marketing literature by integrating the analysis of the delivery dimension (the "how") to the well-studied "what" (content) and "who" (influencer) dimensions. Moreover, these findings offer actionable insights for optimizing influencer marketing campaigns: marketers should not limit creative briefs to guidelines on the concepts to share but also include recommendations on how the message should be delivered by the endorser.

Keywords: Influencer Marketing, Social Media Engagement, Content Analysis, Advertising Effectiveness, Nonverbal Communication

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BLOCKCHAIN AND QR CODES IN EXTRA VIRGIN OLIVE OIL SUPPLY CHAIN: A CONSUMER BEHAVIOR ANALYSIS

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ABSTRACT

INTRODUCTION

Digital technologies are redefining transparency in agrifood supply chains, reducing information asymmetry and improving consumer trust (Li et al., 2025). In particular, blockchain technology (BCT), supported by tools such as QR codes, significantly improves product traceability while reducing the risks of food fraud (Yang et al., 2024). While BCT ensures the immutability of recorded data, creating a trustworthy and tamper-proof record of the product's journey (Vitaskos et al., 2024), the use of the QR code allows immediate access to various information about the production and distribution process, improving the consumer's perception of authenticity and safety (Rotsios et al., 2022). However, despite its high potential of the application of BCT in the agri-food sector, the adoption of BCT in the extra virgin olive oil (EVOO) segment remains limited (Alkhudary et al., 2022). Some research revealed that significant barrier for wider adoption of BCT could be low trust and acceptance by consumers (Maesano et al., 2025; Reitano et al., 2024).

Although some studies investigate the consumer behavior toward traceable EVOO, the existing literature often lacks a strong and consistent theoretical foundation (Masmoudi and Gargouri, 2021; Violino et al., 2019). In order to overcome the identified gap in the literature, this study explores the factors influencing consumer acceptance of traceable EVOO. In particular, using the Theory of Planned Behaviour (TPB), it investigates attitudes towards traceability through BCT and the use of QR codes, as well as social norms, perceived control, the level of trust in the information provided by this technology and the consumer's information-seeking behavior.

METHODOLOGY

To examine consumer purchase intentions towards EVOO traced with BCT, the study adopts the extended TPB model shown in Figure 1. In pursuit of the research objectives, a survey was conducted by using a structured questionnaire distributed via social media (Whatsapp, Facebook, Instagram), using the snowball sampling method to reduce costs and reach as wide audience as possible (McCullough, 1998). The questionnaire included five sections: (i) purchasing and consumption habits related to EVOO; (ii) consumer attitudes, subjective norms and perceived behavioural control (PBC);

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(iii) trust in BCT and consumer information seeking; (iv) purchase intention towards EVOO tracked with BCT; and (v) socio-demographic data of the respondents. The survey was conducted in Sicily (Italy), one of the most renowned Italian regions for olive cultivation and with a strong tradition linked to olive growing (CREA, 2024).

To analyze the data and examine the hypothesized relationships among the constructs, Structural Equation Modeling (SEM) will be employed, as it enables the simultaneous estimation of the measurement model, which assesses the reliability and validity of the latent constructs, and the structural model, which tests the causal relationships among the constructs.

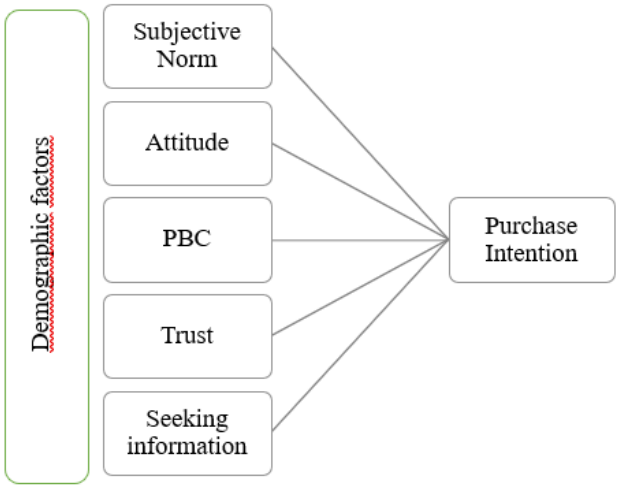


Figure 1. Extended TPB model

EXPECTED RESULTS AND MANAGERIAL IMPLICATIONS

Trust in BCT is expected to have positive influence on purchase intention. Furthermore, consumers who are more conscious of quality and transparency, as well as those who are more digitally literate, may be more likely to choose EVOO with BCT-based traceability. Similarly, attitudes and social norms related to the use of BCT are expected to have a positive influence on the purchase intention of traceable EVOO. As far as socio-demographic characteristics are concerned, it is hypothesized that the level of education, higher economic availability and greater number of household members positively influence the purchase intention. The study will provide useful indications for companies in the EVOO sector to better segment the market and more effectively communicate the added value of traceability with BCT.

LIMITATIONS AND FUTURE RESEARCH

The use of the snowball sampling limits the representativeness of the sample and may introduce bias. Furthermore, the focus on Sicily reduces the generalizability of the results, which may reflect local

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cultural specificities. Despite these limitations, the study offers useful insights into consumer behavior towards EVOO traced through BCT. Future research could extend the analysis to other geographical contexts and further investigate the role of factors such as personal values, attitudes towards technology and digital literacy.

Keywords: Traceability; Consumer trust; TPB; Purchase intention; Agri-food transparency; Supply chain digitalization.

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CAN ARTIFICIAL INTELLIGENCE (AI) BE A DRIVER OF COMPETITIVENESS IN TOURISM? AN ITALIAN CASE OF A SERVICE MANAGEMENT COMPANY SUPPORTING TOURIST DESTINATIONS.

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ABSTRACT

The present research explores how integrating AI and service management can be applied to managing destination management organizations (DMOs). Through the analysis of a case study of an Italian company operating as a Destination Management System (DMS) in the inbound tourism sector, the study aims to answer the following research questions:

RQ1: How does artificial intelligence contribute to sustaining the competitiveness of tourist destinations?

RQ2: To what extent do new technologies and service management influence the optimization of the tourist experience and the operational management of destinations?

RESEARCH STRANDS

The competitiveness of tourist destinations is a central theme in academic literature, yet it remains a debated concept without a universally accepted definition (Cordova-Buiza & Serruto-Perea, 2024; Xia et al., 2024). Poon's (1993) foundational principles laid the groundwork for understanding how destinations achieve competitive advantages. Ritchie and Crouch (1999) developed the first destination competitiveness model by adapting the OECD (1992) national competitiveness framework to tourism (Ritchie & Crouch, 2010; Xia et al., 2024). Latest models have integrated smart technologies with destination management, reinforcing the widely recognized role of digital technologies in achieving a competitive advantage (Cimbaljević et al., 2019; Usai et al., 2021). Zhu, Zhang, and Li (2014) emphasized information exchange in their smart tourism model (Zhu, Zhang, and Li, 2014; Sandhya, 2023); while, Koo et al. (2016) linked digital innovation and tourism competitiveness by placing smart technology at the core of destination management. Nonetheless, each category of digital technologies impacts innovation performance differently (Usai et al., 2021). Among them, Artificial Intelligence (AI) stands out for its transformative impact on tourism, enabling novel service design and delivery methods. As a consequence, Destination Management Organizations (DMOs) are increasingly leveraging the potential of AI to enhance their capabilities and competitiveness (Sandhya, 2023). AI-driven systems improve traveler experiences by increasing satisfaction and loyalty, while predictive analytics optimize resource allocation, and AI chatbots intensify customer service. These

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technologies collectively contribute to sustainable tourism through effective resource management and targeted marketing strategies (Bulchand-Gidumal et al., 2023; Xia et al., 2024). In addition, Destination Management Systems (DMS) offer a significant opportunity by providing tourists with comprehensive destination-related information while integrating product databases, customer databases, and reservation systems, functioning as operational tools and strategic marketing assets. Integrating user-centred methodologies into DMS development from a Design Thinking perspective can further drive service innovation. Design Thinking is a human-centred innovation approach that prioritizes user observation, cross-functional collaboration, accelerated learning cycles, quick prototyping, and simultaneous viability assessments (Lockwood, 2010). In this regard, Hehn et al. (2018) identified 52 Design Thinking methods particularly effective for enhancing service innovation. Since the literature emphasizes the role of Artificial Intelligence in improving analytical capabilities, user-centric service design, and destination management systems (DMS), the key question explored in the present work is whether the convergence of these approaches offers a viable strategy for delivering valuable services that strengthen destination competitiveness.

FINDINGS

HubCore.AI is a DMS designed to enhance the competitiveness of tourist destinations through three key dimensions: operational efficiency, personalized experience and multi-channel distribution. This end-to-end platform uses AI-based tools to transform destinations into comprehensive digital ecosystems, optimizing processes, improving offerings, and expanding visibility in global markets, addressing the needs of a holistic destination management approach as proposed in the literature (Stickdorn & Zehrer, 2009).

Product	Description	Competitive Advantage
Digital Factory	Combines Digital Warehouse (centralized data/content repository) and Product Factory (transformation of territorial assets into dynamic packages).	Territorial valorization, reduction of package production time, differentiated offer.
Smart Travel	Aggregates services (accommodations, experiences, transfers) into customizable itineraries.	Simplified booking, customer retention, and enhanced user experience.
AI Copywriter Assistant	Generates multilingual, brand-aligned content via AI.	Cost reduction, SEO optimization, brand consistency.
TripBuilder	Creates personalized multi-day itineraries combining attractions, accommodations, and experiences.	Maximized personalization, cross-selling growth, and differentiation.
AI Virtual Concierge	Provides real-time, AI-driven assistance to travelers.	Improved customer satisfaction, operational cost reduction, and reputation enhancement.

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B2C/B2B Websites	Integrated CMS for B2C/B2C sales with conversion-optimized funnels.	Increased visibility, centralized offer management, and target adaptation.
Embeddable Widget	Distributes offers across external platforms (blogs, partner sites).	Market expansion, cost-free reach, destination visibility boost.
Split Payment	Centralized payment management for direct supplier transactions.	Financial risk reduction, administrative efficiency, compliance.

Table 1. Hubcore.AI Features and DMO's advantages.

From an operational efficiency perspective, the platform centralizes the management of complex processes such as inventory and payment management, reducing operational costs by automating repetitive tasks, including content creation. The *Digital Warehouse* and *Split Payment* simplify the coordination with local suppliers and partners, improving financial transparency and mitigating the risk of transactional errors. Since personalization is a key driver of destinations' competitiveness, the *TripBuilder* and *AI Virtual Concierge* enable customer satisfaction and loyalty by offering real-time, customized experiences. Additionally, promoting lesser-known territorial attractors and unique experiences through the *Digital Warehouse* allows the creation of innovative thematic packages. Finally, HubCore.AI enhances destination visibility and market reach through multi-channel tools such as *Smart Travel*, *Embeddable Widgets*, and *B2B/B2C websites*. Integrating tourism offers in external platforms and exploiting cross-selling dynamics helps increase overall profitability, thus maximizing booking conversion. In sum, the impact of HubCore.AI on competitiveness of tourist destinations can be translated into three main strategic benefits: 1) reduction of operating costs – through to the automation of management and financial processes; 2) differentiation of the offer – through the creation of innovative packages; 3) expansion of visibility – through integration on digital platforms and connection with new distribution channels.

An ideal application of HubCore.AI would involve a Destination Management Organization (DMO) using the *AI Copywriter Assistan*t to transform content production by automatically generating descriptions, titles, and multilingual translations while preserving the brand tone of voice. When combined with the *Digital Factory* for creating thematic packages and *Split Payment* for managing supplier payments, this model would maximize administrative efficiency, minimize operating costs, and deliver a consistent, highly personalized tourist experience. This approach would align with a Design Thinking orientation and be supported by effective technological service management, thereby creating a competitive advantage over other destinations.

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CONCLUSION AND IMPLICATIONS

The results of this exploratory study suggest a possible interdependence between service management, AI, and Design Thinking in the competitiveness of tourist destinations. The operational model of the examined case may serve as a valuable resource for DMOs, by alleviating commercial tasks that fall outside their core responsibilities while enhancing operational efficiency, facilitating service personalization, and optimizing multi-channel distribution. From an academic perspective, these results highlight the validity of theoretical models related to the interconnection between digital innovation and tourism competitiveness (Koo et al., 2016; Sandhya, 2023; Zhu, Zhang, and Li, 2014). On the other hand, from a managerial point of view, the integration of Artificial Intelligence-based solutions allows for cost reduction, increased operational efficiency, and more significant differentiation of the offer and strategic elements for the competitiveness of tourist destinations (Bulchand-Gidumal et al., 2023; Xia et al., 2024). Furthermore, the synergy between digital tools like AI and IT Service Management (ITSM) fosters the creation of an integrated ecosystem, strengthening DMOs' ability to manage the entire destination lifecycle effectively and coordinately. Finally, combining AI and Design Thinking stimulates innovation in tourism services, improving the visitor experience and promoting sustainable and innovative development of customer-centric models (Hehn et al., 2018).

Future research could focus on analyzing qualitative and quantitative data on the practical application of the case study on a DMO and comparing it with other destinations. Consequently, a development model could be structured with this triptych approach (AI, Design Thinking, DMS) as a driver for the competitiveness of tourist destinations.

Keywords: Artificial Intelligence, Destination Competitiveness, Service Management, Design Thinking, IT Service Management (ITSM), Digital Innovation, Tourism Technology, Destination Management Organizations (DMOs), Destination Management Systems (DMS)

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THE DARK SIDE OF CONSUMER ETHNOCENTRISM: A NETNOGRAPHIC STUDY

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ABSTRACT

Consumer Ethnocentrism is conceptualized as "*the beliefs held by consumers about the appropriateness, indeed morality, of purchasing foreign-made products*" (Shimp and Sharma, 1987, p. 280). Most research on consumer ethnocentrism focuses on historical, cultural, economic, and political shifts that impact consumer behavior, e.g., trade disputes between the U.S. and China, Brexit, economic nationalism during the COVID-19 pandemic or the rising populist sentiments in European countries. Moreover, the existing research focuses on identifying and measuring its antecedents and outcomes (Baber *et al.*, 2024; Bizumic, 2019; Leonidou *et al.*, 2022; Sobol *et al.*, 2018). Recently, scholars have used the lens of consumer ethnocentrism to analyze socio-economic and political contexts (De Nisco *et al.*, 2020; Kuhschelm, 2020), psychological and behavioral insights (Aufegger *et al.*, 2021; Cleveland and Balakrishnan, 2019; Kumar and Kaushal, 2021; Prince *et al.*, 2020) and market and media dynamics (Batra *et al.*, 2000; Dudziak *et al.*, 2023; Trentinaglia *et al.*, 2023). In other words, the majority of research conducted to date has focused on the positive side of consumer ethnocentrism at a macro and micro-level, thus neglecting the dark side of consumer ethnocentrism.

The investigation of the dark side of consumer ethnocentrism is especially relevant in an era when media narratives reflect the tension between patriotic acts supporting local economies and cultural identities, and global trends linked to value-seeking, sustainability and convenience (Euromonitor International, n.d.). These negative manifestations are increasingly visible in consumer online interactions, presenting challenges for brands navigating diverse global markets (Behl and Jain, 2023; Do *et al.*, 2024).

Brand hate is understood as an emotional and cognitive response that often arises from perceived violations of personal values or dissatisfaction with brands (Curina *et al.*, 2020), which can lead to boycotts (Kucuk, 2019). Boycott is a behavioral response that allows consumers to express their rejection of foreign or disliked brands and serves as a tool for collective action (Beck, 2019). A modern extension of boycotting is a so-called cancel culture, which is prominent among young generations. It

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involves mass online condemnation and rejection of brands based on their perceived social or cultural missteps (Saldanha *et al.*, 2023). In some cases, negative feelings such as animosity or brand hate can exacerbate or fuel xenophobic or racist attitudes. For instance, if some consumers perceive a foreign brand as a threat to their cultural values or national identity, their hatred feelings can have a xenophobic or racist undertone. This is particularly true in situations where boycotting becomes a way to protest foreign influence or practices deemed harmful to national economy or culture (e.g., Buy Canadian, Boycott USA).

To better understand the dark side of consumer ethnocentrism, we adopt a qualitative research approach which is more appropriate when the research question is exploratory. To operationalize the study, we selected netnography as a methodological tool to collect consumers posts on negative facets of consumer ethnocentrism. Netnography studies allow researchers to understand complex social phenomena and developing themes from the consumers' points of view (Kozinets, 2024). To date there is no ethnographic study on the dark side of ethnocentrism, which adds novelty to our empirical study.

We adopted Kozinets' (2024) netnography procedure to design our empirical study. The first step involves identifying the online communities most relevant to study the dark side of ethnocentric consumption. Hence, the first phase research phase of our study consisted of a pure observation of the communities to better understand online activity and exchanges between members and verify if those communities match the selection of criteria (Kozinets, 2024). Afterwards, we decided to select Reddit and X. The data was collected from 1st of February 2023 to 1st of February 2025. Following Kozinets's (2024) recommendations, we followed the definition of ethnocentric consumption suggested by Shimp & Sharma (1987) and used the following keywords: domestic support, national support, made in, economic protection, nationalism, patriotism, buy domestic, buy national, local production, boycott, cancel culture, animosity, and brand hate. We then carefully chose only postings related to negative aspects of consumer ethnocentrism. We also focused on posts written in English to avoid language bias. The third phase refers to data analysis. As such, we will perform a sentiment and content analysis based on a non-participatory type of netnography. We will ensure uniformity of the coding process through two authors to ensure the quality of research design. Currently the analysis is under progress and the results will be presented during the conference.

Our study conceptually links consumer ethnocentrism with reactance theory (Matarazzo *et al.*, 2023) in qualitative, exploratory netnographic context. While consumer ethnocentrism has been previously thoroughly examined through lenses of social identity or planned behavior theories, it has rarely been

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studied as a form of collective psychological reactance (Bartikowski *et al.*, 2021). We propose that reactance theory as an interpretative lens serves as a compelling framework for understanding how consumers respond to macro-level crises, such as geopolitical conflicts, trade disputes, or cultural threats. From this perspective, consumer ethnocentrism is not merely a stable attitudinal orientation but a situational and affectively charged reaction to perceived external threats.

Drawing from netnographic data, we examine how consumers perform ethnocentric attitudes in public digital platforms, such as Reddit and X. This expands reactance theory into online consumer discourse, where individuals co-create identity narratives and engage in reactive consumption behaviors, such as boycotts, symbolic defiance, or moral condemnation of foreign brands (Dalakas *et al.*, 2022). This contribution supports a broader interpretation of reactance as not only internal resistance but as external, discursive, and participatory.

By conceptualizing consumer ethnocentrism as a reactive and crisis-contingent phenomenon, this study offers practical value to help firms better anticipate why and when ethnocentric backlash may arise not due to long-standing beliefs alone, but in reaction to evolving events and narratives (Pekkanen and Penttilä, 2020). Emotional cues such as indignation, sarcasm, or nationalism in consumer communities can serve as early indicators of reactive shifts that precede coordinated actions like boycotts or campaigns (Strathern *et al.*, 2020). Early detection of these shifts enables more adaptive communication and reputation management strategies in volatile social and geopolitical environments.

Keywords: Consumer Ethnocentrism, Dark Side, Netnography, Animosity, Brand Hate, Reactance Theory

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SUCCESS FACTORS OF ARTIFICIAL INTELLIGENCE INTEGRATION AND THEIR IMPACT ON TECHNICAL CUSTOMER SERVICE EFFECTIVENESS

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ABSTRACT

Purpose: This study examines how the intensity of artificial intelligence (AI) implementation, organizational readiness, and task-technology fit interact and influence the efficiency of technical customer service processes within the information technology, telecommunications, and high-tech manufacturing industries.

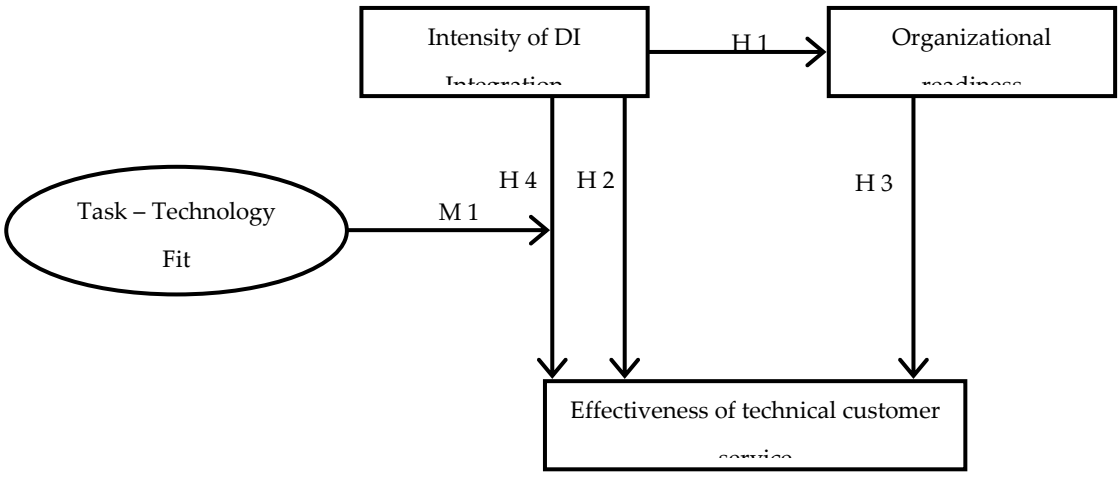
In today's business environment, technical customer service faces challenges such as increasing complexity of inquiries, growing customer expectations, and the need to ensure fast, accurate, and personalized service (Dombrowski and Malorny, 2016; Trkman et al., 2015). Technical customer service plays a crucial role in shaping customer satisfaction and company reputation, making it a strategic necessity to improve its effectiveness (Sheth et al., 2023; Westlund et al., 2005). Thus, it is turning into an important area for applying AI (Huang and Rust, 2018). AI solutions help automate repeated tasks, provide faster and more accurate responses to customer inquiries, anticipate customer needs, distribute workloads more effectively (Xu et al., 2020). Although companies are increasingly investing in AI solutions, these investments often fail to deliver the expected results. The implementation of new AI technologies without a systematic approach can result in inefficient investments (Ångström et al., 2023).

Methodology: Based on the literature review, we propose an integrated theoretical model (1 Figure) that partially combines the task-technology fit (TTF) and technology-organization-environment (TOE) structures and theoretical models. Such a combined model enables a systematic assessment of the impact of AI solutions on the effectiveness of technical customer service and the success of their implementation, considering intermediate factors such as organizational readiness and task-technology fit.

We verified the theoretical research model by conducting a structured questionnaire survey using purposive sampling supplemented by the snowball sampling method to form the sample. Purposive sampling ensured inclusion of respondents with the necessary knowledge and direct experience in the application and use of AI in customer service. A total of 252 completed questionnaires were received, suitable for further analysis. This response rate is considered sufficient for the PLS-SEM methodology. For the data analysis, we were using the SmartPLS 4 (Hair et al., 2019) software, applying the partial least squares structural equation modelling (PLS-SEM) method.

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Figure 1. Artificial Intelligence in Customer Service: Theoretical Model



Source: prepared by authors

Findings: Empirical research confirmed the assumption made in the methodological section that there is a strong positive correlation between AI implementation intensity and organizational readiness ($\beta = 0.690$; $p < 0.001$). The intensity of AI implementation has a direct positive effect on the effectiveness of technical customer service ($\beta = 0.319$; $p < 0.001$). Organizational readiness acts as an important mediating factor between AI implementation and customer service effectiveness, with a strong positive relationship ($\beta = 0.443$; $p < 0.001$). This relationship is even stronger than the direct impact of AI. An analysis of the results of the study of factors (indicators) reflecting organizational readiness revealed that the quality of documentation ($\beta = 0.514$; $p < 0.001$) and the technical agility of employees ($\beta = 0.463$; $p < 0.001$) have the greatest impact on organizational readiness. Meanwhile, based on the study's results, the contribution of technical infrastructure was statistically insignificant ($\beta = 0.125$; $p = 0.140$), indicating that companies should prioritise developing employee competencies in the context of technical and knowledge management. The task-technology fit model as a moderator between DI implementation intensity and customer service effectiveness was not confirmed ($\beta = 0.022$; $p = 0.535$), which indicates that the TTF theory may be less relevant and no longer applicable in the context of DI technologies.

Originality: This work expands on previous research into DI integration by creating and empirically testing an integrated theoretical model that combines the theoretical aspects of Technology-Organisation-Environment (TOE) and Task-Technology Fit (TTF) theories. The paper focuses on the emerging concept of technical agility and its impact on the success of DI implementation.

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Practical Implications: The study showed that organizational factors are just as important, if not more important, than the AI solutions implemented in order to achieve greater effectiveness in technical customer service processes. Based on these insights, companies should view AI implementation as a holistic process that encompasses not only technological solutions but also the transformation of organizational capabilities, processes, and culture. A comprehensive approach will maximize the potential of artificial intelligence by increasing the effectiveness of technical customer service and creating a sustainable competitive advantage.

Keywords: Artificial intelligence integration; customer service effectiveness; organizational readiness; task-technology fit.

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IMPROVING BIOECONOMY EDUCATION THROUGH ACTIVE LEARNING: A PATH TO INNOVATION AND SUSTAINABILITY IN HEIS

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ABSTRACT

The Green Deal, which was approved by the European Commission in 2020 and includes several policy-related initiatives supporting the transition to carbon neutrality by 2050, has made the bioeconomy a central topic in European Union policymaking in recent years. In the years to come, it is anticipated that national and European policy support for the bioeconomy will continue to grow (Paris *et al.*, 2024).

The bioeconomy focuses on the sustainable use of biological resources for food, energy, and industrial applications, being a key driver of economic growth, environmental stewardship, and sustainability. Although this has been mostly seen as a purely technological effort, it is insufficient and would not effectively address global sustainability issues. Consequently, integrating active learning methodologies within Higher Education Institutions (HEIs) curricula is crucial for fostering innovation and sustainability in the bioeconomy sector. Contrary to passive teaching methods, which usually fail to equip students with the interdisciplinary skills and innovative thinking necessary to address the evolving challenges of this field, since it is focused on the teaching role and the content, using passive methods like lecturing or teacher presentations (e.g., Hartikainen *et al.*, 2019), we want to explore the impact of active learning education on bioeconomy, highlighting how problem-solving, experiential learning, and cross-disciplinary collaboration can lead to sustainable solutions and economic resilience (Kozanitis and Nenciovici, 2023). Creative learning approaches such as design thinking, project-based learning, and digital simulations engage students in real-world problem-solving, fostering critical thinking and adaptability (Theelen *et al.*, 2019; Yu, 2024).

By embedding these strategies into bioeconomy curricula, HEIs can cultivate professionals who possess technical expertise and demonstrate the creativity and ingenuity required to develop sustainable bio-based solutions. Moreover, collaborative learning environments that connect students with industry stakeholders, policymakers, and researchers enhance knowledge exchange and improve employability in the bioeconomy sector.

Beyond technical skills, active learning practices offer numerous benefits, including enhanced problem-solving abilities, deeper student engagement through interactive experiences, and increased resilience in addressing complex sustainability challenges (Merovci and Dimov, 2024). It also fosters an

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entrepreneurial mindset, empowering students to develop innovative business models that contribute to the circular economy (Renfors, 2024). By promoting teamwork and interdisciplinary collaboration, creative learning prepares graduates for dynamic professional environments where cross-sector partnerships are vital in tackling global sustainability challenges.

According to Kalnbalkite *et al.* (2022), given the Green Deal framework, the question of how the bioeconomy's objectives will be met is becoming increasingly significant, and HEIs are vital organizations in accomplishing these objectives by putting competence-based study programs into place, producing highly skilled bioeconomy specialists.

This study aims to examine some case studies of universities that have successfully integrated creative learning methodologies into their bioeconomy curricula, to illustrate best practices in merging creativity, sustainability, and technological advancements to enrich student learning experiences. In addition, we want to provide some policy recommendations to support HEIs in adapting their curricula to align with bioeconomy priorities.

For example, Urmetzer *et al.* (2020) assess four university bioeconomy Master programs in Europe (Finland, Germany, Netherlands, and the UK) using a methodology that combines semi-structured interviews and keyword-based content analysis of the module descriptions. The analysis shows that crucial components of transformational knowledge, such as participation, communication, and decision-making abilities, are included in the curricula of all four programs. On the other hand, the programs include implicit skills concerning to the ability to modify and reflect personal beliefs. In addition, the results show that the courses are primarily designed to take transformative knowledge transport into account, and all of them include communication skills and participation strategies.

Pink *et al.* (2024) assess how the bioeconomy is viewed, understood, and positioned in the HEIs research and education, considering universities in the Czech Republic, Poland, Portugal, and Spain, conducting a questionnaire survey of students. The results show that a traditional approach to the bioeconomy, which is related to ecological and agricultural elements, dominates the academic community under study. Although the benefits of the bioeconomy for the environment are recognized, respondents are less aware of its importance from a socio-economic point of view. The authors concluded that there is evidence that education and research in the field of the bioeconomy is inadequate, suggesting that there is no relationship between the national strategy on the bioeconomy and social awareness of this issue.

We know that embracing creative learning within bioeconomy education is vital for producing skilled graduates capable of driving sustainable innovation. HEIs must adopt forward-thinking educational strategies encouraging creativity, collaboration, and real-world application, bridging the gap between academic knowledge and industry needs. By doing so, they can play a pivotal role in ensuring the

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continued growth and sustainability of the bioeconomy sector in an era of rapid technological and ecological transformation.

Keywords: Bioeconomy, Higher Education Institutions, Active Learning, Innovation, Sustainability.

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MINIMIZING L.O.S. (LENGTH OF STAY) IN HOSPITALS: THE CASE OF LABOR WARD (DELIVERY ROOM)

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ABSTRACT

The study was conducted in the Labor Ward (Delivery Room) in one of the hospitals in the center part of the country. There are about 11 thousand births every year with an average of 30 deliveries per day. The Labor Ward contains several units: Reception and Screening, Delivery Rooms, Natural Birth Center and Monitoring Unit. It operates 24/7 all over the year managing twelve delivery rooms. In addition, there are three operating rooms to conduct caesarian surgeries when needed. Observing the average number of deliveries per day reveals that on Saturdays there are 25 deliveries where on Wednesdays there are 35 deliveries. This variance creates a resources planning issue and the need to conduct the right and suitable schedule of the capacity of care givers and other supporting facilities. Scheduling should fit the various demands in various days during the week and the given shift (there are three shifts of 8 hours each: 07:00-15:00, 15:00-23:00 and 23:00-07:00). The hospital and the Ward Room owns the Quality Certificate of "International Patient Safety Goals" accredited by the Joint Commission International (JCI). Health care services face a major issue of waiting time to receive the needed treatment. Viberg et al., 2013, describe how countries measure waiting times and to assess whether waiting times can be compared. The ward room management under study has defined service levels for the various stages of treatment where the main problem is the gap between the service level defined and real life results. In the reception and screening unit the gap is of 50% (the goal is average of < 4 hours) with an average of 7.5 hours with a standard deviation of 0.55 hours and a median of 4.0 hours. Figure 1 illustrates the waiting time distribution in the reception/screening unit.

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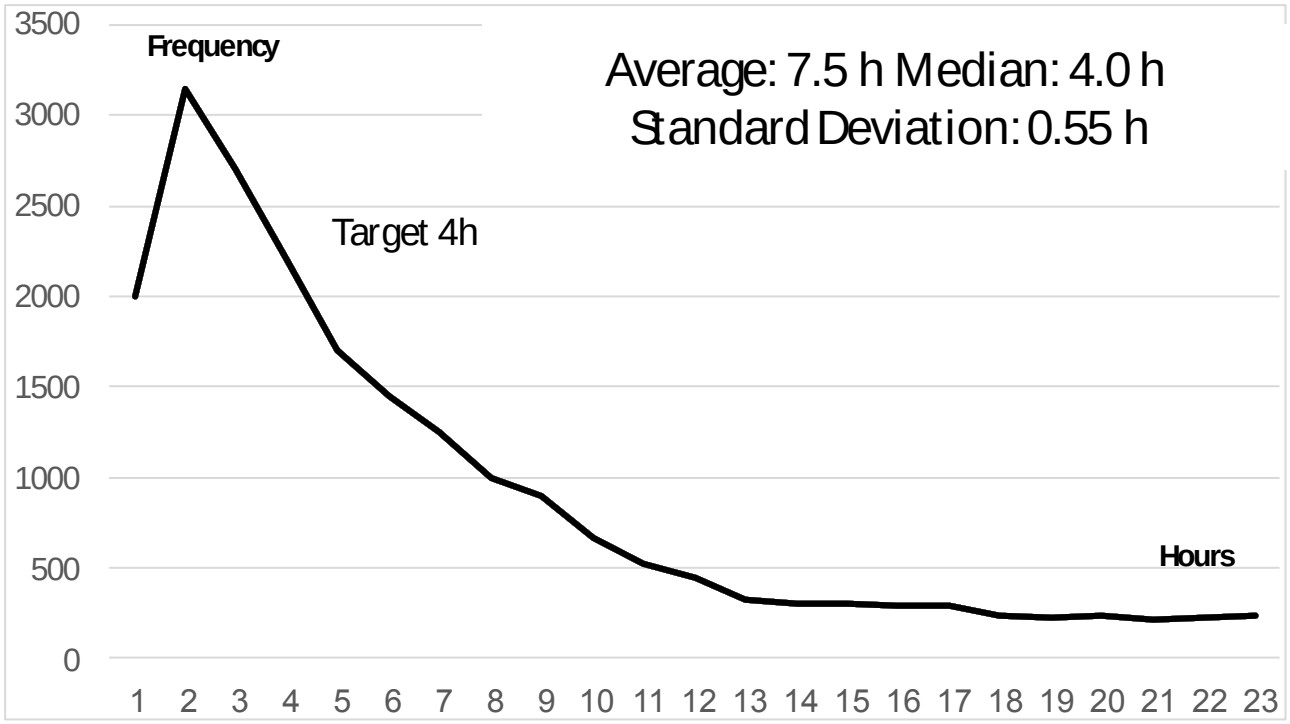


Figure 1: Waiting time in reception/screening unit

It reveals that many women stay longer than the standard. Another problem is nonconformance with the time to be hospitalized in the new born department once delivery is over (the goal is < 3 hours). It was found that in 81% of the cases it does not achieve the goal defined. The Ward Room management decided to try and reduce the period of time in the Reception and Screening unit. The new goal was 2.5 hours mainly to reduce risky conditions of the mother and the baby. A work study of the process was conducted to verify the stages of: Receiving administration, clinical data collection, physician check and transfer to delivery room. It should be stated that there was not any given/written protocol for the various activities performed and no time studies were available. Simulation models are practical tools to investigate service providers and supporting improvement processes. Gaba, (2007), presented the future vision of simulation in health care. A simulation model using the Arena system was developed utilizing a three stages Triage to verify preference in treatment: very urgent (14.5%), urgent (32.7%) and not urgent (52.8%). The American College of Obstetricians and Gynecologists (2016), recommended to apply in delivery rooms a similar triage method used in emergency departments. At present the waiting que is according to FCFS technique. Three decision variables were tested: a. Screen method- no triage, with triage, b. number of nurses: 2,3,4,5,6,7 and number of monitors in the screening unit: 7,8,9,10,11,12.

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Simulation results (see Figure 2) show that the best configuration is: using the triage method, 5 nurses and10 monitors. It resulted with total time of 2.2 hours. The worst configuration is: no triage, 2 nurses and 7 monitors resulted with total time of 3.25 hours.

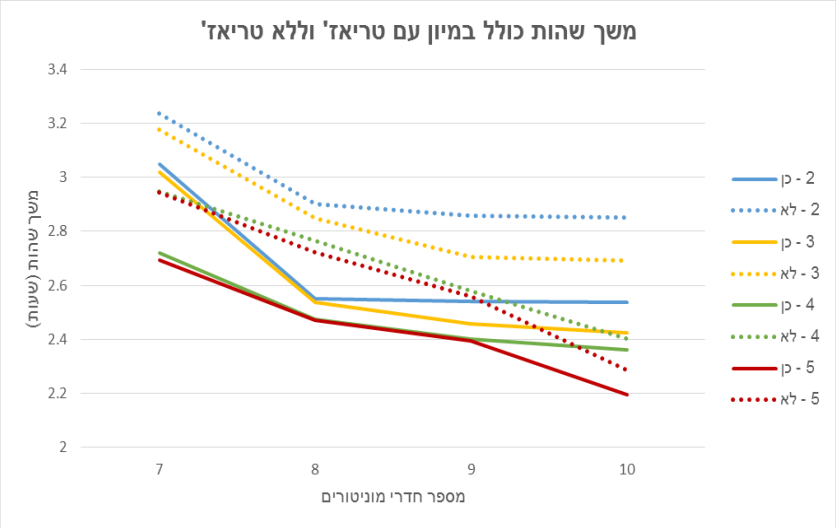


Figure 2: Simulation results

Keywords: Ward Room, Delivery, Length of Stay, Triage

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IMPACT OF ARTIFICIAL INTELLIGENCE IN CUSTOMER RELATIONSHIP MANAGEMENT: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

In the era of digital transformation, most of the organizations integrate Artificial Intelligence (AI) into Customer Relationship Management (CRM) systems to enhance customer experiences, automate processes, and gain valuable insights. Despite AI-CRM's growing importance, theoretical and empirical research remains fragmented, necessitating a comprehensive review of existing studies. This study seeks to put the fragments of the current research related to the AI-CRM integration together. It aims to bridge this gap by conducting a systematic literature review (SLR) to examine AI's role in CRM, identify key theoretical frameworks, evaluate research methodologies, and highlight associated benefits and challenges. The findings reveal that integration of AI in customer relationship management have significantly transformed customer engagement, and it enhances the long-term customer journey by enabling businesses to deliver more personalized interactions and proactive service. Moreover, the review also highlights major challenges, including employee resistance to AI adoption, implementation complexities, data privacy concerns, and ethical considerations. These findings underscore the intricate and multifaceted relationship between AI integration and organizational dynamics. The study contributes to the academic discourse by mapping existing literature, identifying research gaps, and providing insights for future investigations into AI-CRM integration.

INTRODUCTION

In today's fast-changing digital era, most organizations recognize the importance of digital transformation to stay competitive, adapting to evolving customer preferences while responding swiftly to shifting market landscapes. With advanced technologies significantly reshaping business models, particularly in customer relationship management, companies are increasingly embracing innovations like artificial intelligence (AI). Customer Relationship Management (CRM) is a strategic approach to managing customer data collected from various touchpoints. It includes activities, strategies, and technologies that help organizations build and maintain strong relationships with both existing and potential customers. The concept of CRM first emerged in the early 1990s as a simple database system for collecting and analyzing customer information (Harcus, 2024). Over time, it

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evolved to integrate marketing, sales, customer service, and supply chain functions, improving efficiency and customer value delivery (Giannakis-Bompolis, 2014).

In recent years, customer data has grown rapidly in volume, speed, and variety. As exceptional customer service and a positive customer experience (CX) have become essential for business success, data has become one of the most valuable assets for organizations (Weerakkody, 2017) and companies started to adopt AI to handle large amounts of customer data to analyze data faster, automate tasks, and make better decisions (Erik Brynjolfsson, 2017). AI has become an important part of the current CRM system and help businesses gain useful insights, improve operations, and enhance customer experiences (Ledro, 2023) (Kitchenham, 2004). Moreover, the next development in the field of CRM might become the integration of AI in CRM system.

METHODOLOGY

In this study, the methodology, systematic literature review, will be conducted in three main phases, as outlined by Kitchenham (2004; 2009). Given the widespread adoption of AI in the current year, coupled with the growing attention from leading corporations towards AI tools and the associated challenges, it is relevant to identify and summarize the existing literature on the impact of Artificial Intelligence on Customer Relationship Management (CRM) systems. The research objectives of this study are presented in

.

No	Objective
1	Review existing research on AI adoption in CRM to understand current trends and developments.
2	Identify theoretical frameworks and analyze research methods applied in previous studies to evaluate their strengths and limitations.
3	Examine potential advantages and challenges associated with AI adoption in CRM, considering both business and customer perspectives.

Table 3. Research Objectives (ROs)

In accordance with the inclusion criteria, this study followed (Kitchenham, 2009) and (Nightingale, 2009) to ensure the quality of the reviewed studies. Regarding the inclusion criteria, key aspects such as publication date, type of study, type of documents, language and organization ages were specifically outlined to align with the study's focus. Inclusion criteria are listed in Table **4**.

Inclusion	Description
Publication Date	Articles published between 2015 and 2024 were extracted
Subject Area	Include Business and Management subject area because this study focus on management sector
Document type	Include Peer reviewed articles and Conference papers

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Language	Include articles that were written in English
All ages	Include Organizations of differing stages of development

Table 4. Inclusion Criteria

After completing the data collection, the extracted data were organized in Microsoft Excel. Finally, during the full-text screening stage, specific details from each primary study were collected (see also in Figure **5**).

No	Metadata
1	Paper titles
2	Authors
3	Publication years
4	Abstract note
5	Document type



No	Specific data
1	Research method
2	Main topic area
3	Scope of the study
4	Benefits and challenges of using AI-CRM
5	Summary of key findings

Figure 5: Data Extraction: Metadata and Specific Data

In the first step, only the titles of the papers were screened to determine their relevance to the research topics. Based on this, 127 articles were filtered for further review. In the second step, an abstract screening was performed, reducing the selection to 56 papers. These 56 articles were then exported to Microsoft Excel, along with their metadata. As a final step, a full-text screening was conducted, during which specific details such as research methods, study scope, and key findings were extracted. This process resulted in the careful selection of 43 primary studies to address the research questions of this study. Figure 6 provides the result of review protocol (Adapted from (Vadi, 2010)).

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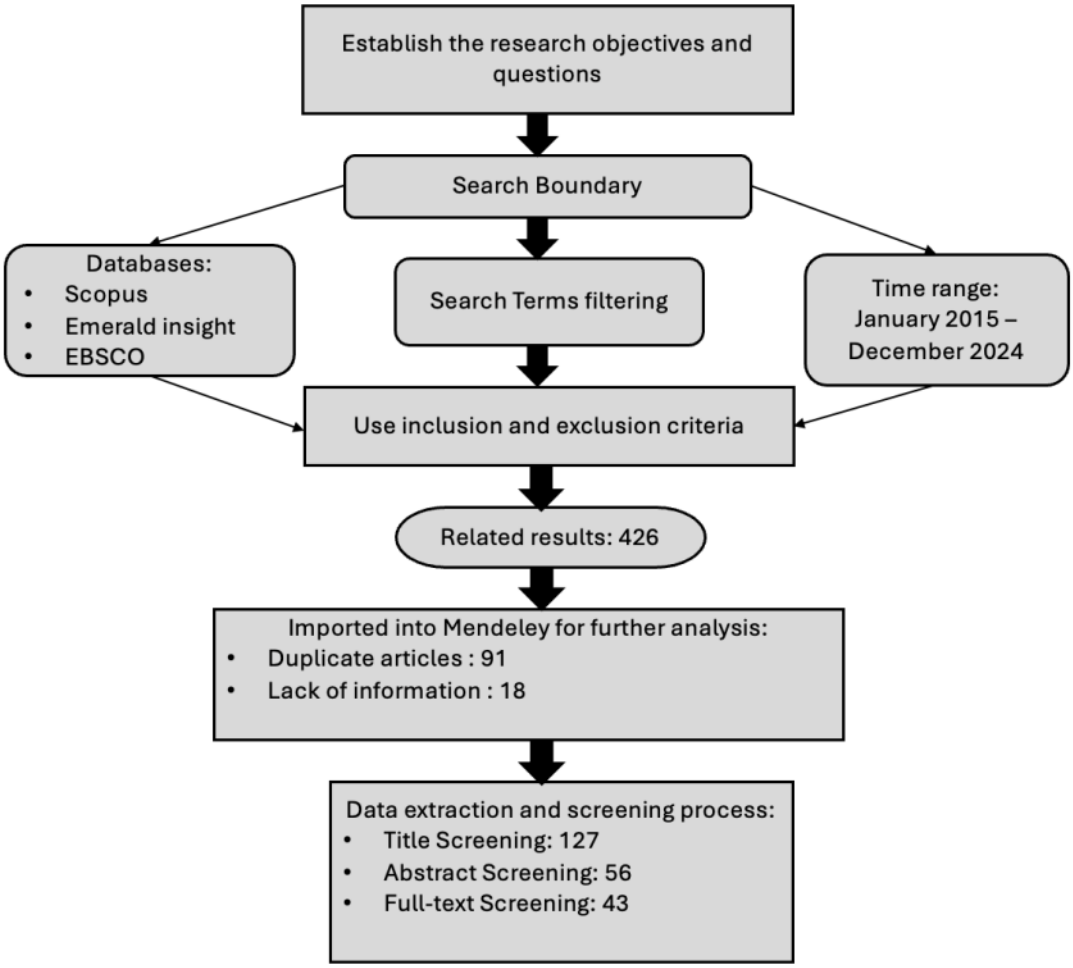


Figure 6: Step by step summary of the results of review protocol

DISCUSSION AND CONCLUSION

In an era where data drives decision-making and customer expectations evolve rapidly, Artificial Intelligence (AI) is reshaping the way businesses manage customer relationships. This study conducted a systematic literature review of a total of 43 peer-reviewed journal and conference articles published between 2015 and 2024 to explore the adoption of AI in Customer Relationship Management (CRM).

The findings indicate that AI is increasingly seen as a transformative force in CRM, enabling automation, personalization, and data-driven decision-making. The adoption of AI in CRM spans diverse sectors, with India emerging as a leading contributor to the research landscape. Despite the growing academic interest, the field still lacks cohesion, as many studies are fragmented and do not consistently build upon each other.

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Thirteen theoretical frameworks were identified, with a dominant focus on management, strategic, and technology adoption models. However, many studies lacked a clear theoretical underpinning, indicating a need for future research to be more theory-driven. Empirically, most studies used quantitative methods—primarily surveys—while qualitative and mixed methods were less common. Conceptual contributions such as systematic reviews and bibliometric analyses also played a significant role in mapping the evolving AI-CRM field.

In conclusion, while AI presents significant opportunities for enhancing CRM capabilities—ranging from improving customer engagement to optimizing business processes—there remain substantial challenges. These include **inadequate planning, high investment costs, integration complexity, user resistance, ethical concerns,** and **data privacy issues.** Addressing these challenges is essential for the successful and sustainable deployment of AI-CRM solutions.

Future studies should aim to address these gaps by employing diverse methodologies, incorporating robust theoretical frameworks, and exploring under-researched contexts such as SMEs and developing countries. Ultimately, this study offers a valuable foundation for scholars, practitioners, and policymakers seeking to understand and leverage the intersection of AI and CRM. It calls for a more unified research agenda to guide the responsible and effective implementation of AI-driven CRM systems in both academic and practical domains.

Keywords: Artificial Intelligence, CRM, AI-CRM Integration, Hyper-Personalization, Customer Engagement, Data-driven Decision-making, Systematic Literature Review

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UEFA'S BROKEN ECONOMY: FOOTBALL REVENUE INEQUALITY

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INTRODUCTION

European football has transformed into a major economic sector with complex financial dynamics, gaining global attention beyond traditional sports (Yiapanas et al., 2024). This shift has resulted in significant revenue growth for major clubs, fuelled by broadcasting rights, sponsorship deals, enhanced matchday experiences, and merchandise sales (Martín-Magdalena et al., 2024). However, financial opportunities are unevenly distributed among clubs, creating inequalities between wealthy teams in elite leagues, and those in smaller leagues. The study analyzes the stark revenue divide across UEFA's 55 member associations, to shed light on the industry's financial inequalities.

THEORETICAL BACKGROUND

European football clubs face unique economic challenges, balancing financial sustainability with sporting goals and community interests (Serrano et al., 2023). Revenue mainly comes from broadcasting, sponsorships, merchandising, and matchday earnings (Litvishko et al., 2021). However, this leads to significant gaps in revenue distribution, particularly between clubs in large, profitable leagues like the English Premier League and those in smaller leagues (Deloitte, 2024). Such inequality limits the ability of smaller clubs to compete, both financially and on the field (Flanagan, 2023).

METHODOLOGY

This research primarily relies on UEFA's 2023 European Club Finance and Investment Landscape report (Union of European Football Associations, 2024), a comprehensive and authoritative source on club financial performance. The data is collected from around 700 clubs, verified through UEFA's rigorous review process, ensuring accuracy. The report presents aggregated financial metrics at league and club levels, comparing top European leagues and tracking trends over time.

RESULTS

Key findings reveal record revenues of €26.8 billion in 2023, yet severe concentration among elite leagues. European football is a deeply stratified ecosystem where the "Big 5" leagues [England, Spain,

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Germany, Italy, and France] dominate 73.5% of total revenues, while smaller leagues and microstates grapple with systemic financial constraints (Table 1).

Table 1. Revenue streams across UEFA's 55 member associations for 2023 (€m)

		TV	UEFA	Gate	Commercial	Other	Total
Top-Tier Leagues	England	3,216	500	1,000	2,144	286	7,146
	Spain	1,387	402	584	1,132	146	3,651
	Germany	1,086	326	507	1,484	216	3,619
	Italy	1,095	403	432	807	145	2,882
	France	498	190	427	664	593	2,372
Mid-Tier Leagues	Russia	118	10	49	579	225	981
	Netherlands	81	102	176	278	41	678
	Portugal	185	191	74	123	42	615
	Belgium	99	81	98	157	145	580
	Turkey	75	59	86	293	21	534
Smaller Nations	Scotland	30	68	128	100	31	357
	Switzerland	20	43	94	107	70	334
	Denmark	43	83	30	112	63	331
	Austria	30	62	54	95	30	271
	Sweden	34	20	44	73	27	198
	Norway	42	35	25	68	23	193
	Israel	21	30	51	26	61	189
	Poland	52	13	28	74	18	185
	Greece	33	19	35	62	24	173
	Hungary	24	12	5	44	85	170
	Czech Republic	8	39	15	47	12	121
Microstates	Ukraine	0	62	4	18	16	100
	Serbia	5	37	7	22	27	98
	Cyprus	16	10	13	39	20	98
	Romania	21	6	13	34	23	97
	Croatia	8	13	11	44	18	94
	Kazakhstan	1	10	1	5	70	87
	Bulgaria	3	11	6	31	28	79
	Slovakia	4	13	7	36	15	75
	Azerbaijan	0	13	1	28	21	63
Minnows	Belarus	0	5	1	10	22	38
	Finland	3	6	4	10	9	32
	Iceland	2	6	2	8	12	30
	Latvia	0	4	0	18	4	26
	Bosnia and Herzegovina	1	6	2	4	13	26
	Slovenia	2	7	2	8	7	26
	Republic of Ireland	0	4	8	8	5	25
	Luxembourg	0	3	1	12	5	21
	Northern Ireland	0	3	3	4	6	16
	Georgia	0	4	0	2	10	16
	Lithuania	0	4	0	1	10	15
	Moldova	0	8	0	3	3	14
	Estonia	0	3	0	6	5	14
	Malta	0	3	0	8	3	14
	Liechtenstein	0	5	1	5	2	13
	Faroe Islands	0	5	0	4	4	13

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	Kosovo	0	4	0	3	5	12
	Armenia	0	4	0	1	6	11
	North Macedonia	0	2	0	3	5	10
	Wales	0	2	0	1	6	9
	Albania	0	2	0	1	5	8
	Montenegro	1	1	0	1	3	6
	Andorra	0	4	0	1	1	6
	Gibraltar	0	3	0	0	1	4
	San Marino	0	1	0	1	2	4
	Total	8.2	2.9	4.1	8.9	2.7	26.8

Top-Tier Leagues: The Dominants

The "Big 5" claim 90% of TV revenue. The Premier League leads with €7.1 billion, fuelled by €3.2 billion in TV rights, more than double Spain's La Liga [€3.6bn total] and Germany's Bundesliga [€3.6bn]. While La Liga depends heavily on Real Madrid and Barcelona [€1.4bn in TV income], the Bundesliga thrives on matchday revenue [€507m]. Serie A has rebounded commercially [€807m], while Ligue 1 [€498m TV income] leans on PSG's state-backed wealth. These leagues dominate UEFA competitions, widening the financial gap.

Mid-Tier Leagues: The Struggle for Relevance

Leagues in the Netherlands [€102m UEFA earnings], Portugal [€191m], and Turkey [€293m commercial income] operate on modest budgets. Their domestic TV deals are shadowed by the "Big [Portugal earns just €185m, the Netherlands €81m]. Turkey's passionate fanbase drives commercial revenue, but limits growth.

Smaller Nations: Survival Over Competitiveness

Scotland [€357m] and Switzerland [€334m] benefit from stable infrastructures, but others like Denmark [€331m] and Austria [€271m] struggle. Eastern European leagues [Poland, Czech Republic, Hungary] generate under [€200m], with TV rights contributing little (Poland: €52m, [1.6% of England's]. Sweden [€198m] and Norway [€193m] rely on player sales, while Greece [€173m] has declined due to economic crises [€33m TV revenue].

Microstates and Minnows: Financial Survival in the Shadows

34 of UEFA's smallest members collectively earn just €1.2bn [4.5% of Europe's total]. Microstates like San Marino and Gibraltar [€4m each] operate on budgets smaller than a Premier League player's salary. Ukraine [€100m, 1.4% of England's revenue] and others rely on UEFA subsidies, with

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negligible TV income [Serbia: €5m]. Without systemic reforms, such as regional broadcasting partnerships or UEFA-mandated redistribution, these leagues risk permanent feeder status.

CONCLUSION

Football is often praised for its competitive leagues, historic clubs, and passionate fanbases. However, beneath the surface lies a stark financial divide between nations and clubs. European football is a tale of haves and have-nots, where a handful of elite leagues dominate revenue while the smallest nations fight for survival. Without intervention, competitive balance will further erode, leaving much of Europe's football economy in financial dependency

Keywords: UEFA; European football; Football finances; Financial Fair Play; Regional disparities

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HUMAN, VIRTUAL, OR BOTH? A SYSTEMATIC LITERATURE REVIEW ON INFLUENCER MARKETING IN THE METAVERSE

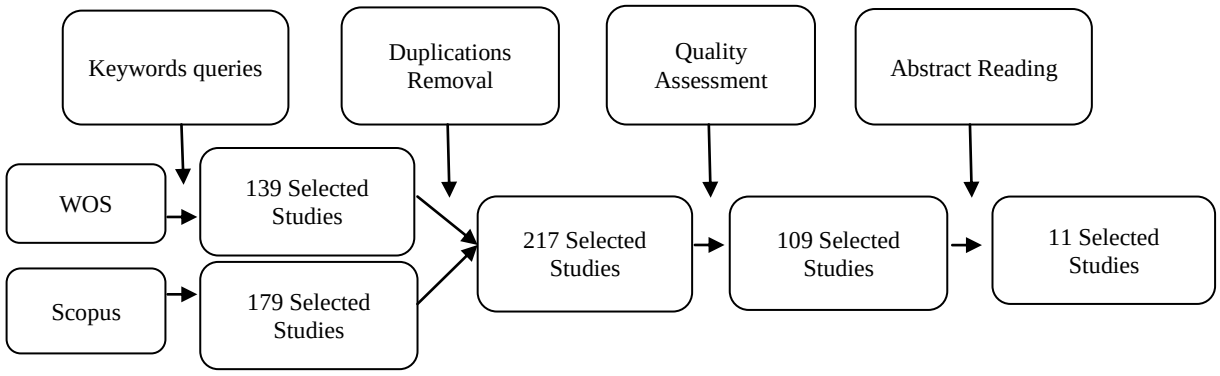
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ABSTRACT

Influencers within the metaverse represent a burgeoning topic in the discipline of marketing. This topic particularly captivates the interest of numerous scholars and industry professionals due to the simultaneous existence of human and virtual influencers within the metaverse. There is a need for a methodical approach to the examination and synthesis of academic literature within this emerging domain. This research adopts a systematic review of the literature (Tranfield et al., 2003; Loureiro et al., 2020), drawing upon 217 pertinent Web of Science and Scopus articles. The research provides relevant research themes, methodologies, theoretical frameworks, variables, antecedents, consequences, managerial implications, and potential avenues for further study.

Figure 1. Screening process



Source: Author's elaboration

The initial phase of the screening process for the studies utilized in this research, presented in Figure 1 above, is extracted from two prominent online libraries: Web of Science and Scopus. Based on the specified keywords across all domains of expertise, 2,874 and 1,645 results are identified, respectively. Subsequently, only English articles on Business, Management, and Accounting are chosen on Scopus, yielding 179 results. The same criteria are used to select on the Web of Science; however, accounting is not listed as a research category on the platform. This leads to 139 articles on Business and Management written in English. In total, 318 publications are collected on Scopus and the Web of Science.

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In the next phase of the screening process, 101 of 318 articles are duplicated and extracted from the total number (318), indicating 217 results. One hundred eight (108) of these results (218) were removed due to the content in the title and abstract being irrelevant to the purpose of this research, leaving 109 articles for abstract reading. Based on the quality criteria suggested by Macpherson and Holt (2007), 98 of 109 are eliminated for not meeting the requirements.

Of the literature on the topic, 11 articles related to this study's objective were published from 2023 to 2025. The year with the highest number of publications is 2024. That year, various journals contributed to the scientific community (45 % of all journals with publications). The journals with publications in 2024 are Management Review Quarterly, Journal of Retailing and Consumer Services, Journal of Psychology and Marketing, Journal of Technological Forecasting and Social Change, and Journal of Technology in Society. This year, 2025, also three (3) articles were published in the Journal of Consumer Behavior in Tourism and Hospitality, Journal of Business Information Review, and Journal of Business Research.

The articles analyzed in this literature review focus on two types of influencers: human and virtual. In one (1) study, human influencers (HIs) are called Real Influencers. In 60% of all studies, virtual influencers (VIs) are referred to by several terms, including AI avatars, Human-Like Virtual Influencers, Generative AI-Enabled Virtual Influencers, AI-Powered Virtual Influencers, Non-Human Virtual Influencers, AI Influencers, and Human-Like Social Robots. In addition, above 70% of all studies concentrate on virtual influencers, while nearly 30% compare human and virtual influencers.

Concerning the sectors of studies analyzed in this literature review, 70% deal with marketing with influencers in general. However, in the remaining 30%, the contexts of hospitality, multi-channel retailing, and multiculturalism are studied only once. Influencer marketing has its antecedents rooted in various factors, with Social Media accounting for nearly 50% of all studies conducted in this area. For virtual influencers, the primary factor is Artificial Intelligence. As significant components, 3D Modeling and Machine Learning (ML) are also highlighted more than once. One study introduces Metaverse as an extended reality (XR) environment, which includes augmented reality (AR), virtual reality (VR), and mixed reality (MR). Another study describes Metaverse as a space influenced by VR and AR, where blockchain technology also plays a significant role.

In terms of methodologies, eight (8) studies were qualitative. Out of these, five (5) employed the interview method as part of their methodology. Additionally, two (2) of three (3) quantitative studies were conducted as an experiment, while the other used surveys. The independent variables identified in the studies include the type of VI (Virtual influencer)—human-powered vs. AI-powered, Satisfaction with Consumer Experience, and VI Diversity Representation. The dependent variables

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examined in the studies are Blame Judgment, Brand Trust, Perceived Anthropomorphism, Word-of-Mouth (WOM), Purchase Intention, and Follow Intention. The studies determined mediating variables including Mind Perception, Perceived Usefulness and Credibility, Perceived Enjoyment and Flow, and Novelty and Likability. Only one study used a moderator: Social Media versus Metaverse.

Six (6) theories are identified throughout the analysis in all studies: Computers-Are-Social-Actors –- CASA— Theory (Nass et al, 1995; Nass and Moon, 2000; Reeves and Nass, 1996), Motivation Theory (Wang et al, 2023), Mind Perception Theory (Gray et al., 2012), Actor-Network Theory (Latour, 2007; Law, 2009), Social Response Theory (Festinger, 1954), the Theory of Reactance (Brehm and Brehm, 1981), and Source Credibility Theory (Hovland et al., 1953), which is referenced more than once.

The findings of this systematic literature review contribute to existing knowledge on influencer marketing in the metaverse in six aspects: (1) provides an overview of the literature, (2) identifies significant research themes, materials and methods, theories, variables, antecedents, and consequences relevant to social media influencer literature, (3) gives the current themes for influencer marketing in the metaverse, (4) reveals the significant research gaps in articles and offers future research directions to academicians, (5) propose an integrative framework based on research themes, significant antecedents, independent variables, dependent variables, consequences, mediators, and moderators, and (6) provide businesses with some pointers for best practices.

Keywords: Social Media Influencer, Virtual Influencer, Metaverse, Systematic Literature Review, AI, Machine Learning, Big Data

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EXPLORING AI INTEGRATION TO RETHINK DECISION-MAKING IN SPORTS ORGANIZATIONS

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INTRODUCTION

The integration of Artificial Intelligence (AI) is transforming organizational decision-making by enhancing cognitive capacity, improving predictive accuracy, and increasing operational efficiency (Al-Surmi et al., 2022; Strich et al., 2021). AI enables more informed, data-driven choices by processing large volumes of information, with Information Technologies (IT) and Management Information Systems (MIS) playing a key role in turning data from various sources into actionable insights (Parra et al., 2023). At the same time, these technologies add complexity to organizational structures and decision-making dynamics.

In the field of sports management, AI is emerging as a powerful tool, offering benefits such as improved efficiency, greater precision in athlete scouting, injury prediction, personalized fan engagement, and enhanced tactical decisions (Al-Surmi et al., 2022). However, despite this potential, research has yet to fully explore how managers perceive and engage with AI systems (Cao et al., 2021). Questions remain about the conditions under which decision-makers are willing to collaborate with AI (Haesevoets et al., 2021), even though IT acceptance has long been a focus in the information systems literature (Verdegem & De Marez, 2011).

A persistent gap exists between technological potential and actual organizational readiness, often resulting in partial or fragmented adoption in the sports industry (Parra et al., 2023). Additional barriers, such as skepticism, limited expertise, and cultural resistance, further hinder integration (Shrestha et al., 2019).

This study investigates how AI is transforming decision-making processes within sports organizations. Through a qualitative approach, it explores the main drivers and barriers influencing AI adoption, seeking to conceptualize the progressive stages of organizational maturity in this context. Accordingly, the research addresses the following questions:

(1) What are the key factors in sports organizations' adoption of AI-based decision-making systems?

(2) How can AI adoption shape the decision-making process in sports organizations?

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(3) What distinct evolutionary phases can be identified in the organizational adoption of AI?

THEORETICAL BACKGROUND

The growing integration of AI into organizational settings is transforming how decisions are made, reshaping managerial engagement with data, altering established routines, and influencing strategic direction. From supporting day-to-day operations to enabling complex, autonomous decision-making, AI technologies now play a pivotal role across multiple levels of organizational activity (Shrestha et al., 2019). Studies emphasize AI's ability to extract insights in real time, support knowledge management, and automate processes (Jovanovic et al., 2021; Brock & von Wangenheim, 2019). By taking over routine tasks, AI enables managers to focus on activities that require creativity and complex judgment (Wilson & Daugherty, 2018).

Organizations often adopt hybrid models where humans and AI collaborate, either through sequential or joint decision-making approaches (Shrestha et al., 2023). These models enhance accuracy and speed, particularly in data-driven environments, provided that decision-makers trust the systems and operate within cultures that foster innovation (Bankins et al., 2023; Nguyen & Malik, 2022a). However, several scholars have noted the limitations of algorithmic reasoning, particularly in contexts that demand ethical sensitivity or contextual interpretation (Newman et al., 2020).

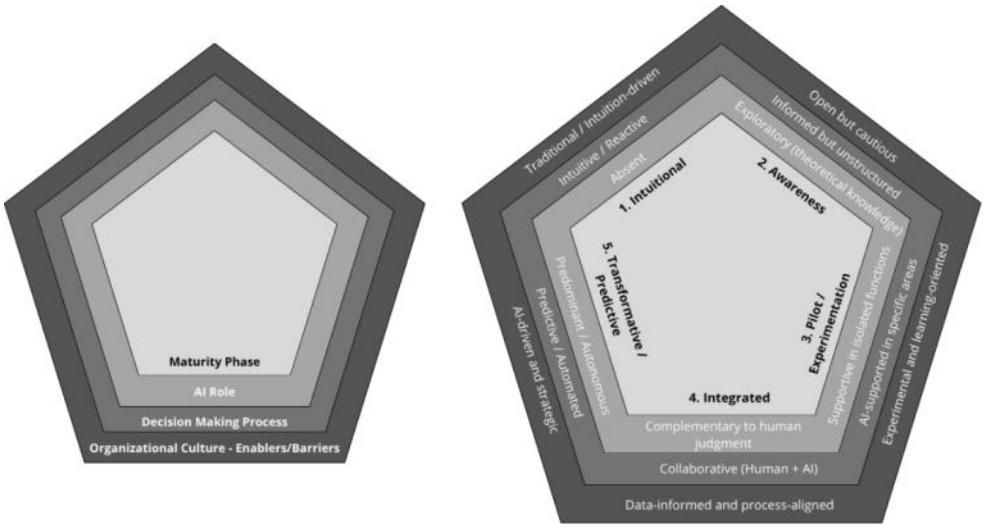
Managerial acceptance of AI depends on both technological and psychological factors. Expectations about performance and ease of use play a key role, alongside organizational enablers such as training and infrastructure (Bankins et al., 2023; Brink et al., 2024). At the same time, concerns about job security, skill relevance, and loss of experiential learning create resistance to adoption (Cao et al., 2021; Duan et al., 2019). These tensions suggest that the adoption of AI is not only a technical transition but also a cultural and managerial shift.

While prior research has explored AI adoption drivers (Brink et al., 2024), little is known about how decision-making evolves as AI becomes part of daily practice, particularly in sports management (Parra et al., 2023).

Drawing on the CHROMA model (Parra et al., 2023), which conceptualizes information-driven decision-making through stages of organizational maturity, this study aims to develop a phased framework that captures the evolving relationship between AI and organizational decision-making. By identifying stages of maturity and mapping the factors that support or hinder integration, this research offers new insights into how sports organizations navigate technological change and redefine managerial processes in practice.

Figure 1: Theoretical Framework

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The model unfolds through five progressive phases, each characterized by a distinct role played by AI, a specific decision-making logic, and a set of contextual enablers and barriers. Starting from the Intuitional phase, where decisions are reactive and AI is absent, organizations may gradually progress through phases of Awareness and Experimentation, marked by exploratory attitudes and localized trials. Further stages involve Systematic Integration, where AI becomes a consistent support in decision-making, and culminate in the Transformative phase, where AI plays a leading role in predictive, often autonomous, decision processes. At each stage, progress is conditioned by enabling factors, such as strategic alignment, digital infrastructure, or leadership vision, as well as by typical barriers, including cultural resistance, skill gaps, or governance complexity. The framework offers a structured understanding of how decision-making capabilities evolve over time and what specific organizational shifts are required to advance.

METHODOLOGY

Given its exploratory nature, this study adopts a qualitative approach based on semi-structured interviews, following the methodological principles outlined by Strich et al. (2021). This method allows for an in-depth exploration of how organizations perceive and manage the integration of AI into their decision-making processes. The open structure of the interviews encourages participants to reflect freely on their experiences, enabling the emergence of context-specific insights that more rigid approaches might overlook (Rowley, 2012).

The sample includes professionals from sports organizations with varying levels of familiarity and engagement with AI. This diversity allows the study to capture a wide range of perspectives, from early reflections on adoption to more established experiences with AI in practice (Solarino & Aguinis, 2021).

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Thematic analysis guides the interpretation of the data, supported by comparative strategies that help identify both recurring patterns and meaningful differences across cases. This process informs the development of an evolutionary framework that illustrates how decision-making practices evolve as organizations approach, adopt, and integrate AI over time (Solarino & Aguinis, 2021).

EXPECTED FINDINGS

Drawing on the CHROMA model (Parra et al., 2023), this study proposes an extended maturity framework that captures the complex, non-linear integration of Artificial Intelligence into decision-making within sports organizations. By mapping the interdependencies through the Intuitional, Awareness, Experimentation, Systematic Integration, and Transformative phasesthis framework serves not only as a diagnostic tool to assess an organization's current AI maturity but also as a conceptual lens to interpret how structural, technological, and cultural dynamics shape the evolution from intuition-based decision-making to increasingly data-driven and predictive approaches. Rather than treating AI as a neutral technological layer, the framework highlights its active and transformative role in reshaping how decisions are informed, structured, and executed, contributing to the literature on AI and organizational decision-making.

Practically, the framework is expected to support sports managers and decision-makers in recognizing their position along this maturity continuum and in planning targeted interventions. It provides a stage-sensitive roadmap that outlines not only the benefits and opportunities of AI integration but also the organizational adaptations necessary to overcome inertia and resistance, paving the way for more informed, responsive, and effective decision-making systems.

Keywords: Artificial Intelligence (AI), decision-making, sports, technology transformation, sports marketing

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CULTURAL INTELLIGENCE IN ACTION: LESSONS FROM STUDY ABROAD EXPERIENCES

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ABSTRACT

As global interconnectedness intensifies, the need for culturally intelligent leaders has become increasingly important across all professional sectors. Cultural intelligence (CQ) is defined as the capability to understand and adapt to diverse cultural contexts through respectful communication, collaboration, and effective problem-solving techniques (Earley & Ang, 2003). The framework of CQ consists of four distinct dimensions: cognitive, motivational, behavioral, and meta-cognitive. Extensive research supports CQ as a key predictor of professional success and highlights that it is a skill that can be intentionally practiced and developed over time (Marr, 2022). In response to evolving demands in business education, there is a growing imperative to adopt innovative strategies that better prepare students for a global workforce. Study abroad programs have emerged as a dynamic educational approach that offers real-world immersion, fostering not only academic knowledge but also critical thinking, independence, adaptability, cultural awareness, and self-confidence (Umbra Institute, 2025). Furthermore, these programs have been shown to enhance global competencies, leadership capabilities, and expanded worldviews, all of which are essential for career readiness in a competitive global market (Gan & Kang, 2022). This presentation reviews current literature on cultural intelligence and presents an applied approach to developing CQ among undergraduate business students through targeted study abroad experiences. Specifically, we explore two recent Global Management courses conducted in London and Thailand, where students engaged in structured onsite activities, cultural immersions, and reflective assignments. Using Kolb's Experiential Learning Theory as a guiding framework (Kolb, 2015), we designed learning interventions aimed at deepening students' cultural understanding and growth across the four CQ dimensions. Our work offers an original contribution by explicitly aligning CQ development strategies with experiential learning models in the context of short-term, faculty-led study abroad programs—an area that remains underexplored in current literature. We also discuss the broader theoretical and practical implications for educators seeking to cultivate a more culturally intelligent, globally competent student body. Finally, attendees will gain practical insights and actionable strategies to enhance study abroad curricula, ultimately supporting the development of a workforce that is better equipped to meet the challenges of a complex and diverse global environment.

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Keywords: Cultural Intelligence, Global Business, Management Education, Study Abroad, Cross-cultural Management, Experiential Learning

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NAVAGATING THE INTERSECTIONS OF GLOBAL MIGRATION AND HIGHER EDUCATION: IMPLICATIONS FOR POLICY, INSTITUTIONAL ADAPTATION, AND LABOR MARKET DYNAMICS

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ABSTRACT

The current environment surrounding higher education worldwide has driven the need to deepen research surrounding migration patterns and the ultimate impact on everything from university offerings to global workplaces. According to the National Immigration Forum (2019), there has been a notable shift in the demographic composition of migrants over the past decade, marked by an increase in unaccompanied minors and family units originating from El Salvador, Honduras, and Guatemala—collectively referred to as the Northern Triangle (ASJ.org, 2024). The underlying drivers of this migration can be broadly categorized into three primary domains: economic instability, social insecurity, and political unrest. The political landscape surrounding migration in the United States is characterized by deep polarization, with shifting policies reflecting competing narratives on national security, economic needs, and humanitarian obligations. These political dynamics significantly influence immigration legislation, border enforcement, and the lived experiences of migrant communities (Tichenor, 2002).This presentation aims to provide a foundation for focused and comparative studies on migration and the evolving role of higher education. This presentation contributes to the theoretical understanding of global mobility by advancing an integrated framework that links migration patterns with higher education systems, labor market dynamics, and institutional adaptability. It extends existing theories of internationalization and transnational education by emphasizing the reciprocal relationship between mobile populations and the structural, cultural, and policy transformations within higher education institutions (Knight, 2012; Marginson, 2014). Furthermore, it highlights the critical role of data standardization and comparative analysis in enriching migration and education theories (King & Ruiz-Gelices, 2003). By doing so, it foregrounds the importance of culturally and institutionally adaptive strategies that universities must employ to foster global competence and support mobile learners in increasingly interconnected knowledge economies (Altbach & Knight, 2007).

Additionally, by examining the significant increase in international student enrollment in U.S. higher education institutions, we will use current trends influence the global supply of highly educated

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workers to determine impacts the U.S. labor market, and affects the financial structures of universities. The goal of this presentation is to create a gateway for focused and comparative studies that could explore specific aspects of migration and the role of higher education. Additionally, finding opportunities to enhance labor market dynamics and pathways for improved data collection and standardization efforts will enhance the accuracy and consistency of cross-country analyses.

Keywords: Migration, Higher education, Global mobility, Labor market, Data standardization

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ENVIRONMENTAL DISRUPTION AND BUSINESS SHIFTS

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ABSTRACT

BACKGROUND

The global order is undergoing rapid transformation, driven by a convergence of political, economic, and technological disruptions. Politically, Donald Trump's actions have heightened tensions both domestically and internationally, fueling nationalism and destabilizing alliances. Economically, new tariffs have strained U.S. relationships, raised concerns about stability, increased inflationary pressures, and disrupted global supply chains. Meanwhile, rapid advancements in artificial intelligence and cybersecurity are reshaping industries and amplifying uncertainty. Collectively, these changes create a volatile environment, complicating strategic planning and necessitating shifts in business strategies.

PURPOSE

The paper seeks to explore how the environmental disruption is affecting the strategic shifts that businesses are making or are likely to make.

METHODOLOGY

The approach to the study is based on analysis of current trends and literature review.

FINDINGS

The environmental disruption is likely to shape five major strategic shifts for many businesses:

1. International domestic shift.
2. Technology workers shift.
3. Change readiness shift
4. Political business orientation shift

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5. Cooperation solo shift

1. International Domestic shift

The shift from global to domestic operations in taking place as a result of rising tariffs, supply chain disruptions, and geopolitical uncertainty. High trade barriers increase the costs of imports and exports, making international operations less profitable. In response, many firms pivot to domestic markets, reshoring production and sourcing materials locally. This transition can help companies stabilize costs and supply chains and comply with changing regulations. However, the shift requires investment in domestic infrastructure and workforce and could lead to higher manufacturing costs.

2. Technology workers shift

As global uncertainty intensifies and technological advancements accelerate, many businesses are shifting from traditional hiring to increased investment in Al and robotics. Economic instability, trade disruptions, and unpredictable labor markets make long-term workforce planning riskier, prompting firms to seek automation as a more stable and cost-effective alternative. Advancements in AI, machine learning and robotics have made automation more accessible and capable of handling operations once reserved for human workers. The shift can improve productivity, reduce operational costs, and provide consistency in output. It can also reduce the risk of labor shortages and regulatory changes.. The transition requires training of existing workers or hiring new workers who can handle Al-driven operations.

3. Change readiness shift

In unstable environments, firms must develop the capability to identify relevant changes early and respond swiftly. A change readiness approach consists of three key elements: trigger identification, preparation for action, and action activation.

Trigger identification involves monitoring the political, economic, and technological landscape for early and weak signals. These may include shifts from democracy to autocracy, anticipated changes in government control and regulations, expected modifications in tariffs and economic policies, and emerging breakthrough technologies. Identified signals must be analyzed to differentiate meaningful developments from random noise, assessing their likelihood, impact, and timing. Once a significant change is deemed necessary, the firm moves to the preparation phase. Preparation for action requires allocating resources and organizing for a timely response. The speed at which triggers are translated into action is critical for effective strategic adaptation. The third phase involves specific action projects.

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Firms must distinguish between the need for a major strategic shift and incremental adjustments to avoid unnecessary or premature changes. See Timmor and Zif (2010) for theoretical and empirical background.

Firms are expected to develop a higher level of flexibility in their strategy and operations that will enable them to shift quickly based on environmental monitoring.

4. Political business orientation shift

Firms operating in nationally strategic industries—such as defense, energy, water supply, and sometimes agriculture and food—must cultivate strong relationships with government agencies to ensure success. In sectors where economic activity is heavily influenced by government control, firms need to develop and allocate resources to a political strategy. In stable environments, the balance between business and political oreintation is relatively clear. However, rising political disruptions, fueled by nationalism and authoritarian leadership and changing regulations, make close government ties increasingly essential. As a result, firms are expected to dedicate a growing share of their managerial resources to political interactions that could directly impact business outcomes. Political activities can include recruiting representatives with close ties to the regime, lobbying, petitioning, developing programs favored by the government, making financial contributions, and adjusting promotional activities.

For theoretical and empirical reference to business and political orientation see Zif (1981).

5. Cooperation solo shift

With the reduction of regulations, businesses are likely to shift their strategies to take advantage of newly permissible forms of cooperation. Previously, strict antitrust laws and other regulatory barriers limited how firms could collaborate, often forcing them to compete aggressively rather than coordinate efforts. However, with fewer legal constraints, companies may explore new partnerships, joint ventures, and strategic alliances that were once considered legally questionable. For example, firms in highly competitive industries might share resources, streamline supply chains, or collaborate on research and development without fear of legal repercussions. This could lead to greater efficiency, reduced costs, and faster innovation, as businesses can pool their expertise and infrastructure rather than duplicating efforts.

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CONTRIBUTION

This paper enhances the understanding of the dynamic relationship between contemporary political, economic, and technological disruptions and business strategy. It explores five key types of business shifts that emerge in response to these environmental transformations. While the timing and magnitude of these shifts may vary across firms and contexts, adaptability and readiness for change will be critical for many businesses. The paper provides guidelines for continuous monitoring and deeper analysis of organizational adjustments, offering insights for both scholars and practitioners.

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GENDER EQUALITY IN THE CHILDCARE BENEFITS SYSTEM: DO MEN CONTRIBUTE MORE ACTIVELY AFTER THE INTRODUCTION OF PARENTAL QUOTAS? CASE OF LITHUANIA

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ABSTRACT

In the 20th of 2019, The European Parliament and the Council of The European Union adopted directive (EU) 2019/1158 on work-life balance for parents and carers, which introduced measures to improve the work-life balance for working families. One of the key elements of this directive is the provision of non-transferable paid leave benefits, which aims to encourage gender equality in caregiving responsibilities and support parents and carers. In the light of this Directive from 1 January of 2023, three changes related to childcare benefits came into effect in Lithuania: (1) the introduction of two non-transferable months of parental benefit for each parent, (2) changes to the duration of the benefit, and (3) adjustments to the benefit amounts. Using descriptive statistics and binary response models the aim of this paper is to show how families' childcare benefit choices have changed because of the changes in the childcare benefit regime in Lithuania, and to show how actively men have been using the non-transferable parental months. Analysis of comprehensive administrative data covering the entire population reveals that families residing in larger urban areas and with higher household incomes are more likely to opt for the shorter-duration childcare benefit. In contrast, the two-year benefit option remains more prevalent among families living in smaller or more remote settlements. Furthermore, the analysis of non-transferable parental leave months indicates that higher-earning men are more likely to use these months compared to their lower-earning counterparts. The author presents initial findings from the recent reform of the Lithuanian childcare benefit system.

The literature examines the socio-economic characteristics that may determine whether men take advantage of the non-transferable months of parental allowance. According to the literature it is possible to identify personal (age and education level), financial (men's income) and work environment factors (economic sector) that influence men's response to the "daddy's quotas" for parental leave. *Individual factors.* Sundstrom & Duvander (2002) found that the share of leave taken by fathers in a couple tended to be higher for younger men. Education could work both ways: on the one hand, the more educated have better career prospects and may be reluctant to give up or lose them; on the other hand, the more educated earn more and may be able to use these benefits to successfully re-enter the labor market later (Han et al., 2009). Within the framework of the Lithuanian study, considering the

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limitations of the lack of an education factor, the occupation factor, which is closely related to education, will be used. *Financial factors.* Income also seems to run in both directions. And this is to be expected, as education and income are quite correlated, so the effects of both are similar, in this case fixed in both directions. There may be positive relationship between fathers' individual income and probability of taking leave (Sundström & Duvander, 2002; Lappegard, 2008). According to Saarikallio-Torp & Miettinen (2021) total non-use of fathers' quate strongly concentrates into the lowest income groups, and the differences are much smaller among fathers in the middle- or higher-income groups. Previous analyses in Lithuania have shown that, until 2023, higher income earners chose shorter-term parental benefits, as reflected in the occupations of these parents, who were more likely to be engineers and programmers. *Work environment factors.* The authors found an unambiguous effect that men working in the public sector are more likely to use leave than men working in private ones (Nielsen, 2009; Lappegard, 2012; Geisler & Kreyenfeld, 2019; Duvander et al., 2024). Duvander et al. (2024) showed that fathers with income above the ceiling increase their leave use most, but there are no differences by sector. Only when they studied the sectors separately they found above ceiling income fathers, especially within the private sector, but also to some extent in the state sector, to increase their leave more than fathers that have incomes below the ceiling.

Two analytical samples were constructed to examine the use of the new childcare benefit system introduced in 2023. This research utilized comprehensive Lithuanian social security data, enabling an analysis of the entire population rather than relying on sample-based estimates, as is common in prior studies. To investigate how families' choices between the 18-month and 24-month benefit options were influenced by individual-level factors, data on 11,700 individuals were analyzed. Additionally, to assess whether fathers utilized the non-transferable parental leave months, the study analyzed data on 13,300 men who received paternity benefits in 2023, determining whether they used the non-transferable months in 2023 or 2024. In both cases, binary response models were employed for analysis.

The study found that families with higher educational and occupational qualifications—specifically managers and specialists—as well as those employed in finance, insurance, and information and communication sectors, and residing in large urban areas, were more likely to opt for short-term childcare benefits. In contrast, families with lower qualifications, living in less urbanized districts, and working in lower value-added sectors were less likely to make this choice.

The applied models also indicated that male specialists were more likely to take non-transferable parental leave months, with 42% reporting participation. This proportion was slightly lower among managers (37%), skilled workers (36%), and unskilled workers (36%). The highest participation rates were observed among men employed in the finance and insurance sector (45%), public administration (43%), and manufacturing (42%). In contrast, the lowest rates were found among those working in

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agriculture (29%), transportation and storage (28%), and healthcare and social work (27%). Men living in large urban areas were more likely to take non-transferable months (40%) compared to those in smaller cities or rural districts (36%). Furthermore, the data showed that the average income of men who took non-transferable months was 8% higher than that of those who did not.

The data indicate that men with higher levels of education are more likely to utilize the non-transferable parental leave months in Lithuania, supporting findings from previous studies. Age also plays a significant role, with younger men demonstrating a higher likelihood of responding to the new system and opting to use these non-transferable months. The education variable appears to correlate with financial stability, suggesting that individuals with greater economic security are more inclined to take advantage of the new benefit system. Furthermore, sectoral analysis reveals that men employed in higher value-added sectors are more likely to utilize the so-called "daddy quotas." These findings highlight existing disparities between higher- and lower-earning men, underscoring the need for supportive infrastructure—such as accessible childcare services, flexible labor market policies, and workplace accommodations—to ensure the effectiveness of such parental leave policies. Strengthening these supporting structures could lead to increased uptake of paternal leave and promote a more equitable distribution of childcare responsibilities between partners.

Keywords: parental leave, childcare benefit, childcare allowance, gender equality, non-transferable months

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