



Core functions, visitor friendliness and digitalisation: a comparative analysis of corporate museums' performance

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Abstract

We exploit a rich dataset on Italian museums to investigate whether corporate museums' service provision is quantitatively different from the provision by the rest of private museums and by the three different types of Italian publicly owned museums (whose classification is by organisational mode: traditional, autonomous, and outsourced). We consider service provision in the dimensions of core museum functions (research, collection management, dissemination) and visitor friendliness, and we also focus on digital services. We use count data models estimation methods and include controls referring to museums' characteristics and contextual factors to account for possible confounding effects. Our analysis reveals that corporate museums do not provide more core services than other museums, as expected given the public good component of this category of services. Contrary to expectations, we find that corporate museums are not among the museums providing the largest number of services enhancing visitor friendliness. Finally, corporate museums provide more digital services than traditional public museums and private museums owned by churches, and not less than other museum types. We argue that this latter evidence may come from their interaction with the parent firm. Corporate museums' higher levels of digitalisation may be seen as the effect of a knowledge spillover between the more profit-oriented business world and the non-profit cultural sector.

Keywords Corporate museums · Museum services · Digitalisation · Innovation

JEL Classification Z11 · L33 · O33

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1 Introduction

In the last three decades, the growth in the number and popularity of museums set up by and closely connected with firms has been observed all over the world (Danilov, 1992; Mikus, 1997; Nissley & Casey, 2002; Messedat 2013; Xu, 2017; Riviezzo et al., 2021; Augello, 2022). Referred to in diverse ways, such as ‘company museums’, ‘firm museums’ (Firmenmuseum in German), ‘brand museums’, ‘corporate heritage museums’ or, most often, ‘corporate museums’, such institutions are numerous and visible in large European countries with a long history of high-quality manufacturing (Great Britain, Germany, France, Italy). However, they are also present in other European countries, such as Portugal, Spain, Czech Republic, Poland, Sweden, Switzerland and Greece (Mikus, 1997; Messedat 2013; Forga & Valiente, 2017; Chaney et al., 2018; Hudson, 2017; Cerquetti et al., 2022; Riviezzo et al., 2022) and in other parts of the world, for instance, the United States, Brazil, Australia, Japan, Korea and China (Danilov, 1992; Lehman & Byrom 2007; Seligson, 2010; Wu, 2017; Xueai et al., 2019; Zang et al., 2020). Corporate museums are owned and run by private companies, or by institutions (e.g. foundations) established for this purpose by firms (Augello, 2022; Riviezzo et al., 2022). Present in the museumscape since the beginning of the twentieth century, they have evolved over time: from museums mostly focused on tracing a company’s past to more complex institutions fulfilling broader museum functions and aims (Seligson, 2010), in line with their parent companies’ public relations and corporate cultural/heritage policies (Augello, 2022) and corporate heritage identity management strategies (Burghausen & Balmer, 2014).

Despite the fact that they have recently attracted great scholarly attention, still little is known about their general characteristics. This contribution aims to shed some light on corporate museums by examining a large sample of them in a specific national context: Italy. This country is presently home to the largest number of corporate museums in the world (Augello, 2022; Bonti, 2014), with numerous new initiatives in recent years set up by companies with long traditions in the production of creative goods, including ‘Made in Italy’ icons (Cerquetti et al., 2022). We use data referring to 2018 coming from the Italian Statistical Office (ISTAT), which we complement with information coming from the museums’ websites. A first qualitative assessment reveals that Italian corporate museums are young, mostly located in the North and their ownership is heterogeneous in spite of clear connections with their parent companies. The latter belong to as diverse industries as mechanics and fashion, with a slight prevalence of food and wine producers.

We then move on to quantitative analysis to verify whether corporate museums’ connection with the competitive and efficiency-oriented world of companies makes them different from other museum types. To the best of our knowledge, this is the first quantitative analysis on corporate museums. We focus on museums’ provision of different types of services, in line with previous studies on its determinants (Vincente et al. 2012; Bertacchini et al., 2018; Cellini et al., 2020; Cellini et al. 2024). In particular, we investigate whether corporate

museums' service provision is quantitatively different from the provision by other private museums and from the provision by the three different types of public museums identified by the literature on Italian museums: traditional, autonomous and outsourced public museums (Bertacchini et al., 2018; Cellini et al., 2020; Cellini et al. 2024). We consider the services pertaining to core museum functions (research, collection management, dissemination), those improving visitors' experience, and digital services. We use count data models estimation methods and include museums' characteristics (among which size, age, and ticketing policy) and contextual factors to control for possible confounding effects.

Our analysis reveals that corporate museums do not provide more core function services than the rest of museums, as expected given the public good component of this category of services. Contrary to expectations, we find that corporate museums are not among the providers of the largest number of services enhancing visitor friendliness. Finally, corporate museums offer more digital services than church and traditional public museums, and not less than the rest of museums. We suggest that their interaction with the parent firm may be the reason for the latter evidence: corporate museums' higher innovation level may be seen as a knowledge spillover. Since being a corporate museum involves the closest form of interaction between museums and firms, our findings can then also be read, more generally speaking, as evidence that museums do benefit from exposure to the more competitive world of profit-making companies, at least as far as innovativeness is concerned.

The article is organised as follows: Sect. 2 surveys the existing literature on corporate museums; in Sect. 3, we discuss our hypotheses about their peculiarities, vis à vis all other types of museums, in the domain of service provision; Sect. 4 illustrates our data, and Sect. 5 the empirical strategy; in Sect. 6, we show and comment the results of our empirical analysis, and in Sect. 7, our robustness checks are presented; the last section is devoted to our conclusions.

2 Survey of the relevant literature

Our contribution focuses on corporate museums. It has to be stressed that, with a few exceptions (Carloni et al., 2023; Xu, 2017), the majority of existing research on corporate museums comes from scholars focusing on industrial heritage or fields such as marketing, corporate branding and organisational studies (Augello, 2022). Contributions on corporate museums published so far tend to be qualitative, often have a demand side perspective and adopt a case study approach, with a focus on a single firm or a few firms from a single industry (Riviezzo et al., 2021). Riviezzo et al. (2022) hence call for quantitative research on strategic orientation and economic performance of corporate museums.

2.1 Corporate museums: definitions

Danilov (1992) defines a corporate museum as: *'an exhibit-based facility, owned and operated by a company, collecting and displaying objects (products, visuals,*

photographs, prototypes and other material from the corporate archives) illustrating the history of the company itself (its roots, milestones, achievements, leading figures, etc.) and/or its operations to employees, guests, customers and/or other visitors' (on the target visitor, see par. 2.2). Unlike company archives, usually characterised by limited access, a corporate museum is '*designed for broader appeal (...) to enjoy and discover the cultural roots of the companies and their territories. The experiential sphere dominates, and the heritage buildings and collections are 'manipulated' to stimulate multiple connections in the visitor*' (Riviezzo et al., 2021). Some authors emphasise that they are '*museums established, governed and financed by active companies (...) the corporate museum has a mission to communicate all aspects of corporate heritage and explain its multi-dimensional value*' (Cerquetti et al., 2022). The adjective 'corporate' means, according to Augello (2022), '*related to a corporation, when a firm is legally recognised and exists as an entity separate and distinct from its owners*'.

Mikus (1997) stresses that unlike other company-supported exhibits, corporate museums are distinguished by '*a permanent collection presented as an exhibition, founded and maintained by a corporation*'. They are therefore true cultural institutions. As permanent institutions with a managed museum collection, they are also different from company visitor centres or company tours—they constitute a different way to familiarise customers and the general public with the company and its past (Lehman & Byrom 2007).

Augello (2022) emphasises that a corporate museum is different from non-museum corporate exhibits also for other reasons. While in the latter '*visitors are in the merely role of customers and appreciators of the brand*', the former is meant to stress '*the social relevance of products, and contextualises them within broader culture*', so that '*the company positions visitors as part of the society discussed by the exhibition*'. In that sense, a corporate museum is more than a marketing tool. In fact, it is a producer of collective awareness that a given good has a cultural value attached to it. However, other authors emphasise that corporate museums are also '*a symbolically prestigious instrument of communication, strengthening the (corporate) image with a range of stakeholders*' (Riviezzo et al., 2021). This makes them different from publicly owned museums focused on local industrial heritage or manufacturing traditions (Hudson, 2017; Montella, 2014).¹ Indeed, it is intrinsic in corporate museums' nature that they should indirectly benefit, in many different ways, the parent firm. In fact, they are meant by definition to (also) serve specific corporate needs in the context of firms' relationship with diverse stakeholders.²

Taking the above into account, for the purpose of our research we define a corporate museum as a museum institution established, owned and/or operated, either directly or indirectly (through a non-profit organisation) by a company (or a group

¹ Simone et al. (2022) distinguish between corporate history museums and brand museums on one hand and generic product museums, sector museums and complementary museums on the other.

² A minority of authors are critical about the definition of corporate museums as cultural institutions because they see the commitment to creating value for the parent firm as incompatible with freedom of research. Kooijman (2006) defines them as '*new cathedrals of consumption*', serving company needs

of firms) currently competing on a market. Its collection and displays consist of artefacts which are related to the firm's core economic activity.

2.2 Corporate museums: purposes

Corporate museums support the company in the accomplishment of strategic objectives by using the past as a strategic asset (Nissley & Casey 2002; Riviezzo et al., 2021). Heritagization of the company's past (Bonti, 2014) should be read as the pursue of aims that may be both symbolic (organisational identity) and practical (knowledge on past products and processes) (Vacca, 2014). Sacco and Conz (2023) propose a slightly different conceptualisation of this issue and distinguish corporate heritage for authenticity, heritage for market leadership and heritage for continuity.

Corporate museums serve as communication tools vis à vis at least three stakeholder groups external to the museum itself (Carloni et al., 2023; Garofano et al., 2020): the parent company—its marketing department and its employees in general (company perspective); its consumers and shareholders (external perspective—market relations); the general public (external perspective—non-market relations).

From an internal company perspective a corporate museum helps to manage corporate heritage, defines company culture, assists in internal brand communication and employee training, fosters employee pride, attachment and identification with the company and inspires and assists in developing new skills and products (Bonti, 2014).

Corporate museums are also sometimes functional to creating a narrative on the firm and its strategic progress that is useful in the relationship with shareholders and potential shareholders, particularly when added value mainly relies on the immaterial aspects of the produced good (Paolino, 2019).

However, from the perspective of the founding company's market relations, enhancing competitiveness is often seen as the main motivation (Comunian, 2009; Simone et al., 2022). The key function of a corporate museum is then to connect with existing and potential new consumers, expressing and enhancing the immaterial, symbolic values of products (Ravasi et al., 2011). Aesthetic experiences and entertainment offered to visitors are peripheral to the core product yet instrumental in shaping its perception (Hudson 2017). They may be key in defining and transmitting brands' identity and uniqueness (Burghausen & Balmer, 2014; Sacco & Conz, 2023; Urde et al., 2007). They emphasise brand prestige and authenticity (Bertoli et al., 2016) by stressing its links with the place of origin (Cerquetti et al., 2022), special design or production process, the fact that the brand is innovative yet timeless or leading in a given area or industry (Caru et al. 2017). Corporate museums may be seen as a platform to establish emotional bonds with consumers (Cerquetti et al., 2022; Danilov, 1992). As a communication tool (Chaney 2018) a

Footnote 2 (continued)

under the disguise of leisure and experiences. Hudson (2017) stresses that *'They are manipulative commercial attractions that showcase products and communicate brand values, but their mission and manner are perceived as subtle and vaguely benevolent.'*

corporate museum is also meant to engage consumers with the brand and strengthen brand loyalty (Hudson, 2017). It may be functional to brand extension and internationalisation. This is particularly true in some industries, like fashion (Ostillio & Ghaddar, 2017; Caru et al. 2017).

Corporate museums are likewise an expression of a firm's corporate cultural responsibility, and they influence public opinion about the company (Bonti, 2014) also on controversial issues linked with it (Danilov, 1992).³ Moreover, they often exert a broad cultural, economic and social impact on the region they are located in (Williams, 2013). By preserving, displaying and promoting corporate heritage they contribute to the enhancement of local identity, act as guardians of a broader local memory and are instrumental to preservation of local knowledge and skills (Inácio, 2018; Spielmann et al., 2021). They may serve as training grounds and inspiration not only internally but also to trainees and students in certain niche sectors (Appiani, 2019), and also for employees of smaller companies of the same industry who cannot afford to have their own heritage policy (D'Angelo 2019). Consequently, Massi and Turrini (2020) consider them an instrument for developing the relationship between brand and territory, and they may be seen as part of corporate social responsibility strategies at the local level.⁴ Moreover, in many places, corporate museums are key (industrial) tourism attractions (Hudson, 2017; Otgaar et al., 2010; Williams, 2013) and are essential for destination image (Montella, 2014; Riviezzo et al., 2021). They therefore often collaborate with the leisure and tourism sector (Riviezzo et al., 2022) and foster links with the local communities (Bonti, 2014; Hudson, 2017).

3 Hypotheses on corporate museums' service provision

As already stressed, the premises of existence of corporate museums are usually different from those of traditional, non-profit museums. Even if their establishment in itself is not motivated by the wish to generate direct profits, it is neither the result of the desire to preserve heritage per se, as in the case of traditional museums. They may be seen as an instrumentalisation of heritage for a company's needs (Bertoli et al., 2016; Livingstone, 2011; Nissley & Casey, 2002). This may lead to doubts as to whether this museum type is able or inclined to pursue the broad range of traditional core museum missions, defined as collecting, conserving, researching, displaying and communicating tangible and intangible heritage to diverse publics for the purpose of education, study and enjoyment (Alexander et al., 2017; ICOM, 2022).

³ Corporate museums may offer opportunities to draw on the multi-generational character of corporate heritage by using it as a way to communicate and create links between different stakeholder groups, e.g. new and old employees, younger and older consumers (Balmer 2013).

⁴ CSR both at the non-local and at the local level may be read as a strategy aiming at enhancing the *moral capital* of a firm, which is essential for its resilience (Godfrey et al., 2009).

If museums in general may be satisfied with the delivery of services with public good features, corporate museums, due to their hybrid nature, are more likely to focus on the fulfilment of company-specific goals, which may lead to different agendas and operating standards (Livingstone, 2011). The focus might be more on transmission of an easy, enjoyable narrative rather than strong research and education efforts. However, some authors claim that economic and non-economic aims pursued by corporate museums do not have to be in conflict with each other (Riviezso et al., 2022). Indeed, some contributions report that many corporate museums are compliant with all core museum functions. However, this evidence is anecdotal and the issue must be investigated in a more systematic way. We wish to do that and verify the following hypothesis:

Hypothesis 1 Being at the intersection of the cultural non-profit museum world and profit-oriented business world, corporate museums are likely to deliver a smaller number of core museum services, many of which have a public good component.

That economic and non-economic aims pursued by corporate museums do not have to be in conflict with each other may be evident when one considers those museum auxiliary services making a visitor's experience easier, richer and more enjoyable, because visitors are potential buyers and/or local residents the benevolence of whom is one of firms' objectives. The aim to 'pamper' their visitors may be even more salient for corporate museums, given that they are accountable to their parent firm, a profit-making entity valuing the response of that audience a lot. Last but not least, thanks to close links with parent firms, corporate museums may adopt a more goal-oriented approach leading to greater general effectiveness. We therefore propose the following hypothesis:

Hypothesis 2 Being at the intersection of the cultural non-profit museum world and profit-oriented business world, corporate museums are likely to deliver a larger number of those museum services making the visit experience easier, richer and more enjoyable.

Museums engage their audience not just in the real world, but also in the virtual one. Digitization enhances museums attractiveness directly, through delivery of digital services to physical visitors, and indirectly through reaching out to virtual visitors (Palumbo, 2022). Digitalization, virtual presence and the use of digital technologies may be seen as a sign of visitor friendliness and a reflection of a more visitor-centred approach (Marty, 2008). We then single out digital services and propose Hypothesis 3:

Hypothesis 3 Being at the intersection of the cultural non-profit museum world and profit-oriented business world, corporate museums are likely to deliver a larger number of digital services.

Just like for Hypothesis 2, the rationale for Hypothesis 3 may be a stronger incentive to visitor friendliness and a stronger focus on effectiveness, but in fact, there is more than that at stake. Provision of digital services may be interpreted as a proxy for attitude towards innovation.

The issue of digitalization and the effects of the use of ICT technologies in museums are one of the ‘hot’ topics in the museum discourse (Guccio et al., 2022).⁵ It is mainly dealt with by scholars in the fields of tourism, museum management, visitor studies and with respect to specific museum types (e.g. art museums). Many contributions report the adoption of different technological tools by museums and the reactions of their audiences to them,⁶ but, as noticed by Borowiecki and Navarrete (2017), the contributions focusing on what makes a museum more prone to go digital, hence more open to technological change, are not many, especially if we consider quantitative analyses.

Camarero et al. (2011) identify museum size as a significant factor. They also find that mixed sources of funding facilitate innovation in general (public funding does not provide sufficient incentive for innovation), and organisational mode matters. Vicente et al. (2012) find that publicly founded museums tend to apply innovation more to management-related issues (digitisation of artefacts and catalogues, education, training, management), while self-funded museums are more likely to opt for technological innovations applied to enhancing visitor experience. Bertacchini et al. (2018) confirm the role of size, ownership and organisational mode, as well as networking and competitiveness of the local museum environment. More recent research of Li et al. (2023) and Cavalieri et al. (2023) also ascertains that private museums are more likely to engage in technological and functional innovations, but just like previous studies, they neglect to consider that private museums are a very miscellaneous group, including museums belonging to religious organisations, art lovers, private universities and also corporate museums, among others. Arguably, these categories are likely to be characterised by different attitudes towards innovation.

Hypothesis 3 thus posits that corporate museums are more digital, hence innovation-prone. The reason is that the parent firm-corporate museum relation is likely

⁵ The COVID-19 pandemic has accelerated the introduction of digital technologies in museums (Raimo et al., 2022).

⁶ Borowiecki and Navarrete (2017) consider museum digitalisation from the perspective of different spatial scales (macro, meso and micro) and of the digital literacy of both producers and consumers. Zollo et al. (2022) regard virtual environments such as social media platforms as catalysts to attract new visitors, improve their experiences, and increase their loyalty and overall satisfaction. They are significant predictors of customer loyalty and impact on willingness to pay for entrance and products at museum store of tech-savvy visitors. Taylor and Gibson (2017) analyse the use of social media by museums and its impact on democratisation of heritage through digital access, a topic covered also by Audunson et al. (2020). Solima and Izzo (2018) discuss the use of QR codes in museums to enhance their tourism attractiveness. Perez-Sanaugustin et al. (2016) see digitalisation as an opportunity to enhance visitor experience as well as a cost-effective way to deliver information in museum spaces. Virtual and augmented reality are considered useful new tools to present and curate heritage content (Gatelier et al., 2022). Palumbo (2022) focuses on Wi-Fi access in museum spaces, including coworking spaces. The only contribution on the more specific topic of digitalisation in corporate museums is Mason et al. (2022), who focus on their websites. Using a qualitative approach, they link their features with the intention to visit.

to have a positive impact on the latter in this respect. This impact is in terms of a better chance to learn about the benefits of innovation, thus leading to a more proactive behaviour (quicker adoption of new technologies in the museum). After all, companies are usually accustomed to more competitive market environments than museums and are therefore more prone to innovate to gain competitive advantage. When a company creates its own museum, it is likely that this attitude is transmitted to the corporate museum.

4 Data

We use data coming from 2018 survey *Indagine sui musei e le istituzioni similari* by ISTAT. It is the fourth round of a survey meant to map all Italian museums and their activities. The data we consider allow to identify observation units definable as corporate museums, whose main characteristics we analyse by complementing the dataset with information coming from their websites (and/or the websites of their parent company).

Then, we use ISTAT questions on museums' activities and physical infrastructure to construct our dependent variables, i.e. the counts of services pertaining to the spheres of core missions and visitor friendliness and the count of digital services. Finally, from the same source, we extract extra information on other museum characteristics likely to have a statistical association with service provision, which we use as controls.

The number of museums covered by ISTAT (2018) is 4,908. Since not all respondents answered all the questions we consider, our analyses will include a smaller number of institutions, but still a sizable one.

4.1 Identification of the corporate museums sample

Our first task was to single out corporate museums. At first it looked as an easy job: there is a specific question in the ISTAT survey asking for the type of collection, and one of the answers is 'industrial and/or corporate museums'. In fact, we soon realised that choosing that answer is neither a necessary nor a sufficient condition for a museum to be classifiable as a corporate museum. On the one hand, it is not a sufficient condition because a number of industrial museums are included that are not corporate museums. Typically, these museums are institutions owned by a local government and make it possible to visit local industrial heritage sites such as old mines and mills. On the other hand, it is not a necessary condition because a number of corporate museums chose a different category for their collection, possibly because they did not consider it associated with the notion of standardised industrial production. For instance, Salvatore Ferragamo Museum (the museum of a well-known producer of top-quality shoes) chose to be categorised as an art museum. More interestingly, a large number of food and wine museums declared their collection to be either 'Thematic and/or specialist' or related to 'Ethnology and anthropology'. This

forced us to consider all private museums not belonging to religious organisations and to check them all.

Following the conceptualisations of the extant literature, we used two criteria to decide whether a museum was corporate or not. In particular, a museum is corporate if:

- (1) It belongs to a firm still in existence and established prior to the establishment of the museum (to rule out cases of companies whose core activity is the museum itself);
- (2) Its collection consists of artefacts/documents definable as corporate heritage, and/or artefacts produced by other makers in the same industry, equipment or machines used in that industry in the course of history (such as the case, for instance, of a printing company whose collection mainly consists of old typographic tools).

These criteria allow avoiding to consider as corporate museums the following heritage institutions: art museums belonging to companies and banks; hybrid collection museums (art and corporate heritage); museums focusing on a single company, good or service opened and run by collectors or governments (a typical case being the museum of a lover of vintage motorbikes or cars produced by a single company). As a further important validation check, we also considered whether there is a link between the company's website and the museum website.⁷

4.2 Italian corporate museums' characteristics

We identified 120 corporate museums in the 2018 ISTAT survey. It is worthwhile to describe their main features, also to see if our data offer a picture of the corporate museums world that is similar to the one emerging from the extant contributions based on case studies. The corporate museums we consider categorise their collection and type of owner as illustrated in Table 1.

Notice that only slightly more than half of the museums in the corporate museums sample are in the 'Corporate and/or industrial museums' category, for the reasons mentioned in par. 4.1.

Notice also that only 56 corporate museums are actually *owned* by a company. This is the consequence of three different phenomena. The first is that, as anticipated in par. 2, companies often set up a foundation to run a museum. The second is that, in a number of cases, the collection is the private property of the company's owner, and so is the museum. Finally, museums owned by cooperatives and associations are also represented. Cooperatives are common in some Italian regions and often compete in the same markets as companies. As for associations, they are often the

⁷ This was particularly time consuming because in some cases the museum name did not include the company's name, and therefore it was necessary to identify the latter in the first place. The website of the Italian Ministry of Culture, that has a page for every museum in the survey, was the starting point for this search.

Table 1 Corporate museums, self-classification by type of collection and type of owner. *Source:* own elaboration based on ISTAT 2018

Type of collection	Frequency	Ownership	Frequency
Corporate and/or industry	64	Private company	56
Thematic and/or special theme	32	Private collector	19
Ethnography and anthropology	10	Foundation	17
Modern and contemporary art	4	Cooperative	8
History	3	Informal association	7
Science and technology	2	Foreign company	4
Natural science	1	Formal association	3
Historic house-museum	1	Company owned by government	2
Historic building	1	Other private entity	2
NA	2	NA	2
Total	120	Total	120

expression of industrial districts. The story here goes that a plurality of companies decided to exhibit their collections together, and to open one large museum instead of several small, almost identical ones in the same area. In this case we then consider as corporate the museums set up by the producers of a specific, often niche good, typical of a specific geographical area.⁸

In order to complete our illustration of Italian corporate museums, we consider the industry they are associated with. Data in this respect cannot be extracted from the 2018 ISTAT museum census; we therefore collected them from the museums' and companies' websites.

Table 2 shows that food and beverage companies have a pre-eminent role. It is not a new finding that these industries are present in the domain of corporate museums (Forga & Valiente, 2017; Gómez, 2017; Habegger, 2022; Inácio, 2018; Spielmann et al., 2021; Williams, 2013), but perhaps their pre-eminence is. Some of the parent food and beverage firms are large (Martini; Peroni; Perugina), but most of them are small. It is interesting to notice that the contributions on corporate museums published so far tend to identify them with the initiative of large, industrial manufacturers. Probably the reason why we also find small firms is that our data detect a supply-side trend connected to the booming phenomenon of wine and gastronomy tourism in Italy: that of providing tourists a museum experience (alongside other experiences) by private producers of local delicacies.

Table 2 also reveals the relevant presence of automobile and motorbike museums (including Ferrari, Ducati, Fiat, Lamborghini, Piaggio), fashion museums (Ferragamo, Zegna, Benetton) and of the miscellaneous group of artistic crafts museums (among which there are jewellery museums), in line with the importance of these industries in Italy's GDP (and exports in particular), and also in line with contributions on corporate museums in other national contexts (on

⁸ We exclude this type of museums whenever the founders include local governments. For instance, we do not consider city of Parma's food museums.

Table 2 Corporate museums by industry. *Source:* own elaboration based on ISTAT 2018 and corporate museums' websites

Sector	Frequency
Food	25
Wine and spirits	20
Means of transport	13
Artistic crafts	12
Fashion and textiles	11
Mechanics	6
Paper and printing	6
Design and furniture	5
Performing arts	4
Sports and sports gear	3
Energy	3
Musical instruments	3
Banks	2
Ceramics and porcelain	2
Pharmacy	2
Metals	1
Chemical	1
Telecommunication	1
Total	120

corporate museums of automotive manufacturers, see Hudson, 2017; aviation is covered by Chaney et al., 2018; jewellery, clockwork and furniture design by Kries, 2019).

Table 3 shows that most of these museums are located in the northern part of the country.

This comes as no surprise, as the North of Italy is much richer in companies and manufacturers than the South. Finally, Table 4 illustrates corporate museums' answer about their birth year:

In most cases, these museums are very recent, in line with the findings of previous contributions.

4.3 Construction of indexes of service provision

As anticipated, our next aim is to compare corporate museums vis à vis other types of museums, taking into consideration service provision pertaining to the spheres of core missions, visitor friendliness and digitalisation. First of all, it is therefore necessary to operationalise these dimensions. Carloni et al. (2023) propose as many as 63 performance indicators for corporate museums. We follow a different, more quantitative literature in this respect, started by Bertacchini et al. (2018) and later followed by Cellini et al. (2020; 2024) and Cavalieri et al. (2023). We construct indexes whose value for each museum are the counts of the 'yes' answers to the

Table 3 Corporate museums by location. *Source:* own elaboration based on ISTAT 2018

Location	Frequency
North	78
Centre	20
South & Islands	22
Total	120

Table 4 Corporate museums by year of establishment. *Source:* own elaboration based on ISTAT 2018

Year	Frequency
Before 1970	4
1970s	6
1980s	10
1990s	22
2000s	43
2010–18	17
NA	18
Total	120

pertinent questions in the 2018 ISTAT survey.⁹ Having *synthetic* indexes broadens the possibility to use them as dependent variables in empirical analysis. Table 5, 6 and 7 define COREINDEX, VFINDEX and DIGITALINDEX:

COREINDEX includes items directly or indirectly related to the three dimensions of heritage preservation (collection management, conservation, research activities) and making it accessible and understandable.

VFINDEX expands the notion of heritage accessibility by including all services making a museum visit both an instructive and an enjoyable experience.

DIGITALINDEX summarises all the services available to the potential visitor for the online exploration of the museum, for the online planning of her visit, the digital services available during the visit and after it, to keep in touch with the museum (social media, APP). This index covers all the salient digital strategies directly targeting the audience highlighted by the extant literature on museums and digitalisation.¹⁰ DIGITALINDEX may be intended as a complement to VFINDEX, but we

⁹ Bertacchini et al. (2018) were the first to construct visitor friendliness and digitalisation indexes of this sort. Our own visitor friendliness and digitalisation indexes are similar conceptually to theirs, but slightly different in the questions considered and their number. This is because not all the questions in ISTAT (2015), which they used, were repeated in ISTAT (2018), and because some new questions were added.

¹⁰ Extant indicators of technological innovation in museums (Li et al., 2023; Vicente et al., 2012) include: digitalisation or digital catalogues of books, archives and items in the museum collection, digitalisation of object images, software applications for managing collections, databases of friends of the museums, staff training programmes, educational programmes, intranet, technology applied to visitors experience: information through computers and screens, projection screens, photographic panels, audio guides, video mapping, webpages, virtual tours, educational programmes on the web, the use of social media and QR codes.

Table 5 Definition of COREINDEX

COREINDEX	Count
Purchase of items for the museum collection	Yes = 1
Presence of inventory	Yes = 1
Presence of an archive	Yes = 1
Research activities	Yes = 1
Organisation of conferences or seminars	Yes = 1
Presence of a restoration laboratory	Yes = 1
Presence of room for seminars and/or educational activities	Yes = 1
Presence of a library or a documentation centre	Yes = 1
Borrowed items for exhibition	Yes = 1
Borrowed items for research	Yes = 1
Lent items for research	Yes = 1
Lent items for exhibition	Yes = 1
Open at least 24 h a week	Yes = 1
Open at least 100 days in a year	Yes = 1
Organised temporary exhibitions	Yes = 1
Organised educational workshops	Yes = 1
COREINDEX (sum of the above) distribution support	0–16

Table 6 Definition of VFINDEX

VFINDEX	Count
Infopoint in the lobby	Yes = 1
Map of museum in the lobby	Yes = 1
Indications of visit path	Yes = 1
Paper material to explain the exhibits	Yes = 1
Captions for all exhibited items	Yes = 1
Name at entrance	Yes = 1
Timetable at entrance	Yes = 1
Signposts in the surroundings	Yes = 1
Parking lot	Yes = 1
Cloakroom	Yes = 1
Restaurant or cafe	Yes = 1
Food and beverage vending machine	Yes = 1
Bookshop	Yes = 1
Night openings	Yes = 1
Shows and cultural events	Yes = 1
Special educational material for children	Yes = 1
Special educational material for disabled	Yes = 1
Assistance for the disabled	Yes = 1
Entertainment for children	Yes = 1
VFINDEX (sum of the above) distribution support	0–19

Table 7 Definition of DIGITALINDEX

DIGITALINDEX	Count
<i>Website</i>	Yes = 1
<i>Online ticket purchase</i>	Yes = 1
<i>Online virtual tour</i>	Yes = 1
<i>Online catalogue</i>	Yes = 1
<i>Social media accounts</i>	Yes = 1
Link to digital maps	Yes = 1
App	Yes = 1
Audioguide	Yes = 1
QR codes	Yes = 1
Tablets available for visitors	Yes = 1
Interactive devices (touchscreen, videos)	Yes = 1
Room for videos	Yes = 1
Free Wi-Fi	Yes = 1
DIGITALINDEX (sum of the above) distribution support	0–13

DIGITAL-ONLINE comprises the items in italics

will mainly consider it as a proxy for a museum's attitude towards technological innovation.

All our indexes are the counts of at least 10 items. Although they are not exhaustive as to museums' activities and infrastructure, the information provided by the 2018 ISTAT survey is very rich, and we believe this makes COREINDEX, VFINDEX and DIGITALINDEX good proxies of the dimensions we investigate.

5 Empirical strategy

Following Bertacchini et al. (2018), we propose the following model:

$$INDEX_i = \alpha + \beta'_i MUSTYPE_i + \delta'_i X_i$$

where $INDEX_i$ is the value either of the three indexes presented in par. 4.3 referring to museum i . In order to translate this into an empirical model we add an error term with standard characteristics (zero mean, constant variance).

$MUSTYPE_i$ is a set of dummy variables capturing the different types of museums: corporate museums (CORPMUSEUM), private non-corporate museums (OTHER-PRIVMUS), which in some specifications are further divided, following Bertacchini et al. (2018), into museums belonging to churches (CHURCH) and the rest of private museums (PRIVNOCHURCH); and, as far as public museums are concerned, the two categories of outsourced museums (OUTS) and those that are not outsourced but have a budget, also called autonomous museums (AUT). There are in fact three types of public museums in Italy, the third type being the one of public museums without a budget on their own and managed as a section of the culture department of central or a local government (traditional public museums). As Bertacchini et al.

(2018) have shown that the three types of public museums perform very differently, we consider this distinction, and we initially use the third type as reference category. Clearly, our target variable is CORPMUSEUM: a positive and statistically significant parameter would highlight that, other conditions equal, corporate museums are associated with a higher number of provided services, in the dimension under investigation, than those offered by traditional public museums (the most numerous category in the sample). We then consider similar models in which other museum types are taken as reference.

X_i is a set of controls relative to the characteristics of museum i and of the province where it is located. We derive the candidate attributes from Bertacchini et al. (2018), Cellini et al., (2020, 2024) and Cavalieri et al. (2023). In particular, we consider the following variables: a dummy equal to 1 if the institution is a museum and not a monument or an archaeological site (MUSEUM); the logarithm of surface expressed in square metres (SIZE); number of employees (STAFF); number of employees per surface unit (EMPSUR) to control for nonlinearities in the combination of given quantities of inputs; a discrete variable with support 1–13 capturing (the inverse of) age (YEAROPEN); a dummy accounting for membership in a network of museums (NET), as this may imply that there are extra human and capital resources available; a dummy accounting for free admission policy (FREEACCESS) and the number of museums in the same province (PROVMUSNUM). In some of the models we present we also include regional dummies. Regional dummies are meant to control for relevant context-specific features such as size of the local population, tourist vocation, institutional quality and, in the case of DIGITALINDEX, internet accessibility.

COREINDEX, VFINDEX and DIGITALINDEX are the result of counting the number of services provided by each museum. It is therefore necessary to use count data models estimation methods. As there may be a problem of overdispersion, we consider two: Poisson and Negative Binomial, and choose the best one, model by model, according to the results of LR and goodness of fit tests.

6 Results

First of all, we illustrate the results we obtain when we use the same sample for all our models, no matter the dependent variable considered. The total number of museums answering all the questions used to construct COREINDEX, VFINDEX, DIGITALINDEX and all the covariates is 2,690. The summary statistics for this sample of all dependent and independent variables are in Table 8.

Considering $N=2690$, the three indexes have different means in the corporate and non-corporate museum subsamples. Table 9 shows that corporate museums have, on average, higher means. The differences do not, however, appear to be sizable, especially as far as COREINDEX and VFINDEX are concerned. We must therefore check whether they are statistically significant. A graphical inspection of the distribution of the indexes suggests that, as typical of count variables, they are not normally distributed, which is confirmed by normality tests (available upon request). In Table 9, we then report the p-values of t tests of equality of means with unequal

Table 8 Summary statistics
(*N* = 2690)

Variable	Mean	Std. Dev	Min	Max
COREINDEX	7.115	3.585	0	16
VFINDEX	9.921	3.423	0	19
DIGITALINDEX	3.804	2.614	0	13
DIGITAL-ONLINE	1.752	1.222	0	5
DIGITAL-INSITU	2.054	1.813	0	8
CORPMUSEUM	0.025	0.155	0	1
OTHERPRIVMUS	0.299	0.458	0	1
AUT	0.169	0.375	0	1
OUTS	0.226	0.418	0	1
MUSEUM	0.785	0.411	0	1
SIZE	6.425	1.577	1.791	13.700
STAFF	12.442	28.495	1	594
EMPSUR	0.023	0.051	5.00e-06	1.267
OPENYEAR	7.659	2.998	1	13
NET	0.313	0.464	0	1
FREEACCESS	0.375	0.484	0	1
PROVNUMMUS	69.697	46.740	8	213

variances and of the Wilcoxon-Mann-Whitney tests, which are tests of equality of medians.

In the case of COREINDEX and VFINDEX, the null hypothesis of equal means and medians cannot be rejected. As for DIGITALINDEX, the means and medians of the corporate and non-corporate museum samples are different from each other at the 1% statistical significance level. This is an interesting finding, which seems to be driven in particular by the higher probability for a corporate museum to have a website, to allow the online purchase of tickets and to provide free Wi-Fi to visitors. However, this evidence needs confirmation from regression analysis before drawing any conclusion, because we are not controlling for possible confounding effects here.

Tables 10, 11 and 12 report regression results. In all the three tables, Model (1) does not distinguish between corporate and non-corporate museums – private museums are one category, and only the ownership/organisational variables are considered. This model is mainly for comparison with the findings of previous literature and with Model (2). The latter considers only the ownership/organisational variables, too, but now corporate museums are singled out from the rest of private museums. In Model (3) we add all controls, and in Model (4) both controls and the 19 regional dummies (reference category: Tuscany). In the next column we show the marginal effects at means of Model (4), and (5) illustrates the output of OLS regressions with robust standard errors of the same model. We show these for comparison with the marginal effects of Model (4) and to check the R square value. Finally, we propose Model (6), in which we substitute OTHERPRIVMUS with the two categories CHURCH and PRIVNOCHURCH.

Table 9 Tests of equal means and medians ($N=2690$ sample)

	Means		t test eq. means
	Corporate	Non-corporate	No eq. variance
COREINDEX	7.424	7.108	-0.844
VFINDEX	10.030	9.919	-0.261
DIGITALINDEX	4.606	3.784	-2.797***
	Medians		Wilcoxon test
	Corporate	Non-corporate	
COREINDEX	8	7	-0.962
VFINDEX	10	10	-0.245
DIGITALINDEX	5	4	-2.899***

In Model (2) of Table 10 corporate museums' probability of offering a large number of core services seems higher than the one of public traditional museums. However, when the effect of other covariates is controlled for (Model 3), the estimated parameter of CORPMUSEUM loses statistical significance.

Adding regional dummies (Model 4) does not change the picture substantially. OLS estimates are similar in sign, size and significance to the marginal effects of Model (4), and we learn that the model explains 0.36% of the variance of the dependent variable. In Model (6) all parameter estimates change very little with respect to (4). All in all, H1 is partially confirmed by the evidence in Table 10: corporate museums do not deliver a larger number of core services than traditional public museums. Notice also that all estimated parameters of the covariates, save for NET, are statistically significant. They also have the expected sign: other things equal, museums offer more core services than other institutions; larger institutions do, too, as well as those under more competitive pressure. Free admission is associated with less core museums services (probably because costly tickets are a source of revenue) and so is the decade when the museum opened (younger museums often collect recent artworks, perhaps needing less restoration works).

In the Models (3) and (4) of Table 11, most controls are also statistically significant (exceptions are NET, EMPSUR and PROVNUMMUS) and show the expected sign. Once again, our target variable loses statistical significance once the controls are added (Model 3), and when both the controls and the regional dummies are added (Model 4 and 6).

This leads us to the conclusion that our data do not confirm H2. Quite surprisingly, it is not just corporate museums that, other conditions equal, provide a smaller number of services making a visit easier and more enjoyable than traditional public museums, but all private museums do. In this specific dimension of museum service provision, the outperforming museums types are public autonomous and public outsourced museums. This is in line with evidence in Bertacchini et al. (2018), who used the 2015 round of ISTAT museum survey.

Table 10 Dependent variable: COREINDEX

	(1)	(2)	(3)	(4)	(4bis)	(5)	(6)
	Negative Binomial	Negative Binomial	Negative Binomial	Negative Binomial	Marg eff	OLS	Negative Binomial
PRIV	0.195*** (0.025)						
CORPMUSEUM		0.192*** (0.064)	0.065 (0.054)	0.048 (0.054)	0.330	0.341 (0.327)	0.053 (0.053)
OTHERPRIVMUS		0.195*** (0.026)	0.137*** (0.023)	0.123*** (0.023)	0.834	0.825*** (0.156)	
CHURCH							0.006 (0.033)
PRIVNOCHURCH							0.166*** (0.024)
AUT	0.394*** (0.029)	0.394*** (0.029)	0.195*** (0.025)	0.184*** (0.025)	1.252	1.367*** (0.179)	0.187*** (0.025)
OUTS	0.043 (0.028)	0.043 (0.028)	0.034 (0.025)	0.054** (0.025)	0.366	0.307* (0.170)	0.054** (0.025)
MUSEUM			0.535*** (0.024)	0.517*** (0.024)	3.514	3.200*** (0.143)	0.514*** (0.024)
SIZE			0.112*** (0.007)	0.109*** (0.007)	0.740	0.699*** (0.050)	0.107*** (0.007)
STAFF			0.001*** (0.000)	0.001*** (0.000)	0.007	0.018*** (0.004)	0.001*** (0.000)
EMPSUR			0.507*** (0.176)	0.509*** (0.174)	3.462	2.083 (1.694)	0.502*** (0.173)
OPENYEAR			-0.012*** (0.003)	-0.011*** (0.003)	-0.074	-0.087*** (0.019)	-0.012*** (0.003)

Table 10 (continued)

	(1)	(2)	(3)	(4)	(4bis)	(5)	(6)
	Negative Binomial	Negative Binomial	Negative Binomial	Negative Binomial	Marg eff	OLS	Negative Binomial
NET			0.004 (0.018)	0.009 (0.018)	0.059	0.080 (0.120)	0.010 (0.18)
FREEACCESS			-0.123*** (0.018)	-0.142*** (0.018)	-0.967	-0.977*** (0.129)	-0.138*** (0.018)
PROVNUMMUS			0.0004** (0.000)	0.001*** (0.000)	0.006	0.006*** (0.002)	0.001*** (0.000)
Constant	1.813*** (0.019)	1.813*** (0.019)	0.777*** (0.065)	0.783*** (0.068)		-0.139 (0.459)	0.804*** (0.068)
Regional dummies	NO	NO	NO	YES		YES	YES
N	2690	2690	2690	2690		2690	2690
Log Likelihood	-7,150.846	-7,150.845	-6,741.695	-6,696.614			-6,685.070
LR test	463.79***	436.79***	58.11***	39.61***			35.22***
R Square						0.362	
F statistic						54.08 (df: 31; 2658)	

The OLS estimation in (5) is with robust standard errors

*Denotes statistical significance at the 10% level

**At the 5% level

***At the 1% level

Table 11 Dependent variable: VFINDEX

	(1) Negative Binomial	(2) Negative Binomial	(3) Poisson	(4) Poisson	(4bis) Poisson marg. eff	(5) OLS	(6) Poisson
PRIV	0.065*** (0.017)						
CORPMUSEUM		0.107** (0.043)	0.042 (0.041)	0.009 (0.042)	0.084	0.091 (0.357)	0.010 (0.042)
OTHERPRIVMUS		0.061*** (0.018)	0.027 (0.017)	0.002 (0.018)	0.021	0.011 (0.153)	
CHURCH							-0.035 (0.026)
PRIVNOCHURCH							0.017 (0.019)
AUT	0.241*** (0.020)	0.241*** (0.020)	0.117*** (0.019)	0.103*** (0.020)	1.000	1.047*** (0.167)	0.103*** (0.020)
OUTS	0.139*** (0.019)	0.139*** (0.019)	0.086*** (0.018)	0.064*** (0.019)	0.620	0.593*** (0.167)	0.064*** (0.019)
MUSEUM			0.153*** (0.017)	0.144*** (0.017)	1.396	1.358*** (0.141)	0.143*** (0.017)
SIZE			0.069*** (0.005)	0.071*** (0.005)	0.688	0.693*** (0.050)	0.070*** (0.005)
STAFF			0.001*** (0.000)	0.001*** (0.000)	0.007	0.013*** (0.002)	0.001*** (0.000)
EMPSUR			0.209 (0.132)	0.259* (0.133)	2.523	2.094 (-1.655)	0.258* (0.133)
OPENYEAR			0.006*** (0.002)	0.007*** (0.002)	0.065	0.067*** (0.019)	0.006*** (0.002)

Table 11 (continued)

	(1)	(2)	(3)	(4)	(4bis)	(5)	(6)
	Negative Binomial	Negative Binomial	Poisson	Poisson	Poisson marg. eff	OLS	Poisson
NET			0.021 (0.014)	0.023* (0.014)	0.223	0.233** (0.118)	0.023* (0.014)
FREEACCESS			-0.232*** (0.014)	-0.238*** (0.014)	-2.320	-2.202*** (0.126)	-0.237*** (0.014)
PROVNUMMUS			0.000 (0.000)	0.000 (0.000)	0.002	0.002 (0.002)	0.000 (0.000)
Constant	2.198*** (0.013)	2198*** (0.013)	1.682*** (0.047)	1.670*** (0.050)		3.921*** (0.475)	1.677*** (0.051)
Regional dummies	NO	NO	NO	YES		YES	YES
<i>N</i>	2690	2690	2690	2690		2690	2690
Log-likelihood	-7,119.370	-7,118.800					
LR test	17.12***	16.98***					
Gof chi(2)			2,520.236	2,430.376			2,426.461
<i>p</i> value			0.985	0.999			0.999
R Square						0.337	
F statistic						45.59 (df:31;2658)	

The OLS estimation in (5) is with robust standard errors

* Denotes statistical significance at the 10% level

** At the 5% level

*** At the 1% level

Table 12 Dependent variable: DIGITALINDEX

	(1)	(2)	(3)	(4)	(4bis)	(5)	(6)
	Negative Binomial	Negative Binomial	Negative Binomial	Negative Binomial	NB marg eff	OLS	Negative Binomial
PRIV	0.385*** (0.036)						
CORPMUSEUM		0.526*** (0.085)	0.404*** (0.077)	0.362*** (0.077)	1.293	1.306*** (0.264)	0.369*** (0.076)
OTHERPRIVATEMUS		0.373*** (0.036)	0.316*** (0.034)	0.281*** (0.035)	1.002	0.903*** (0.118)	
CHURCH							0.096* (0.051)
PRIVNOCHURCH							0.345*** (0.037)
AUT	0.560*** (0.041)	0.560*** (0.041)	0.344*** (0.039)	0.331*** (0.039)	1.180	1.114*** (0.141)	0.334*** (0.039)
OUTS	0.421*** (0.039)	0.421*** (0.039)	0.335*** (0.036)	0.300*** (0.037)	1.072	0.967*** (0.134)	0.300*** (0.037)
MUSEUM			0.343*** (0.033)	0.340*** (0.033)	1.214	1.156*** (0.113)	0.335*** (0.033)
SIZE			0.108*** (0.010)	0.109*** (0.010)	0.389	0.385*** (0.036)	0.105*** (0.010)
STAFF			0.002*** (0.000)	0.002*** (0.000)	0.005	0.012*** (0.002)	0.002*** (0.000)
EMPSUR			0.630** (0.244)	0.713*** (0.242)	2.546	2.175* (1.282)	0.705*** (0.240)
OPENYEAR			0.011*** (0.004)	0.012*** (0.004)	0.042	0.041** (0.016)	0.010** (0.004)

Table 12 (continued)

	(1)	(2)	(3)	(4)	(4bis)	(5)	(6)
	Negative Binomial	Negative Binomial	Negative Binomial	Negative Binomial	NB marg eff	OLS	Negative Binomial
NET			0.105*** (0.027)	0.100*** (0.027)	0.356	0.376*** (0.100)	0.101*** (0.026)
FREEACCESS			-0.351*** (0.028)	-0.355*** (0.028)	-1.268	-1.177*** (0.097)	-0.350*** (0.028)
PROVNUMMUS			0.001*** (0.000)	0.001*** (0.000)	0.004	0.005*** (0.001)	0.001*** (0.000)
Constant	1.002*** (0.027)	1.002*** (0.027)	-0.005 (0.095)	0.019 (0.100)		-0.642* (0.349)	0.056 (0.099)
Regional dummies	NO	NO	NO	YES		YES	YES
N	2,690	2,690	2,690	2,690		2,690	2690
Log Likelihood	-6,133.394	-6,131.718	-5,882.824	-5,854.543			-5,842.154
LR test	445.84***	442.97***	164.02***	142.97***			132.30***
R Square						0.259	
F statistic						34.11***	(df:31;2658)

The OLS estimation in (5) is with robust standard errors

*Denotes statistical significance at the 10% level

**At the 5% level

***At the 1% level

DIGITALINDEX is the dependent variable in Table 12, in which all covariates, whenever present, turn out to be statistically significant and with the expected sign.

If we focus on our target variable, CORPMUSEUM, we see that its estimated parameter is always positive and statistically significant. When considering the marginal effects at means of Model (4), our evidence is of 1.3 ca. more digital services in corporate museums than in traditional public museums, vis a vis just 1 more digital service for other private museums and public outsourced museums and 1.2 ca. in the case of public autonomous museums (1.1 is the OLS estimate). This means that, at mean, corporate museums are 10% more digital than traditional public museums. We can therefore say that our evidence confirms H3.

In the first part of Table 13 we illustrate the regression results of Model (4) of the previous three tables after removing the constraint of use of the same dataset no matter the dependent variable. N increases considerably when considering VFINDEX (+19%) and DIGITALINDEX (+30%). In spite of this increase, statistical significance, sign and size of the different museum types parameters stay (almost) the same (Model 2 and Model 3), a remarkable sign of robustness.¹¹

Following Cavalieri et al. (2023), we then split DIGITALINDEX into two different counts: that of the digital services available (also) before the visit (online services), and that of services available in situ. The former comprises website, online ticket purchase, online catalogue, virtual tour and social media accounts. The latter comprises audioguide, QR code, tablets, app, interactive devices, room for videos, free Wi-Fi and digital map.¹² We call these counts DIGITAL-ONLINE and DIGITAL-INSITU. Regressing these two variables on all covariates and regional dummies reveals that in the case of online services, the big divide is between public traditional museums and all other museum types; in the case of in situ digital services, while all museum types still outperform traditional public museums, private non-corporate museums do so to a lesser extent (Models 4 and 5). In both cases, the estimated parameter of corporate museums is the highest. Replicating these regressions on the $N=2690$ sample produces similar results (available upon request).

In the first column of Table 14, we recall the CORPMUSEUM estimates of Model (6) in Tables 10, 11 and 12. In the other columns, we show the estimated parameter of the same variable obtained by running regressions on similar models—the only change is in the reference category. For instance, in (2) AUT is the reference category, therefore the estimated models have the same regressors as Model (6) of Tables 10, 11 and 12 except for the fact that AUT is excluded and a dummy for traditional public museums included. This analysis is meant to provide a full picture of corporate museums' standing, in the different dimensions, vis-à-vis all other types of museums.

The evidence is the following:

¹¹ The estimated parameters of the other covariates are also similar; full estimation results available upon request.

¹² Cavalieri et al. (2023) use data coming from different rounds of ISTAT museum survey. Since the ones previous to 2018 included a smaller number of questions about digital services, their sub-indexes do not fully correspond to ours.

Table 13 In (1)–(3) larger N ; in (4) depvar=count of digital services available before the visit; in (5) depvar = count of digital services available during the visit

	(1)	(2)	(3)	(4)	(5)
	COREINDEX	VFINDEX	DIGITALINDEX	DIGITAL- ONLINE	DIGITAL- INSITU
	Neg. Binomial	Poisson	Neg. Binomial	Poisson	Neg. Binomial
CORPMUSEUM	0.046 (0.054)	0.022 (0.040)	0.369*** (0.072)	0.421*** (0.086)	0.321*** (0.094)
OTHERPRI- VATEMUS	0.121*** (0.023)	0.013 (0.016)	0.275*** (0.031)	0.393*** (0.039)	0.170*** (0.042)
AUT	0.185*** (0.025)	0.110*** (0.018)	0.333*** (0.035)	0.347*** (0.044)	0.319*** (0.047)
OUTS	0.052** (0.025)	0.062*** (0.017)	0.293*** (0.034)	0.277*** (0.042)	0.305*** (0.044)
CONTROLS	YES	YES	YES	YES	YES
REGIONAL DUMMIES	YES	YES	YES	YES	YES
N	2707	3201	3508	3508	3508
Log Likelihood	-6,745.795		-7,636.348		-6,213.009
LR test	41.77***		243.82***		192.33***
Gof chi(2)		3,064.038		3,230.118	
p value		0.907		0.999	

*Denotes statistical significance at the 10% level

**At the 5% level

***At the 1% level

- As far as core museums functions are concerned, we find that corporate museums perform worse than other private non-church museums (21.3% of the sample) and are not statistically different from the rest of museums;
- As for visitor friendliness, we find that corporate museums perform worse than public autonomous museums (16.9% of the sample) and are not different from the rest of museums;
- As far as digital services are concerned, we find that corporate museums perform better than public traditional and church museums (which together make up for 36.7% of the sample) and are not different from the rest of museums.

7 Robustness checks

In line with the above-mentioned decomposition of DIGITALINDEX, we split COREINDEX into the count of services focusing on acquisition, conservation and research on one hand, and exhibition on the other. We used these counts as dependent variables in models similar to Model (4), both on the restricted and full sample,

Table 14 Estimated parameters of CORPMUSEUM, full model with different reference categories

	Refcat: traditional public	Refcat: AUT	Refcat: OUTS	Refcat: CHURCH	Refcat: PRIVNO- CHURCH
COREINDEX	0.053 (0.053)	-0.133 (0.054)	-0.001 (0.054)	0.047 (0.058)	-0.112** (0.052)
VFINDEX	0.010 (0.042)	-0.093** (0.043)	-0.054 (0.042)	0.045 (0.046)	-0.006 (0.041)
DIGITALINDEX	0.369*** (0.076)	0.035 (0.077)	0.068 (0.076)	0.273*** (0.083)	0.024 (0.753)

and found that again, H1 was partially confirmed—CORPMUSEUM was never significant.¹³

We re-ran all regressions removing YEAROPEN from the covariates. We did this because a check on this variable in a subsample using other information sources made us realise that it may be problematic. The problem lies in that a large number of museums were closed in the course of their lives (restoration works, earthquakes, etc.), and they re-opened after some years. In answering the question of the ISTAT survey about the decade when they were open, some of these museums answered making reference to the re-opening, and some not. Removing YEAROPEN from the controls does not change our conclusions as to the confirmation or not of H1, H2 and H3.

Cavalieri et al. (2023) find that the digitalisation of Italian museums is also influenced by the share of foreign, young and old visitors, which they interpret as a sign of supply adjustment to the characteristics of their audience. Using data coming from ISTAT (2015, 2018), the authors deal with endogeneity by using the shares recorded in a previous round of the ISTAT museum survey (ISTAT 2011). Unfortunately, we cannot do the same, as we would lose too many observations referred to corporate museums. We therefore use contemporary shares as extra controls, though we are aware that this may flaw the analysis because of reverse causation. When we add these three extra explanatory variables, the sample turns smaller ($N=2,635$). The shares are sometimes significant, sometimes not, depending on the model specification and dependent variable. The statistical significance and relative size of the estimated parameters of CORPMUSEUM, OTHERPRIVMUS; AUT and OUTS are very similar to those illustrated in Tables 10, 11 and 12, so that our conclusions are robust to the consideration of demand-side drivers.

¹³ We did not create sub-indices of visitor friendliness because the services included in VFINDEX are more homogeneous and it is not easy to find reasonable criteria informing the split.

8 Conclusions

Corporate museums are an emerging category of heritage institutions, and our contribution is the first analysis of them using a large dataset. Since we exploit a rich database detailing their features, we provide a wider picture than previous investigations. The results of our analysis question some of the characterisations that previous contributions, mainly based on case studies, had proposed as ‘to be expected’ for this category of museums. In particular, we find that corporate museums are not necessarily the initiative of large firms (many of the identified museums are not connected to big brands), and that their parent company is often in the food and wine industry.

We have proposed hypotheses on how corporate museums should differ from other types of museums in the domain of service provision, due to the hybrid nature of their goals, and we have tested them through regression analysis. Our evidence shows that corporate museums produce less services in the sphere of core museum functions than other private museums not owned by churches, and they do not do better than other museum categories. This is clearly a problem, if they aspire to be recognised as true cultural institutions. At the same time, and perhaps surprisingly, corporate museums are less visitor friendly than some public museums, at least if we exclude digital services. Finally, our analysis reveals that they are more digital than traditional public museums and church-owned museums, and not less digital than the rest of museums. If we understand digitalisation as a part of visitor friendliness, then maybe corporate museums use digital services as substitutes of other types of services, and/or they target virtual visitors more than other museum types.

A possible explanation of the greater number of digital services provided by corporate museums is the fact that, for Italian traditional public museums, going online is more difficult due to the regulations imposed on the communication of public agencies. However, we find that in the case of *in situ* services (QR codes, interactive devices, etc.), there is also a difference between the number of services provided by corporate museums and some private non-corporate museums. This leads us to believe that the difficult transition of traditional public museums to the digital world is only part of the story.

There is also a different reading of the evidence on digitalisation: we can consider it as a proxy for technological innovation. This interpretation contextualises our contribution in the broader context of the ongoing debate on the determinants of innovation and how innovation spreads in an economy. Dalle Nogare and Murzyn-Kupisz (2021) investigated whether museums foster innovation through engagement with firms, based on the hypothesis that innovation is the consequence of knowledge spillovers from museums to firms emerging from their interaction. Here, the perspective is reversed: do firms foster innovation in the heritage sector by interacting with museums? Corporate museums may be seen as the strongest form of firm–museum interaction. Finding that corporate museums are more prone to technological innovation may reveal that there are beneficial knowledge spillovers for a museum engaging with a firm, at least when this interaction is strong.

The knowledge spillovers we detect are in the sphere of digitalisation. In the last few decades, embracing digitalisation has been beneficial, especially for those manufacturers operating in competitive environments, because it enhances productivity. One can then argue that the more a given market is competitive, the more we expect its firms to go digital. If we consider museums as an industry, it is not an industry facing a highly competitive market. Generally speaking, firms operate in more competitive environments (which is not true for governments), so what we may have here is knowledge spillovers whose existence and direction find justification in the different end market structures that museums and parent firms face.

This consideration leads us to a possible generalisation of our results. A situation similar to that of a firm setting up a museum is when they venture into other markets—for instance, when they integrate vertically with an intermediate good provider or a retailer. Our empirical evidence may then help predict what happens in such circumstances, whenever the industries of the buyer and the acquired firm operate in markets characterised by different levels of competition: knowledge spillovers bring benefits to the firm operating in the less competitive market.

There are obviously limitations to this research. One is the use of a dataset that is cross-sectional and refers to just one national context, Italy. More information on parent companies as well as on museums' budgets would also be a great bonus. Finally, we do not know anything about the quality of the services the museums we consider provide. As already pointed out by Bertacchini et al. (2018), one would need both quantitative and qualitative data to get a full picture. In this sense, our research can be a useful point of departure for further analysis.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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