



**Sinergie SIMA**  
Management Conference



# **Management of sustainability and well-being for individuals and society**

*Conference Proceedings*

*Short Papers*

*Parma (Italy)*

**13-14 June 2024**

Sinergie-SIMA Management Conference Proceedings  
*Management of sustainability and well-being for individuals and society*  
13-14 June 2024  
University of Parma - Italy

ISBN 978-88-94-7136-5-7

The Conference Proceedings are published online on <https://www.sijmsima.it>

© 2024 FONDAZIONE CUEIM  
Via Interrato dell'Acqua Morta, 26  
37129 Verona - Italy



# **Management of sustainability and well-being for individuals and society**

**13-14 June 2024**

## *Conference Proceedings*

Short Papers

edited by

*Arabella Mocciaro Li Destri, Marta Ugolini,  
Guido Cristini and Beatrice Luceri*

**Conference chairs**

GUIDO CRISTINI	<i>University of Parma</i>
BEATRICE LUCERI	<i>University of Parma</i>
ARABELLA MOCCIARO LI DESTRI	<i>University of Palermo - SIMA</i>
MARTA UGOLINI	<i>University of Verona - Sinergie Italian Journal of Management</i>

**Scientific committee**

BEATRICE LUCERI (Coordinator)	<i>University of Parma</i>
GUIDO BORTOLUZZI	<i>University of Trieste</i>
ANNA PAOLA CODINI	<i>University OF Brescia</i>
MARIA COLURCIO	<i>Magna Grecia University of Catanzaro</i>
ELISA CONZ	<i>University of Pavia</i>
ALESSANDRA COZZOLINO	<i>Sapienza University of Roma</i>
ALFREDO D'ANGELO	<i>Cattolica del Sacro Cuore University</i>
MARIA DELLA LUCIA	<i>University of Trento</i>
ROSANGELA FEOLA	<i>University of Salerno</i>
MARCO FREY	<i>Scuola Superiore Sant'Anna of Pisa</i>
CHIARA GIACHINO	<i>University of Torino</i>
EMANUELE INVERNIZZI	<i>IULM University</i>
SABRINA LATUSI	<i>University of Parma</i>
ELISA MARTINELLI	<i>University of Modena and Reggio Emilia</i>
DIEGO MATRICANO	<i>Vanvitelli University of Campania</i>
OLIMPIA MEGLIO	<i>Federico II University of Naples</i>
ROBERTO PARENTE	<i>University of Salerno</i>
ANDREA PICCALUGA	<i>Scuola Superiore Sant'Anna of Pisa</i>
MASSIMO PICONE	<i>University of Palermo</i>
ANGELO PRESENZA	<i>University of Molise</i>
ANDREA RUNFOLA	<i>University of Perugia</i>
ANGELOANTONIO RUSSO	<i>LUM University</i>
IVAN RUSSO	<i>University of Verona</i>
ALFONSO SIANO	<i>University of Salerno</i>
PAOLA SIGNORI	<i>University of Verona</i>
TANIA VERGURA	<i>University of Parma</i>
CRISTINA ZERBINI	<i>University of Parma</i>
ANTONELLA ZUCHELLA	<i>University of Pavia</i>

**Organizing committee**

SIMONE AIOLFI	<i>University of Parma</i>
CHIARA BACCHILEGA	<i>University of Parma</i>
MARTA BARATTIN	<i>University of Parma</i>
SILVIA BELLINI	<i>University of Parma</i>
ANNA BONCOMPAGNI	<i>University of Parma</i>
MARIA GRAZIA CARDINALI	<i>University of Parma</i>
BEATRICE CECCOLI	<i>University of Parma</i>
GUIDO CRISTINI	<i>University of Parma</i>
BENEDETTA GRANDI	<i>University of Parma</i>
SUSANNA GRAZIANO	<i>University of Parma</i>
MARCO IEVA	<i>University of Parma</i>
SABRINA LATUSI	<i>University of Parma</i>
BEATRICE LUCERI	<i>University of Parma</i>
DAVIDE PELLEGRINI	<i>University of Parma</i>
GIOVANNI ROMANO	<i>University of Parma</i>
GIADA SALVIETTI	<i>University of Parma</i>
TANIA VERGURA	<i>University of Parma</i>
CRISTINA ZERBINI	<i>University of Parma</i>

CRISTINA ZILIANI  
ANGELOANTONIO RUSSO  
SAVINO SANTOVITO  
FABIO MUSSO  
LARA PENCO

*University of Parma*  
*LUM University*  
*University of Bari*  
*University of Urbino*  
*University of Genova*

**Editorial staff**

FABIO CASSIA  
NICOLA COBELLI  
LAURA CIARMELA  
ADA ROSSI  
ADELE FERRAGAMO

*University of Verona*  
*University of Verona*  
*Sinergie Italian Journal of Management*  
*Sinergie Italian Journal of Management*  
*SIMA*

**Registration and invoicing**

ANNALISA ANDRIOLO

*Sinergie Italian Journal of Management*

**The Conference Chairs and the Scientific Committee  
are grateful to the following reviewers who have actively  
contributed to the peer review process**

GIANPAOLO ABATECOLA	<i>University of Roma Tor Vergata</i>
TINDARA ABBATE	<i>University of Messina</i>
GRAZIANO ABRATE	<i>University of Piemonte Orientale</i>
GAETANO AIELLO	<i>University of Firenze</i>
SIMONE AIOLFI	<i>University of Parma</i>
ANTONELLA ANGELINI	<i>University of Pisa</i>
NORA ANNESI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
ELEONORA ANNUNZIATA	<i>Sant'Anna School of Advanced Studies, Pisa</i>
GINEVRA ASSIA ANTONELLI	<i>Luiss Guido Carli - Roma</i>
ALESSIA ANZIVINO	<i>University Cattolica del Sacro Cuore</i>
BARBARA Aquilani	<i>University of Tuscia</i>
ELISA ARRIGO	<i>University of Milano Bicocca</i>
ANDREA BAFUNDI	<i>University of Padova</i>
GIOVANNA BAGNATO	<i>University of Torino</i>
GABRIELE BAIMA	<i>University of Torino</i>
FABRIZIO BALDASSARRE	<i>University of Bari</i>
BENEDETTA BALDI	<i>University of Verona</i>
MARCO BALZANO	<i>Ca' Foscari University of Venice</i>
MARIASOLE BANNO'	<i>University of Brescia</i>
AUGUSTO BARGONI	<i>University of Torino</i>
DOMENICA BARILE	<i>University LUM Giuseppe Degennaro</i>
ALESSANDRO BARONCELLI	<i>University Cattolica del Sacro Cuore</i>
CLARA BASSANO	<i>University of Salerno</i>
NICOLA BELLINI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
SILVIA BELLINI	<i>University of Parma</i>
VALERIA BELVEDERE	<i>University Cattolica del Sacro Cuore</i>
LARA BENEVOLO	<i>University of Genova</i>
MARCO BERARDI	<i>University of Chieti e Pescara</i>
MARA BERGAMASCHI	<i>University of Bergamo</i>
CRISTINA BETTINELLI	<i>University of Bergamo</i>
FRANCESCO BIFULCO	<i>University of Napoli Federico II</i>
ANIELE BINCI	<i>University of Roma Tor Vergata</i>
SILVIA BIRAGHI	<i>University Cattolica del Sacro Cuore</i>
SILVIA BLASI	<i>University of Padova</i>
ROBERTA BOCCONCELLI	<i>University of Urbino Carlo Bo</i>
MICHELLE BONERA	<i>University of Brescia</i>
ANGELO BONFANTI	<i>University of Verona</i>
GUIDO BORTOLUZZI	<i>University of Trieste</i>
ANTONIO BOTTI	<i>University of Salerno</i>
ANTONIA BRANDONISIO	<i>University LUM Giuseppe Degennaro</i>
FEDERICO BRUNETTI	<i>University of Verona</i>
CLEMENTINA BRUNO	<i>University of Piemonte Orientale</i>
FEDERICA BUFFA	<i>University of Trento</i>
NICOLETTA BURATTI	<i>University of Genova</i>
ANNA CABIGIOSU	<i>Ca' Foscari University of Venice</i>
FEDERICA CABONI	<i>University of Cagliari</i>
ANTONELLA CAMMAROTA	<i>University of Sannio</i>
RAFFAELE CAMPO	<i>University of Bari</i>
ELENA CANDELO	<i>University of Torino</i>
ROSSELLA CANESTRINO	<i>University of Napoli Parthenope</i>
CHIARA CANNAVALE	<i>University of Napoli Parthenope</i>
ARTURO CAPASSO	<i>University of Sannio</i>

FRANCESCO CAPPA	<i>Luiss Guido Carli - Roma</i>
GIUSEPPE CAPPIELLO	<i>University of Bologna</i>
ANDREA CAPUTO	<i>University of Trento</i>
MARIA GRAZIA CARDINALI	<i>University of Parma</i>
SILVIO CARDINALI	<i>University Politecnica delle Marche</i>
ANGELA CARIDÀ	<i>University Magna Graecia di Catanzaro</i>
FRANCESCO CARIGNANI DI NOVOLI	<i>University of Napoli Federico II</i>
CECILIA CASALEGNO	<i>University of Torino</i>
FRANCESCO CASARIN	<i>Ca' Foscari University of Venice</i>
ELENA CASPRINI	<i>University of Siena</i>
FABIO CASSIA	<i>University of Verona</i>
LAURA CASTALDI	<i>University of Campania Luigi Vanvitelli</i>
SANDRO CASTALDO	<i>Bocconi University</i>
PAOLA CASTELLANI	<i>University of Verona</i>
ELENA CEDROLA	<i>University of Macerata</i>
RICKY CELENTA	<i>University of Salerno</i>
MARA CERQUETTI	<i>University of Macerata</i>
FABRIZIO CESARONI	<i>University of Messina</i>
MARIA CHIARVESIO	<i>University of Udine</i>
FRANCESCO CIAMPI	<i>University of Firenze</i>
MARIA VINCENZA CIASULLO	<i>University of Salerno</i>
MARIA CRISTINA CINICI	<i>University of Messina</i>
NICOLA COBELLI	<i>University of Verona</i>
CHIARA COLAMARTINO	<i>University LUM Giuseppe Degennaro</i>
FRANCESCA COLLEVECCHIO	<i>University Politecnica delle Marche</i>
MARIA COLURCIO	<i>University Magna Graecia di Catanzaro</i>
ILENIA CONFENTE	<i>University of Verona</i>
FRANCESCA CONTE	<i>University of Salerno</i>
EMANUELA CONTI	<i>University of Urbino Carlo Bo</i>
ELISA CONZ	<i>University of Pavia</i>
DANIELA CORSARO	<i>IULM University</i>
FILIPPO CORSINI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
MARIA COSCIA	<i>University of Napoli Parthenope</i>
SILVIA COSIMATO	<i>University of Napoli Federico II</i>
ALESSANDRA COZZOLINO	<i>Sapienza University of Roma</i>
KAROLINA CRESPI GOMES	<i>University of Padova</i>
FRANCESCO CRISCI	<i>University of Udine</i>
MATTEO CRISTOFARO	<i>University of Roma Tor Vergata</i>
CHIARA CRUDELE	<i>University of Salerno</i>
ANTONIO CRUPI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
NICOLA CUCARI	<i>Sapienza University of Roma</i>
VALENTINA CUCINO	<i>Sant'Anna School of Advanced Studies, Pisa</i>
MARIAPIA CUTUGNO	<i>University of Messina</i>
DAVID D'ACUNTO	<i>University of Verona</i>
GIOVANNI BATTISTA DAGNINO	<i>University of Rome Lumsa - Palermo Campus</i>
DANIELE DALLI	<i>University of Pisa</i>
GIORGIA D'ALLURA	<i>University of Catania</i>
EDOARDO D'ANDRASSI	<i>University of Pegaso</i>
ALFREDO D'ANGELO	<i>University Cattolica del Sacro Cuore</i>
EUGENIO D'ANGELO	<i>University of Pegaso</i>
VIVIANA D'ANGELO	<i>University Cattolica del Sacro Cuore</i>
MARIO D'ARCO	<i>University of Sannio</i>
ERNESTO D'AVANZO	<i>University of Trento</i>
CHIARA DE BERNARDI	<i>IUSS - Scuola Universitaria Superiore Pavia</i>
FRANCESCA DE CANIO	<i>University of Modena e Reggio Emilia</i>
ALESSANDRA DE CHIARA	<i>University of Napoli L'Orientale</i>
DOMENICO DE FANO	<i>University LUM Giuseppe Degennaro</i>

MARIA ROSA DE GIACOMO	<i>Sant'Anna School of Advanced Studies, Pisa</i>
PIETRO DE GIOVANNI	<i>Luiiss Guido Carli - Roma</i>
VALENTINA DE MARCHI	<i>University of Padova</i>
SARA DE MASI	<i>University of Firenze</i>
ALFREDO DE MASSIS	<i>Dalmine - Ex Enel</i>
SABINA DE ROSIS	<i>Sant'Anna School of Advanced Studies, Pisa</i>
IVANO DE TURI	<i>University LUM Giuseppe Degennaro</i>
GIACOMO DEL CHIAPPA	<i>University of Sassari</i>
GIOVANNA DEL GAUDIO	<i>University of Napoli Federico II</i>
PASQUALE DEL VECCHIO	<i>University of Salento</i>
EMANUELA DELBUFALO	<i>University Europea Di Roma</i>
BICE DELLA PIANA	<i>University of Salerno</i>
STEFANO DE NICOLAI	<i>University of Pavia</i>
CINZIA DESSI	<i>University of Cagliari</i>
ANGELA DETTORI	<i>University of Cagliari</i>
ELEONORA DI MARIA	<i>University of Padova</i>
NADIA DI PAOLA	<i>University of Napoli Federico II</i>
FRANCESCA DI PIETRO	<i>University of Milano Bicocca</i>
DOMENICO DI PRISCO	<i>Luiiss Guido Carli - Roma</i>
FRÉDÉRIC DIMANCHE	<i>Toronto Metropolitan University</i>
MAURO DINI	<i>University of Urbino Carlo Bo</i>
GIULIA DORE	<i>University of Trento</i>
SAIDA EL ASSAL	<i>University of Bari</i>
ENG TECK-YONG	<i>Henley Business School University</i>
MONICA FAIT	<i>University of Salento</i>
MARIA FEDELE	<i>University of Cassino and Southern Lazio, Italy</i>
ROSANGELA FEOLA	<i>University of Salerno</i>
ROSARIA FERLITO	<i>University of Catania</i>
MICHELA FLORIS	<i>University of Cagliari</i>
BARBARA FRANCONI	<i>University of Urbino Carlo Bo</i>
STEFANO FRANCO	<i>Luiiss Guido Carli - Roma</i>
DOMENICO FRASCATI	<i>University LUM Giuseppe Degennaro</i>
MARTHA MARY FRIEL	<i>IULM University</i>
AMBRA GALEAZZO	<i>University of Padova</i>
SILVANA GALLINARO	<i>University of Torino</i>
MARCO GALVAGNO	<i>University of Catania</i>
ROSSELLA GAMBETTI	<i>University Cattolica del Sacro Cuore</i>
MARIA EMILIA GARBELLI	<i>University of Milano Bicocca</i>
VITTORIO MARIA GARIBBO	<i>Sant'Anna School of Advanced Studies, Pisa</i>
ANTONELLA GAROFANO	<i>University of Campania Luigi Vanvitelli</i>
BARBARA GAUDENZI	<i>University of Verona</i>
FRANCESCO GHEZZI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
SONIA CATERINA GIACCONE	<i>University of Catania</i>
CHIARA GIACHINO	<i>University of Torino</i>
ELENA GIARETTA	<i>University of Verona</i>
BENEDETTA GRANDI	<i>University of Parma</i>
ALBERTO GRANDO	<i>Bocconi University</i>
SIMONE GUERCINI	<i>University of Firenze</i>
NATALIA MARZIA GUSMEROTTI	<i>Sant'Anna School of Advanced Studies, Pisa</i>
RADA GUTULEAC	<i>University of Torino</i>
BIRGIT HAGEN	<i>University of Pavia</i>
LEA IAIA	<i>University of Chieti e Pescara</i>
GABRIELE IANIRO	<i>University of Molise</i>
FABIO IANNONE	<i>Sant'Anna School of Advanced Studies, Pisa</i>
MARCO IEVA	<i>University of Parma</i>
ANNA RITA IRIMIAS	<i>Corvinus University of Budapest, Ungheria</i>
FILOMENA IZZO	<i>University of Campania Luigi Vanvitelli</i>



DIALA KABBARA	<i>University of Pavia</i>
NORIFUMI KAWAI	<i>University of Bergamo</i>
ELVIRA TIZIANA LA ROCCA	<i>University of Messina</i>
MAURIZIO LA ROCCA	<i>University of Calabria</i>
HU LALA	<i>University Cattolica del Sacro Cuore</i>
SABRINA LATUSI	<i>University of Parma</i>
FRANCESCO LAVIOLA	<i>Sapienza University of Roma</i>
CRISTINA LEONE	<i>University of Palermo</i>
LUNA LEONI	<i>University of Roma Tor Vergata</i>
GABRIELLA LEVANTI	<i>University of Palermo</i>
DAVIDE LIBERATO LO CONTE	<i>Sapienza University of Roma</i>
LETIZIA LO PRESTI	<i>University Telematica Unitelma Sapienza</i>
PIERPAOLO MAGLIOCCA	<i>University of Foggia</i>
GIOVANNA MAGNANI	<i>University of Pavia</i>
MATS MAGNUSSON	<i>KTH Royal Institute of Technology in Stockholm</i>
RICCARDO MAIOLINI	<i>John Cabot University</i>
ANTONIO MAJOCCHI	<i>University of Pavia</i>
FILIPPO MARCHESANI	<i>University of Chieti e Pescara</i>
GIANLUCA MARCHI	<i>University of Modena e Reggio Emilia</i>
NANCY ELONA MARKU	<i>University of Cagliari</i>
MICHELA MARI	<i>University of Roma Tor Vergata</i>
MARCELLO MARIANI	<i>University of Bologna</i>
ALBA MARINO	<i>University of Messina</i>
VITTORIA MARINO	<i>University of Sannio</i>
VERONICA MAROZZO	<i>University of Messina</i>
ELISA MARTINELLI	<i>University of Modena e Reggio Emilia</i>
UMBERTO MARTINI	<i>University of Trento</i>
ALICE MARTINY	<i>Sant'Anna School of Advanced Studies, Pisa</i>
MICHELA CESARINA MASON	<i>University of Udine</i>
MARTINA MATTIOLI	<i>University of Chieti e Pescara</i>
CHIARA MAURI	<i>University LIUC</i>
LEONARDO MAZZONI	<i>University of Padova</i>
MARCO FRANCESCO MAZZÙ	<i>Luiss Guido Carli - Roma</i>
DOMENICO MECCA	<i>Sant'Anna School of Advanced Studies, Pisa</i>
OLIMPIA MEGLIO	<i>University of Sannio</i>
MONIA MELIA	<i>University Magna Graecia di Catanzaro</i>
ANNA MENOZZI	<i>University of Piemonte Orientale</i>
ANTONIO MESSENI PETRUZZELLI	<i>Politecnico di Bari</i>
LAURA MICHELINI	<i>University LUMSA of Roma</i>
MARGHERITA MIETTO	<i>University LIUC</i>
MATILDE MILANESI	<i>University of Firenze</i>
MARGHERITA MILOTTA	<i>University of Pavia</i>
ANNA MINÀ	<i>University of Rome Lumsa - Palermo Campus</i>
MICHELE MODINA	<i>University of Molise</i>
LUDOVICA MOI	<i>University of Cagliari</i>
MARIA GABRIELA MONTANARI	<i>University of Vienna</i>
DOMENICO MORRONE	<i>University LUM Jean Monnet</i>
ALESSIA MUNNIA	<i>University of Catania</i>
GRAZIA MURTARELLI	<i>IULM University</i>
FABIO MUSSO	<i>University of Urbino Carlo Bo</i>
GIULIA NEVI	<i>Sapienza University of Roma</i>
MELITA NICOTRA	<i>University of Catania</i>
SANDRA NOTARO	<i>University of Trento</i>
MIRKO OLIVIERI	<i>IULM University</i>
BEATRICE ORLANDO	<i>University of Ferrara</i>
MARIO OSSORIO	<i>University of Campania Luigi Vanvitelli</i>
LINDA OSTI	<i>University of Bolzano</i>

ALESSANDRO PAGANO	<i>University of Urbino Carlo Bo</i>
MARCO UGO PAIOLA	<i>University of Padova</i>
CHIARA PALAGONIA	<i>LUMSA University</i>
MARIA PALAZZO	<i>University of Salerno</i>
ADELE PARMENTOLA	<i>University of Napoli Parthenope</i>
CECILIA PASQUINELLI	<i>University of Napoli Parthenope</i>
MARIACARMELA PASSARELLI	<i>University of Calabria</i>
PIERLUIGI PASSARO	<i>University of Bari</i>
GIUSEPPE PEDELIENTO	<i>University of Bergamo</i>
TONINO PENCARELLI	<i>University of Urbino Carlo Bo</i>
LARA PENCO	<i>University of Genova</i>
REBECCA PERA	<i>University of Torino</i>
MIRKO PERANO	<i>Reald University College</i>
FRANCESCO ANTONIO PEROTTI	<i>University of Torino</i>
ANDREA PICCALUGA	<i>Sant'Anna School of Advanced Studies, Pisa</i>
PASQUALE MASSIMO PICONE	<i>University of Palermo</i>
MARCO PIRONTI	<i>University of Torino</i>
GIUSEPPE PIRRONE	<i>University of Pavia</i>
ROBERTA PISANI	<i>Bocconi University</i>
VINCENZO PISANO	<i>University of Catania</i>
ALESSIA PISONI	<i>University of Insubria</i>
GABRIELE PIZZI	<i>University of Bologna Sede Di Rimini</i>
SARA POGGESI	<i>University of Roma Tor Vergata</i>
SIMONE POLEDRINI	<i>University of Perugia</i>
LORENZO PRATAVIERA	<i>LUMSA University</i>
ANGELO PRESENZA	<i>University of Molise</i>
LUDOVICA PRINCIPATO	<i>University of Roma Tre</i>
GIORGIA PROFUMO	<i>University of Genova</i>
TOMMASO PUCCI	<i>University of Siena</i>
FRANCESCA PUCCIARELLI	<i>University of Turin</i>
SEBASTIAN PUSCEDDU	<i>Sapienza University of Roma</i>
ANDREA QUINTILIANI	<i>University Telematica Pegaso</i>
SILVIA RANFAGNI	<i>University of Firenze</i>
ANGELA RELLA	<i>University LUM Giuseppe Degennaro</i>
SABRINA RESTANTE	<i>Sapienza University of Roma</i>
SABINA RIBOLDAZZI	<i>University of Milano Bicocca</i>
MARIO RISSO	<i>Unicusano</i>
ANGELO RIVIEZZO	<i>University of Sannio</i>
FRANCESCO RIZZI	<i>University of Perugia</i>
CRISTIAN RIZZO	<i>University of Torino</i>
RUBINA ROMANELLO	<i>University of Udine</i>
MARCO ROMANO	<i>University of Catania</i>
STEFANIA ROMENTI	<i>Iulm University</i>
STEFANO ROMITO	<i>University of Milano</i>
EMANUELA RONDI	<i>University of Bolzano</i>
PIERFELICE ROSATO	<i>University of Salento</i>
CHIARA ROSSATO	<i>University of Verona</i>
MARCO VALERIO ROSSI	<i>University of RomaTre</i>
ANDREA RUNFOLA	<i>University of Perugia</i>
FRANCESCO RUSSO	<i>University of Catania</i>
IVAN RUSSO	<i>University of Verona</i>
TIZIANA RUSSO SPENA	<i>University of Napoli Federico II</i>
FEDERICA SACCO	<i>University of Pavia</i>
EL ASSAL SAIDA	<i>LUM University</i>
KAROLINA SALLAKU	<i>LUM University</i>
GIADA SALVIETTI	<i>University of Parma</i>
ANDREA SANGERMANO	<i>University of Bergamo</i>

FRANCESCA SANGUINETI	<i>University of Pavia</i>
ERICA SANTINI	<i>University of Trento</i>
SAVINO SANTOVITO	<i>University of Bari</i>
MARIALUISA SAVIANO	<i>University of Salerno</i>
ROSA MARTINA SCHENA	<i>University of LUM</i>
FRANCESCO SCHIAVONE	<i>University of Napoli Parthenope</i>
ROBERTO SCHIESARI	<i>University of Torino</i>
CARMELA ELITA SCHILLACI	<i>University of Catania</i>
MAURO SCIARELLI	<i>University of Napoli Federico II</i>
PAOLA SCORRANO	<i>University of Salento</i>
PETER ŠEDÍK	<i>Slovak University of Agriculture in Nitra</i>
SILVIA RITA SEDITA	<i>University of Padova</i>
FRANCESCA SERRAVALLE	<i>University of Torino</i>
FABIOLA SFODERA	<i>Sapienza University of Roma</i>
PAOLA SIGNORI	<i>University of Verona</i>
RAFFAELE SILVESTRI	<i>University of Bari</i>
FRANCESCA SIMEONI	<i>University of Verona</i>
MARIO SORRENTINO	<i>University of Campania Luigi Vanvitelli</i>
SONIA MARIACARMELA STRANO	<i>University of Messina</i>
LENKA SVAJDOVA	<i>VŠB-Technical University of Ostrava</i>
ANNUNZIATA TARULLI	<i>University of LUM</i>
FRANCESCO TESTA	<i>Sant'Anna School of Advanced Studies, Pisa</i>
MARCO TREGUA	<i>University of Napoli Federico II</i>
ORONZO TRIO	<i>University of Salento</i>
REBECCA TRIVELLI	<i>University of Chieti e Pescara</i>
ANNA MARIA TUAN	<i>University of Bologna</i>
ANNALISA TUNISINI	<i>University Cattolica del Sacro Cuore</i>
GIANLUCA VAGNANI	<i>Sapienza University of Roma</i>
NICOLA VARRONE	<i>University Magna Graecia di Catanzaro</i>
ŠÁRKA VELČOVSKÁ	<i>VŠB-Technical University of Ostrava</i>
DONATA TANIA VERGURA	<i>University of Parma</i>
MASSIMILIANO VESCI	<i>University of Salerno</i>
MILENA VIASSONE	<i>University of Torino</i>
VANIA VIGOLO	<i>University of Verona</i>
FRANCESCO VITELLARO	<i>University of Genova</i>
FILIPPO VITOLLA	<i>University of LUM</i>
AGOSTINO VOLLERO	<i>University of Salerno</i>
ROBERTO VONA	<i>University of Napoli Federico II</i>
SIMONE VONA	<i>University of Chieti e Pescara</i>
CLODIA VURRO	<i>University of Milano</i>
ALESSANDRA ZAMPARINI	<i>University della Svizzera Italiana</i>
LORENZO ZANNI	<i>University of Siena</i>
CRISTINA ZERBINI	<i>University of Parma</i>
CRISTINA ZILIANI	<i>University of Parma</i>
ANTONELLA ZUCHELLA	<i>University of Pavia</i>

To the reader,

this volume contains the long papers of the Sinergie-SIMA 2024 Management Conference, hosted by the University of Parma on June 13<sup>th</sup> and 14<sup>th</sup> 2024.

Theory and practice in the field of management have been challenged by the emergence of sustainability and well-being as major global policy priorities. Both sustainability and well-being are complex, value-laden, and strongly interconnected; however, they tend to exist in separate realms.

Sustainability literature has recorded an evolution in the way the concept of sustainable development is understood, leading to the articulation of sustainable development as human “well-being” and “flourishing”, rather than “needs”. Nevertheless, some scholars have pointed out a lack of clarity in the conceptualization, which causes some ambiguity in terms of definition (Ronen & Kerret, 2020). Kjell (2011) observed that human needs and well-being are poorly understood, characterized, and developed by sustainability research. Along the same vein, Helne & Hirvilammi (2015) observed that the overarching goal of sustainable development (i.e., well-being) has often been narrowly interpreted, mainly in economic terms, while connections between the natural environment and human flourishing have been overlooked. More recently, O’Mahony (2022) remarked that the literature conceptualizing human well-being continues to exist largely outside sustainable development. Hence, placing well-being more clearly within the sustainability framework could be highly beneficial to sustainability.

Concurrently, the literature on well-being is almost entirely dissociated from the contributions of nature or the relationships with ecological and planetary systems (Roberts et al., 2015), and the importance of social dimensions is an emergent conclusion. Therefore, the rationale of contextual systems inherent to sustainability research (incorporating views of times, society, and biosphere) could significantly enrich well-being research, fostering a more holistic perspective on well-being and an increased awareness of the limits of individual well-being pursuits (Kjell, 2011).

In brief, though well-being has major implications for sustainable development and vice versa, the body of literature that effectively integrates sustainability and well-being remains in an embryonic stage.

The above considerations aim to act as catalysts for an interdisciplinary debate within the field of management. Enriching the conception of flourishing well-being in sustainability and the contribution of nature to well-being can produce impactful scientific research, as O’Mahony (2022) points out. Equally important is the analysis of the links between sustainability and well-being, encompassing synergies and trade-offs at the organizational level, in value chains, and in interactions with stakeholders across various industries.

The Sinergie-SIMA 2024 Management Conference welcomed contributions based on different theories, methodological approaches, and units of analysis with the potential to empower a transformation for flourishing individuals, society, and the natural world alike. More precisely, the Conference was a great occasion to discuss the research efforts of our research community within tracks related to the:

- Conference theme (Management of sustainability and well-being for individuals and society),
- SIMA thematic groups (Entrepreneurship, Innovation & Technology Management, Intelligenza manageriale nel management, International Business, Marketing, Purpose-driven Businesses, Retailing & Service Management, Small & Family Business, Strategic Communication, Strategy & Governance, Supply Chain Management, Logistics & Operations, Sustainability, and Tourism & Culture Management),
- special tracks (Examining the social and environmental relevance of sustainable digital business models: Impact on business practices and consumers, Growing resilient Italian SMEs, and Perspectives on grand challenges in international business and implications for companies),
- Management Case Studies.

The Conference call for papers gave the opportunity to submit either short and long papers. Overall, the editorial staff received 277 submissions of which 215 short papers and 62 long papers.

For the *short and long papers*, the evaluation followed the peer review process, with a double-blind review performed by, respectively, one or two referees - university lecturers and experts about the topic - selected among SIMA and the community of Sinergie members.

In detail, the referees applied the following criteria to evaluate the submissions:

- clarity of the research aims,
- accuracy of the methodological approach,
- contribution in terms of originality/innovativeness,
- theoretical and practical contribution,
- clarity of communication,
- significance of the bibliographical basis.

The *peer review* process resulted in full acceptance or rejection of the submissions. In the case of disagreement among reviewers' evaluations, the decision was taken by the Chairs of the SIMA thematic groups or conference track. Each work was then sent back to the Authors together with the referees' reports. The suggestions received by the referees were used by the Authors during the presentation of their research works at the Conference.

The evaluation process ended with the acceptance of 211 short papers and 58 long papers. This volume proposes the papers whose Authors have authorized their publication.

All the long papers published in this volume were presented and discussed during the Conference and published online on the web portal of Sinergie-SIMA Management Conference (<https://www.sijmsima.it/>).

While thanking all the Authors, Chairs, and participants, we hope that this volume will contribute to advance knowledge about the management of sustainability and well-being for individuals and society.

The Conference Chairs

*Guido Cristini, Beatrice Luceri, Arabella Mocciaro Li Destri, and Marta Ugolini*

# SUMMARY

## Track 1 - Entrepreneurship

<i>Empowering Student Innovators: Framing Entrepreneurship Education in Europe</i> CHIARA BARTOLI, FEDERICA BRUNETTA, CHRISTIAN LECHNER	PAG.	3
<i>Entrepreneurial Education as a transition driver from informal to formal entrepreneurship in complexity context: the AWE program.</i> FABIO GRECO, FRANCESCO CARIGNANI, FRANCESCO BIFULCO	“	11
<i>Fostering Entrepreneurial Thinking: Analysing the Drivers and Impact of Entrepreneurship Education</i> DARIO PEIRONE, JUDY YUEH LING SONG	“	17
<i>Students' entrepreneurial intentions among personal and contextual factors: a pilot study exploring the role of emotions.</i> ROSSELLA BARATTA, PIERMATTEO ARDOLINO, DIEGO BELLINI, SERENA CUBICO, FRANCESCA SIMEONI	“	23
<i>Social Entrepreneurship and Sustainability. How can challenge-based learning impact students' entrepreneurial skills and challenge providers' problems?</i> ALESSANDRA SCROCCARO	“	31
<i>Humane entrepreneurship and the circular economy: an empirical investigation.</i> MASSIMILIANO VESCI, ROBERTA DE ANGELIS	“	33
<i>Is Passion a Driver of Sustainable Entrepreneurship? An Autobiographic Analysis of Fashion Entrepreneurs</i> CECILIA PASQUINELLI, SERENA ROVAI, MATILDE MILANESI, SIMONE GUERCINI	“	39
<i>Social Innovation: a literature review mapping intellectual structure of the field.</i> LORENA GONZALEZ, ELENA CASPRINI	“	45
<i>Inter-organizational knowledge transfer in Open Innovation Ecosystems: the case of Eni's territorial initiative</i> GIORGIO DI FIORE	“	51
<i>Empowering Digital Entrepreneurship: Regulatory Governance in Platform Ecosystems</i> MUHANAD HASAN AGHA, VLADIMIR KOROVKIN, SVETLANA MIRONYUK	“	57
<i>The Governance of Entrepreneurial Ecosystems: Ecosystem Manager or Ecosystem Act?</i> GABRIELE IANIRO, MICHELE MODINA	“	59
<i>A comprehensive exploration of the knowns and unknowns of Private Equity Secondary Markets</i> MICHELE LERTORA, CRISTINA DE SILVA, MARGHERITA MIETTO, ANNA GERVASONI	“	63
<i>Unveiling The Pitfalls Of Entrepreneurial Team Diversity: Insight From A Post-Mortem Analysis of Failed Start-Ups</i> ADELE PARMENTOLA, MICHELE COSTAGLIOLA DI FIORE	“	69
<i>Agility to Handle Dynamics of Business Transformation</i> GIUSEPPE PIRRONE, MARGHERITA MILOTTA, BIRGIT HAGEN, MARTIN CLOUTIER	“	75
<i>Venture-Builders' Program Design and the creation of Scaleups</i> PAOLA BELINGHERI, CHRISTIAN LECHNER	“	83
<i>Entrepreneurial Ecosystems: exploring the Italian Tech Scaleups scenario</i> SERENA VALENTE, ALESSIA PISONI	“	89
<i>Innovazione e imprenditorialità femminile nelle PMI: un'analisi fuzzy dei driver della performance</i> LUDOVICA ANTENOZIO, DANIELA DI BERARDINO	“	97

## Track 2 - Innovation & Technology Management

<i>Beyond Words: Leveraging Language for Strategic Decision-Making in Innovation.</i> MARIA RUCSANDRA STAN, FRANCESCA DI PIETRO, FRANCESCA CAPO	PAG.	105
<i>Combining innovation and business networks for resource mobilization in the meat sector: a case study</i> ALESSANDRO PAGANO, ELISA CARLONI	“	111
<i>The role of purpose in digital companies: a study on Exponential Organizations</i> FRANCESCO DERCHI, NICOLETTA BURATTI, FRANCESCO VITELLARO	“	115
<i>Data Value Chain and Data Ecosystem through digital and traditional tools</i> LORIS SANTARELLI, FEDERICA CECI, MARIANNA SGAMMOTTA	“	123
<i>Web 3.0: il punto di vista dei manager sulle opportunità e le sfide del Metaverso e degli NFT</i> CHIARA BARTOLI, FRANCESCO FASANO, FRANCESCO CAPPÀ, PAOLO BOCCARDELLI	“	129
<i>Fostering high-impact innovation: empirical evidence in Europe</i> VALERIA SCHIFILLITI, ELVIRA TIZIANA LA ROCCA, MAURIZIO LA ROCCA	“	135
<i>Innovation in I4.0 and firms performance in Italy</i> FRANCESCO CAPONE, NICCOLÒ INNOCENTI, LEONARDO MAZZONI, LUCIANA LAZZERETTI	“	141
<i>The “5Vs” of Big Data and the Propensity to Generate Patents with Big Data Technologies in SMEs</i> ENRICO MARCAZZAN, SAVERIO BARABUFFI, GIULIO FERRIGNO, ANDREA PICCALUGA	“	147
<i>How WEIRD is Social Innovation?</i> JORDANA RECH GRACIANO DOS SANTOS, IAN MCCARTHY	“	153
<i>Open Innovation search strategies and Innovation performance: differential moderating effects of Big Data Characteristics</i> GIULIO FERRIGNO, SAVERIO BARABUFFI, ENRICO MARCAZZAN, ANDREA PICCALUGA	“	161
<i>The role of digital platforms in the university exchange of knowledge: the case of Knowledge Share</i> MARIAPIA CUTUGNO, TINDARA ABBATE, FABRIZIO CESARONI	“	167
<i>The measure of digital maturity</i> DARIO RUSSO, PIERO DEMETRIO FALORSI, FEDERICO CARDONE	“	171
<b>Track 3 - International Business</b>		
<i>Exploring the impact of cybersecurity on digital export: evidence from food industry</i> GIOVANNA TERRIZZI, ALBA MARINO, MARIA CRISTINA CINICI, DANIELA BAGLIERI	“	181
<i>Industry 4.0, Sustainability, and Internationalization: A Systematic Literature Review</i> MARTINA TOMASETIG	“	189
<i>The advantage of stateness abroad: an analysis of the social networks of state-owned enterprises</i> GABRIELE GALLI, ROBERTO URBANI	“	197
<i>La strategia ‘grab and go’: intuizioni teoriche preliminari e possibili implicazioni</i> MARTINA CASTRONOVO, ANNA MINA’, PAQUALE MASSIMO PICONE	“	205
<i>L’imprenditorialità femminile migrante nei business familiari</i> GIULIO PALMAS, MICHELA FLORIS	“	211
<i>When algorithms help cross-cultural management educators: a proposed supportive tool</i> BICE DELLA PIANA, FRANCESCO DI VINCENZO, CHIARA SIGNORE, MARIO TREROTOLA	“	217
<i>Decoding the future: entrepreneurial visions on AI’s role in international strategic decisions</i> BARBARA FRANCONI, ALICE AIUDI, YULIIA KYRDODA, SIMONA AMERIO	“	225

#### Track 4 - Management Case Studies

<i>A Public Service Logic perspective applied to health and social welfare services provided to the elderly: the case of the VIII Municipality of Rome</i> MAGDA TOUTI, FABIOLA SFODERA, LUCA DEZI	PAG.	233
<i>Interpreting long-lasting corporate crises according to stakeholders' perspective: evidence from the ILVA experience</i> SILVIA COSIMATO	“	239
<i>Knowledge sharing and learning through face-to-face and digital tools</i> LORIS SANTARELLI, FRANCESCA MASCIARELLI	“	245
<i>How do stakeholders perceive the impacts of Nature-based solutions? An Italian case study for coastal restoration and climate change adaptation</i> GIORGIA CONDOMITTI, MARIA ROSA DE GIACOMO, SARA TESSITORE, MARCO FREY	“	251
<i>Una ipotesi di formalizzazione markoviana della dinamica delle unità operative nei cambiamenti organizzativi di ENEL S.p.A.</i> MARIO BRUNETTI, GIANLUCA VAGNANI	“	259
<i>Empowering women workforce in steel production: A case study on implementing Diversity, Equity and Inclusion (DEI) initiatives</i> LAURA TOLETTINI, ELEONORA DI MARIA, EMILIA FILIPPI, LETIZIA LO PREIATO, MARIAASOLE BANNÒ	“	265
<i>La trasformazione organizzativa di Autostrade per l'Italia: verso la strategic agility nell'era delle policrisi</i> PAOLO BOCCARDELLI, ROBERTO TOMASI, CHIARA BARTOLI, MARIA LORENZA GERARDI	“	273
<b>Track 5 - Management of sustainability and well-being for individuals and society</b>		
<i>Happiness and emotions at work in organizational relationships. The role of affectivity and empathy for meta-organizational and nonhierarchical solutions in the resilient firm</i> LUCIANO PILOTTI	“	283
<i>The shortage of skilled personnel in the transition from Industry 4.0 to Industry 5.0: Impacts and challenges in the machine tool industry</i> ELEONORA BIGLIA, MONICA CUGNO, REBECCA CASTAGNOLI	“	289
<i>Additive manufacturing: tecnologie umane e sostenibili per il benessere degli individui e della società</i> GIUSEPPE BONGIORNO, MARIACARMELA PASSARELLI, MICHELA SANGUEDOLCE, LUIGINO FILICE, ALFIO CARIOLA	“	297
<i>Well-being in the transition from Industry 4.0 to Industry 5.0</i> MICHELA PICCAROZZI, FEDERICA CABONI, ROBERTO BRUNI	“	303
<i>Employee well-being in the era of hybrid work: In search of sustainability for organizational members</i> ALFONSA BUTERA, ALESSANDRA MAZZEI, SILVIA RAVAZZANI	“	311
<i>Navigating Transformative Service Research for individual and social well-being: A comprehensive review</i> MARIA DELLA LUCIA, ERICA SANTINI, MUHAMMAD JUNAID SHAHID HASNI	“	317
<i>Le App di food sharing tra benefici individuali e ambientali: ascolto delle conversazioni online degli utenti su Too Good To Go.</i> SILVIA BELLINI, CRISTINA ZERBINI, DONATA TANIA VERGURA, BEATRICE CECCOLI	“	325
<i>Well-being as a key for sustainable and long-term oriented management</i> DARIO NATALE PALMUCCI, GABRIELE SANTORO	“	331
<i>The role of the enterprise in the pursuit of the well-being for citizens and society. The contribution of the Italian Schools of Enterprise Economics and Management</i> SILVIA BRUZZI	“	335



<b><i>The strength of Nutriscore in improving sustainable eating habits and well-being: bad and good news</i></b> ORNELLA BONAFEDE, CARMELA D'AGOSTINO, ANDREA BAZZANI, GIUSEPPE TURCHETTI, LEOPOLDO TRIESTE	PAG.	341
<b><i>Does organic food consumption impact subjective well-being? A mediation-moderation approach</i></b> CELSO AUGUSTO DE MATOS, MARLON DALMORO, MARCIA DUTRA DE BARCELLOS	“	347
<b><i>An improved framework for social sustainability: a bottom-up approach to boost social innovation and sustain employability</i></b> GIUSY SICA, ALESSANDRA MICOZZI, MARIA ANTONELLA FERRI, MARIA PALAZZO	“	353
<b><i>Knowledge, self-perception and eco-sustainable behaviours. Inspiring actions in green learning</i></b> ADRIANA APUZZO, RITA KLAPPER, MARIALUISA SAVIANO, MARIO TESTA	“	361
<b><i>Understanding the link among cultural participation, resilience, and well-being. A systematic literature review.</i></b> GIORGIA MASILI, DANIELE BINCI	“	369
<b><i>Shaping tomorrow's sustainable enterprises: profiling the hard and soft skills of sustainable managers</i></b> GIULIA NEVI, GIULIA GOGIALI, GIANPAOLO BASILE, LUCA DEZI, CARMELA GUITTO	“	375
<b>Track 6 - Marketing</b>		
<b><i>Virtual influencers in tourism marketing: insight or oversight? The case of “Open to Meraviglia”</i></b> RADA GUTULEAC, GABRIELE BAIMA, CRISTIAN RIZZO	“	383
<b><i>Mitigating the Negative Effects of Human-like Virtual Medical Agents on Patients' Emotions. Results From A Preliminarily Experimental Study</i></b> ANDREA SESTINO, ALFREDO D'ANGELO, RUSSELL W. BELK	“	389
<b><i>Scaling Consumer Neuroscience Technologies for Individual and Societal Well-Being. A Bibliometric Analysis of Precursors.</i></b> ANDREA BAZZANI, GIORGIO MANFRONI, UGO FARAGUNA, GIUSEPPE TURCHETTI	“	393
<b><i>Unveiling the Dynamics of GPT Technology Adoption: Assessing Trust in Technology and Self-Efficacy's Influence on Consumer Behavior</i></b> FRANCESCA CELIO, FRANCESCO RICOTTA	“	403
<b><i>Investigating Consumer Perceptions of Brand Personality and Reactions in the Automotive Industry by ChatGPT</i></b> ALESSANDRO SIGNORINI, ALESSANDRO FERI, ANGELO BACCELLONI, ELISA PUVIA	“	409
<b><i>Understanding the potentialities of metaverse for marketers. Insights from Italy</i></b> MICHELE SIMONI, ANNARITA SORRENTINO, LUCA VENTURINI, MYRIAM CARATU	“	419
<b><i>“The influence of individual values on purchase intention of fair-trade products: An analysis on Italian consumers”</i></b> NOHAILA KARTTI, GIUSEPPE FRANZESE, CHIARA CANNAVALE	“	425
<b><i>The story that only circular products can tell: Empowering consumers through background information</i></b> SHRIPATHY SWAMINATHAN, VINICIO DI IORIO, FRANCESCO TESTA	“	431
<b><i>Reshaping customers' lifelong journey in the health and wellness contexts</i></b> LAURA GRAZZINI, SABINA DE ROSIS, RAFFAELE FRUSTACI, VALENTINA SBROLLI, GAETANO AIELLO	“	445
<b><i>A Well Mind, A Wise Choice: A Systematic Review of Wellness and its Influence on Food Decision-Making</i></b> SIMONA DEL CORE, ALESSIO DI LEO, FABIOLA SFODERA, NICCOLÒ PICCIONI	“	451
<b><i>Taste-Makers Narratives: Analyzing the Effect of Food Influencers on Home Cooks</i></b> FRANCESCO SMALDONE, GIADA MAINOLFI	“	457

<b><i>Building a Better Future: The University Activism for Societal Wellbeing</i></b>	PAG.	463
ANTONELLA CAMMAROTA, FRANCESCA AVALLONE, VITTORIA MARINO, RICCARDO RESCINITI		
<b><i>L'integrazione del Metaverso negli eventi: impatto sugli SDG's e prospettive future</i></b>	“	469
FRANCESCA IGINI, ARTURO CAFARO, MARIO CALABRESE		
<b><i>The impact of sustainability and country-of-origin on consumers' willingness-to-pay for a brand: A conceptual framework</i></b>	“	477
CHIARA SCRIMIERI, ADAMANTIOS DIAMANTOPOULOS, MICHELA MATARAZZO, ALBERTO PASTORE		
<b><i>Conceptualizing perceptions of institutionally derived maneuverable space for value (co)creation.</i></b>	“	483
JIMMIE RÖNDELL, PETER EKMAN		
<b><i>Narrating the past. Exploring the antecedents of the use of heritage marketing tools by centenarian Italian companies</i></b>	“	489
ANGELO RIVIEZZO, GIUSY MIGNONE, ANTONIO LUCADAMO, MARIA ROSARIA NAPOLITANO		
<b><i>Examining Healthy Food Consumption Among People Over 60 years</i></b>	“	495
VINCENZO GISSI, ELISABETTA SAVELLI		
<b><i>The new dimension of brand in 'metaverse': a structured literature review</i></b>	“	503
KAROLINA SALLAKU, DOMENICO MORRONE, ANNUNZIATA TARULLI		
<b><i>Delving into sustainability and Made in Italy fashion brands: Perspectives from Generation Z</i></b>	“	509
FEDERICA CECCOTTI, SARA BOCCALINI, MICHELA PATRIZI, MARIA VERNUCCIO, ALBERTO PASTORE		
<b><i>Drinking with eyes: how colors elicit consumers' taste expectations of coffee</i></b>	“	517
DANIELE PORCHEDDU, RAFFAELE CAMPO, PIERFELICE ROSATO, FABRIZIO PIU		
<b><i>Aging and social influence: An empirical investigation of the effect of age on consumers' susceptibility to word of mouth</i></b>	“	523
ALESSANDRO M. PELUSO, ANTEA GAMBICORTI, GIOVANNI PINO, MIHAELA GIANNELLI		
<b><i>The rise of Phygital Reality: insights from Structural Topic Modelling</i></b>	“	529
DANIELE VIRGILLITO, FRANCESCO RUSSO, ALESSIA MUNNIA, MARCO ROMANO		
<b><i>Exploring the Metaverse from the consumer perspective: insight from a systematic literature review.</i></b>	“	535
MARCO FERRETTI, MARIA ANTONELLA FERRI, GIUSEPPE LA RAGIONE, MARIA PALAZZO, FRANCESCO PAROLA, MARCELLO RISITANO		
<b><i>Fifty Shades of Black Friday</i></b>	“	541
FRANCESCA NEGRI, ALESSANDRO IUFFMANN GHEZZI		
<b>Track 7 - Purpose-driven Businesses</b>		
<b><i>Entrepreneurial Ecosystem and Proximity: a framework for Social Ecosystem Development</i></b>	“	549
RICKY CELENTA, VALENTINA CUCINO, ROSANGELA FEOLA, CHIARA CRUDELE		
<b><i>Purpose-driven Clusters in the Era of Sustainability</i></b>	“	555
MICHELE SIMONI, MARIA CRISTINA PIETRONUDO, EVA PANETTI		
<b><i>The Power of Interactions. Exploring Stakeholder Adoption of pro-social practices from purpose-driven companies</i></b>	“	561
MARTINA TAFURO, ANDREA PICCALUGA		
<b><i>B-Corp: un esame delle aziende alimentari Italiane attraverso la Teoria dei Segnali</i></b>	“	567
NORA ANNESI, VALENTINA CUCINO		
<b><i>Individuals' Goal Alignment in Humane Entrepreneurial Oriented Organisations: A Preliminary Study</i></b>	“	573
CHIARA MARINELLI, GRAZIA GARLATTI COSTA, SALVATORE DORE		

<i>Open Social Innovation per affrontare le sfide globali: il caso Isinnova</i> VALENTINA CUCINO, ROSANGELA FEOLA, GIULIO FERRIGNO	PAG.	581
<b>Track 8 - Retailing &amp; Service Management</b>		
<i>The effect of entrepreneurial and customer orientations on shopper loyalty: an explorative study on small independent retailers</i> ALICE MANTOVANI, LARA PENCO, SANDRO CASTALDO	“	589
<i>Ensuring customer satisfaction and loyalty of online health and well-being: a comparison study across types of services</i> GIADA SALVIETTI, SILVIA RANFAGNI, DANIO BERTI	“	597
<i>Digital Transformation in the Italian Restaurant Industry: Navigating the Challenges and Opportunities of Food Delivery Services</i> ALBERTO SUSCO, DAVIDE CANAVESIO, MONICA CUGNO	“	605
<i>Exploring Metaverse Adoption in High-Involvement Purchases: Insights from field research</i> BEATRICE LUCERI, SIMONE AIOLFI, GIOVANNI ROMANO	“	611
<i>Word of mouth vs. word of machine: a preliminary analysis</i> GRAZIANO ABRATE, VALERIA FARALLA	“	619
<i>Promoting (un)conscious purchasing behaviors and choices in favor of sustainability</i> SILVIA BELLINI, CHIARA BACCHILEGA, DAVIDE PELLEGRINI, SIMONE AIOLFI	“	623
<i>The Family Caregiver Experience in Palliative Care Pathways: Development and Validation of a Multidimensional Approach</i> MARZIA CETTINA SEVERINO, COSTANZA GALLI, SABINA DE ROSIS	“	629
<i>Balancing Act: The Impact of Product-Oriented Sustainability Information on Consumer Responses</i> VALENTINA MAZZOLI, LAURA GRAZZINI, AULONA ULQINAKU	“	635
<i>Catalysing Sustainability: Retailers as Driving Platforms in the Food Industry's Transition</i> ALBERTO MASSACCI, ELENA CASPRINI, LORENZO ZANNI	“	641
<i>The right kiosk across different generations! A quantitative study in the retailing food sector</i> LUCA CORINALDESI, GENNARO IASEVOLI, CHIARA OTTOLENGHI	“	649
<i>Retail Internationalization and Innovation: systematic literature review</i> MICHELE BADOLATO	“	655
<b>Track 9 - Small &amp; Family Business</b>		
<i>Dynamics of Change: A Comparative Analysis of Commitment in Family vs. Non-Family Businesses</i> ROBERTA PINNA, MICHELA FLORIS, FABIO CORONA, GIANFRANCO CICOTTO, CINZIA DESSI	“	673
<i>Exploring the dynamics of external knowledge acquisition in family businesses: factors, constraints, and success indicators</i> GERARDO BOSCO, ALESSIA SCIARRONE, RAFFAELE D'AMORE, DAVIDE LIBERATO LO CONTE, MARIO CALABRESE	“	679
<i>Tradition in Transition: Exploring Organizational Dynamics and Strategies in Small Hotels</i> MARCO CORSINO, DAVIDE BAGNARESI, FRANCESCO MARIA BARBINI	“	685
<i>Whispers of Ambition: Unpacking Emotions in Entrepreneurial Orientation of Women-Led Family Businesses</i> MICHELA FLORIS, ANGELA DETTORI, RICHA GOEL, TILOTTAMA SINGH	“	691

<b><i>The impact of board gender diversity on family firms' value: the mediating role of environmental innovation</i></b>		
FRANCESCO GANGI, MARIA COSCIA, LUCIA MICHELA DANIELE, NICOLA VARRONE	PAG.	699
<b><i>The digital transformation process of SMEs to compete in the current business environment: evidence from an Italian case</i></b>		
GINEVRA TESTA, ANDREA CIACCI, LARA PENCO	“	707
<b>Track 10 - Strategic Communication</b>		
<b><i>Millennials and Bookfluencers: a cross cultural analysis</i></b>		
LINDA GABBIANELLI	“	715
<b><i>The impact of communicating food safety on communication goals: an exploratory study in Agri-food firms from the entrepreneurial perspective</i></b>		
EMANUELA CONTI, DANIELE GIAMPAOLI, FRANCESCA CESARONI, TONINO PENCARELLI	“	721
<b><i>Leveraging Italianness abroad: A corpus-assisted discourse approach to restaurant branding</i></b>		
WALTER SPEZZANO, STEFANO DE CANTIS, JOHN D. BUSCHMAN	“	727
<b><i>Testing controversial advertising effects on brand associations: first insights from an affective priming pilot experiment</i></b>		
FRANCESCA SAMMARTINO, FRANCESCA CONTE, SIANO ALFONSO	“	733
<b><i>Strategic Agility in Error Management: Bridging Theory and Practice in Strategic Communication</i></b>		
MARCO BALZANO	“	741
<b>Track 11 - Strategy &amp; Governance</b>		
<b><i>Do executive actions reflect their personality traits?: A review of organizational misconduct</i></b>		
PIERLUIGI GIARDINO, ANDREA CAPUTO	“	749
<b><i>Governing Micro-Municipalities: A Literature Review</i></b>		
MATTEO CRISTOFARO, NICOLA CUCARI, ANTONELLA MONDA, DAVIDE LIBERATO LO CONTE, ANASTASSIA ZANNONI, LEUL GIRMA, PINALBA SCHILLECI, FRANCESCO LAVIOLA, SIMONA MARE	“	757
<b><i>Uno strumento di Governance ESG integrata per una strategia aziendale sostenibile</i></b>		
ILENIA CEGLIA, MASSIMO BATTAGLIA, NORA ANNESI, FRANCESCO MERCURI	“	765
<b><i>Does female corporate leadership improve environmental performance? A systematic literature review</i></b>		
MARIA ROSA DE GIACOMO, MARCO FREY	“	771
<b><i>The Geography of Innovation: The Phenomenon of Urban Clustering in the Fashion Industry</i></b>		
ALESSIO TRAVASI, FABIO MUSSO	“	777
<b><i>Strategic analysis of IRCCSs' sustainability management</i></b>		
PAOLA OLIMPIA ACHARD, CHIARA BELLINI, LEONARDO IOANNUCCI	“	783
<b><i>The role of HR analytics to Enable Strategic HR management in SMEs</i></b>		
CHRISTIAN DI PRIMA, ALBERTO FERRARIS	“	791
<b><i>Trick or Treat: Firm's strategic response to temporary shock in the real estate business</i></b>		
ALBERTO MASSACCI	“	795
<b>Track 12 - Supply Chain Management, Logistics &amp; Operations</b>		
<b><i>Who Should Pay for the Returns Product? The Effect of Transparency on Consumers' Decision-making across the Reverse Supply Chain.</i></b>		
BENEDETTA BALDI, NADJA VORONTSOVA, IVAN RUSSO, THOMAS J. GOLDSBY	“	805

<b><i>Modern slavery in mining supply chains: the role of social enterprises and the institutional context</i></b>	PAG.	811
FRANCESCO GHEZZI, FABIO IANNONE, FRANCESCO RIZZI, ELEONORA ANNUNZIATA, MARCO FREY		
<b><i>Triadic literature in sustainable supply chain management: paving the way</i></b>	“	817
CHIARA SGUIZZARDI, IVAN RUSSO, ILENIA CONFENTE		
<b><i>Logistics services providers in humanitarian logistics. A bibliometric and systematic literature review.</i></b>	“	823
FRANCESCA CELIO, ALESSANDRA COZZOLINO		
<b><i>Eco-packaging innovations in paper and cardboard. Preliminary insights from cognitive mapping on international projects</i></b>	“	831
ALESSANDRA COZZOLINO, PIETRO DE GIOVANNI		
<b><i>Strategic reshoring: redefining competitiveness in global markets</i></b>	“	837
SIMONE LUONGO, VALENTINA DELLA CORTE, ENRICO DI TARANTO		
<b><i>Unpacking the “truce” in Sales and Operations Planning routine. An ethnographic study</i></b>	“	843
DAVIDE BONFIO, ANDREA FURLAN		
<b><i>Which governance strategy is best for specialized investments? Insights from the weaker partner’s perspective</i></b>	“	849
EMANUELA DELBUFALO		
<b><i>Decarbonizing Last-Mile Delivery: a study on crowdsourced delivery incentives</i></b>	“	855
SILVIA BLASI, SARA TONIOLO		
<b><i>Managing critical raw materials in energy transitioning supply chains: a Resource Dependence theoretical perspective on supply chain management capabilities</i></b>	“	861
VITTORIO MARIA GARIBBO, FRANCESCO GHEZZI, ELEONORA ANNUNZIATA, FRANCESCO RIZZI, MARCO FREY		
<b>Track 13 - Sustainability</b>		
<b><i>The rebound effect of responsible consumption: an explorative research on sharing economy consumers</i></b>	“	869
VERONICA CAPONE, CECILIA GRIECO		
<b><i>Greenwashing Temptation: A Critical Examination of the Legal Approach against Greenwashing</i></b>	“	875
LUCIA GATTI, FEDERICA BUFFA, UMBERTO MARTINI		
<b><i>Harnessing collective bargaining for fostering sustainability and competitiveness: fact or fiction?</i></b>	“	881
CHIARA DE BERNARDI, NICCOLÒ MARIA TODARO, MARIA ROSA DE GIACOMO, MARCO FREY		
<b><i>Understanding Corporate Social Responsibility Scepticism: Implications and Insights from the Literature</i></b>	“	887
RONGTITYA RITH, RICCARDO SPINELLI		
<b><i>Il ruolo degli intermediari nella Simbiosi Industriale: il caso Regusto</i></b>	“	893
CHIARA PALAGONIA, GAELLE COTTERLAZ-RANNARD, CAROLINE MATTELIN-PIERRARD, LAURA MICHELINI		
<b><i>L’industria del calcio tra sostenibilità finanziaria e nuove dimensioni tecnologiche</i></b>	“	899
ANNABELLA CONTURSO, ROBERTO DE RENZI, PIETRO TARAGONI, MARIO RAMAGLIA		
<b><i>Rivelare il potenziale nascosto della natura: il ruolo del management nelle public policy per la biodiversità</i></b>	“	907
JACOPO CRICCHIO, VALENTINA CUCINO, ANDREA PICCALUGA, ALBERTO DI MININ		
<b><i>A explorative analysis on the impact of ESG and ESG ‘s controversies on corporate performance</i></b>	“	913
SALVATORE ESPOSITO DE FALCO, ANTONIO RENZI, ESTELINA DALIPI, GIANLUCA VAGNANI, FRANCESCA RAMAGLIA		
<b><i>Aligning with the Sustainability Promise in ESG investing: A case study on employees’ ESG readiness</i></b>	“	921
HELENA LIEWENDAHL, KRISTINA HEINONEN, TERESIA STIGZELIUS, CATHARINA EHRNROOTH		

<b><i>Food Waste and Out-of-Home Consumption Patterns: Unravelling the Actual Consumption Behavior of Food Taken Away and Consumed at Home</i></b>	PAG.	929
LUDOVICA PRINCIPATO, CAMILLA COMIS, LUCA SECONDI, MENGTING YU, CLARA CICATIELLO		
<b><i>The role of Paradox mindset on the intention to implement Industrial Symbiosis: linking Paradox Theory and Theory of Planned Behavior</i></b>	“	935
ALICE ALOSI, CARINA KELLER, ELEONORA ANNUNZIATA, FRANCESCO RIZZI, KARIN KREUTZER, MARCO FREY		
<b><i>Managing the business and biodiversity relationship: a Systematic Review</i></b>	“	941
SARA TESSITORE, FRANCESCO TESTA, NICCOLÒ MARIA TODARO, DUCCIO TOSI, VINICIO DI IORIO		
<b><i>The role of biodiversity for business and social innovation</i></b>	“	949
MAURO CAPESTRO, STEFANO DENICOLAI		
<b><i>How do Dynamic capabilities, Ecosystems and Green innovations contribute to the creation of a Net Zero Path? Insights from Italian wine sector.</i></b>	“	957
RITA MURA, FRANCESCA VICENTINI, LUCIANO FRATOCCHI, LUDOVICO MARIA BOTTI, MARIA VINCENZA CHIRIACÒ		
<b><i>Linking innovation and sustainability through equity-based crowdfunding campaigns. A focus on cultural and creative industries</i></b>	“	963
CRISTINA CATERINA AMITRANO, CIRO TROISE		
<b><i>Product vs sales platform sustainability: who wins the online challenge? An exploratory analysis of Italian consumers</i></b>	“	969
ANNUNZIATA TARULLI, DOMENICO MORRONE, DANIELE RUTIGLIANO, KAROLINA SALLAKU, RAFFAELE SILVESTRI		
<b><i>Driving corporate social responsibility: examining the impact of diversity and inclusion across multiple levels</i></b>	“	975
CHIARA LEGGERINI, MARIASOLE BANNÒ		
<b><i>From Dominance to Responsibility. The integration of Corporate Social Responsibility in Chaebol's Corporate Governance</i></b>	“	981
CINZIA DESSI		
<b><i>Sustainability Alignment in Cross-Border Collaborations: Dynamics, Challenges and Limits</i></b>	“	987
DAVIDE LIBERATO LO CONTE, SAQIB SHAMIM, GIUSEPPE SANCETTA		
<b><i>Sustainable and innovative practices in foodstuffs domain: the impact on consumer's perceptions and dispositions</i></b>	“	995
VERONICA MAROZZO, ALESSANDRA COSTA, TINDARA ABBATE, AUGUSTO D' AMICO		
<b><i>Evolution of Sustainable Reporting: Impacts and Prospects of CSRD Regulation</i></b>	“	1003
DAVIDE LIBERATO LO CONTE, RAFFAELE D' AMORE, GERARDO BOSCO, ALESSIA SCIARRONE, MARIO CALABRESE		
<b><i>Greening the culinary scene: environmental management initiatives in restaurant sustainability</i></b>	“	1011
SIMONE LUONGO, VALENTINA DELLA CORTE, FABIANA SEPE, GIOVANNA DEL GAUDIO		
<b><i>Perceived authenticity of green influencers: An experiment on components and determinants</i></b>	“	1017
STEFANO ROMITO, GAIA GIAMBASTIANI, CLODIA VURRO		
<b><i>roblematicizing on the three main pillars of sustainability from a paradox theory perspective</i></b>	“	1023
ALICE ALOSI, VINICIO DI IORIO		
<b>Track 14 - Tourism &amp; Culture Management</b>		
<b><i>The evolution of sustainability discourses in online reviews: an investigation of the impact of triple bottom line dimensions on tourists' eWOM and destination satisfaction.</i></b>	“	1031
DAVID D' ACUNTO, SERENA LONARDI, ILENIA CONFENTE		

<i>Generazione Z e percezione delle sostenibilità nella scelta del servizio alberghiero</i> DANIELE GRECHI, ROBERTA MINAZZI	PAG.	1037
<i>Data-driven Strategic Process in the Hospitality Industry: Studying Hotel consumers' purchase intention through web analytics.</i> GIUSEPPINA LO MASCOLO, GABRIELLA LEVANTI, MARCELLO CHIODI, ARABELLA MOCCIARO LI DESTRI	“	1045
<i>Unveiling Museums' Online Reputation. The Case of the Uffizi Galleries</i> PAOLA BECCHERLE, LUCIANA LAZZERETTI, STEFANIA OLIVA	“	1053
<i>Cruise ship size and public perception: An explorative study on X</i> GINEVRA TESTA, GIORGIA PROFUMO	“	1059
<i>The motivations behind religious and spiritual tourism: an empirical investigation on Assisi visitors</i> FRANCESCA RIVETTI, SIMONE SPLENDIANI, MAURO DINI	“	1067
<i>Industrial tourism in Italy: a spatial analysis of regional patterns of specialization</i> ANGELO RIVIEZZO, ANTONELLA GAROFANO, GIUSY MIGNONE	“	1073
<i>Crossing Green Tracks: The Role of Monumental Railways in Promoting Eco-Sustainable Business in Slow Tourism</i> MICHELE BERUTTI, CINZIA DESSI, GIUSEPPE MELIS, DANIELA PETTINAO	“	1079
<i>Contributing to Cultural Welfare: A Critical Review of Methods for Measuring the Impact of Culture on Sustainability and Well-being</i> MARA CERQUETTI, GIULIA LAPUCCI	“	1087
<i>Tourism in Smart City policy: an opportunity for Urban Sustainability</i> STEFANIA ESCOBAR, GIOVANNI ESPOSITO, NATHALIE CRUTZEN, MICHAEL NIPPA, LINDA OSTI	“	1093
<i>Transnational collaborations for a more sustainable tourism: the role of digital transition</i> ALESSIA ZOPPELLETTO, SERENA LONARDI, UMBERTO MARTINI	“	1099
<i>Measuring Destination Carrying Capacity from Residents' Perspectives: A Pilot Study in Garda Trentino</i> OKSANA TOKARCHUK, CAROLA STEFENELLI, UMBERTO MARTINI	“	1105
<i>A sensitizing literature review for future research about overtourism in Milan</i> ANDREA CHIARINI, ALBERTO GRANDO	“	1113
<i>La formazione degli ecosistemi digitali tra strategie deliberate e processi spontanei</i> SONIA CATERINA GIACCONE, ARISA SHOLLO	“	1119
<i>Metaverse in social innovation: developing trends to support marginal areas sustainable growing.</i> GIANPAOLO BASILE, MARIA PALAZZO, MARIA ANTONELLA FERRI, MARIO TANI	“	1125
<i>Harnessing Digital Technologies for Knowledge Management in Luxury Hospitality: the cases of Grand Hotel et de Milan and STRAFhotel&amp;bar.</i> MARIAPINA TRUNFIO, LUNA LEONI, CECILIA PASQUINELLI, ANGELO PRESENZA	“	1131
<i>Cultural Heritage Management in Museums: The Open Culture Dilemma</i> MARIA DELLA LUCIA, GIULIA DORE, RANA MUHAMMAD UMAR	“	1137
<i>Destination ambassador, authenticity and informal communication. Exploratory research on mountain professionals</i> UMBERTO MARTINI, FEDERICA BUFFA	“	1143

**Track 15 - Examining the social and environmental relevance of sustainable digital business models:  
Impact on business practices and consumers - Special Track**

***Good Governance for Smart Villages: A Bibliometric Review***

LEUL GIRMA HAYLEMARIAM, NICOLA CUCARI, MATTEO CRISTOFARO, FRANCESCO LAVIOLA,  
DAVIDE LIBERATO LO CONTE, ANTONELLA MONDA, ANASTASSIA ZANNONI, PINALBA, SCHILLECI,  
SIMONA MARE

PAG. 1151

***The Paradox of Sustainability in Crowdfunding: Lessons from the Food Industry***

LUIGI NASTA, BARBARA SVEVA MAGNANELLI, LUCA PIROLO

“ 1161

***Paradoxical Tensions and Paradoxical Mindset as Predictors of Managers' Behavioral Responses to AI-driven Healthcare Tools: A Preliminary Study***

ANDREA SESTINO, LUÍS IRGANG, HENRIK BARTH, MAGNUS HOLMEN

“ 1167

***Development and Sustainability of Online Pharmacy Sales***

ORAZIO VELLA, SIMONE GUERCINI

“ 1171

**Track 16 - Growing resilient Italian SMEs - Special Track**

***The resilience of family firms: exploring the role of collaborative response with supply chain partners***

CLAUDIA PONGELLI, EMANUELA DELBUFOLO, ALFREDO DE MASSIS

“ 1179

***Verso una Misura di Resilienza per le Piccole e Medie Imprese***

PIETRO TARAGONI, SALVATORE ESPOSITO DE FALCO, ANTONIO RENZI, GIANLUCA VAGNANI

“ 1185

***La diversità di genere nella forza lavoro come antecedente della resilienza d'impresa: evidenze preliminari da un caso studio***

CRISTINA LEONE, PASQUALE MASSIMO PICONE, ARABELLA MOCCIARO LI DESTRI

“ 1193

**Track 17 - Perspectives on grand challenges in international business and implications for companies  
Special Track**

***“Made by”: the evolution of the Country-of-Origin Effect to businesses and firms***

ROSARIO FARACI, ROSARIA FERLITO, SONIA CATERINA GIACCONE

“ 1201

**Track 18 - Intelligenza artificiale nel management**

***From Data to Action: AI-Enhanced Prediction of Business Crises Integrating Financial and Social Media Insights***

DAVIDE LIBERATO LO CONTE, FRANCESCO RICOTTA, GABRIELE RINNA

“ 1209

***When does technological innovation overlap social innovation? Conceptualizing an organizational aidriven model***

SARA DIODATI, LAWRENCE CABRERA, RICCARDO RIALTI, LAMBERTO ZOLLO

“ 1215

***Exploring the impact of Artificial Intelligence on Vocational Education and Training (VET)***

SILVIA COSIMATO, NADIA DI PAOLA, ROBERTO VONA, NUNZIA CAPOBIANCO

“ 1221

***AI-Powered Marketing Communication: Exploring Strategies in the Luxury Furniture Industry***

NICCOLÒ PICCIONI, FABIOLA SFODERA, ALBERTO MATTIACCI

“ 1229

***Artificial Intelligence in SCM: insights from two illustrative cases***

SERENA GALVANI, ROBERTA BOCCONCELLI

“ 1235

***Strategic Foresight and Artificial Intelligence: Evidence of a Paradoxical Relationship***

MATTEO CRISTOFARO, MIE AUGIER, LUNA LEONI, PINALBA SCHILLECI

“ 1241

***A Systematic Literature Review on AI-empowered Strategic Decision-Making process***

ALESSIA MUNNIA, MARCO ROMANO, REBECCA CASEY, JAMES A. CUNNINGHAM

“ 1247



<b><i>Gen-AI nel settore agri-food: determinanti d'adozione ed impatto organizzativo</i></b> FRANCESCO MERCURI, DILETTA PILOCA, SABRINA RESTANTE, LUCA QUAGLIERI, BERNARDINO QUATTROCIOCCHI	PAG.	1255
<b><i>Managing services in tourism destinations through Artificial Intelligence and Machine learning: The Data for Destination Model</i></b> SILVIA BAIOTTO, DANILO CROCE, PAOLA MARIA ANNA PANICCIA, ROBERTO BASILI, ANDRIY SHCHERBAKOV, ALESSANDRA ARCESE	“	1263
<b><i>The Future of Digital Technologies: AI-Driven Interfaces for Universal Usability</i></b> GIUSEPPE LANFRANCHI, ANTONIO CRUPI	“	1273
 <b>Track – General management</b>		
<b><i>Blockchain Waste Management: A Systematic Literature Review for the Public Administration</i></b> GLORIA DIANA MARINSANTI RWAKIHEMBO, FRANCESCA FAGGIONI, MARCO VALERIO ROSSI	“	1281
<b><i>Blockchain Waste Management: are Italian managers ready?</i></b> GLORIA DIANA MARINSANTI RWAKIHEMBO, FRANCESCA FAGGIONI, MARCO VALERIO ROSSI	“	1287
<b><i>Creating a Blockchain Governance framework for Circular Economy: Preliminary results</i></b> GLORIA DIANA MARINSANTI RWAKIHEMBO, FRANCESCA FAGGIONI, MARCO VALERIO ROSSI	“	1291
<b><i>Social acceptance of Decentralized Renewable Energies in East African rural communities: preliminary evidence from a multiple case study</i></b> FABIO IANNONE, ELEONORA ANNUNZIATA, FRANCESCO RIZZI, MARCO FREY	“	1295
<b><i>Sustainable Management of the Photovoltaic Waste Stream: Regional Analysis and Economic and Management Perspectives</i></b> ANDREA FRANZONI, CHIARA LEGGERINI, MARIASOLE BANNÒ	“	1301
<b><i>Enhancing Well-Being for People with Disabilities, Insights from Multiple Case Study of Smart Nature-Based Solutions' Actions in Italy</i></b> GIOVANNA BAGNATO, AUGUSTO BARGONI CHIARA GIACHINNO	“	1307
<b><i>Managerial and technological challenges for climate finance. A multidisciplinary model based on AI for the assessment of sustainability</i></b> DANIELE LEONE, ELVIRA BUONOCORE, EVA PANETTI, BELINDA LAURA DEL GAUDIO, DARIO SALERNO, ANDREA CAPORUSCIO, SALVATORE SCOGNAMIGLIO, FRANCO TRUBIANI, MARIA CRISTINA PIETRONUDO	“	1315

# Sustainable Management of the Photovoltaic Waste Stream: Regional Analysis and Economic and Management Perspectives

ANDREA FRANZONI<sup>1</sup> CHIARA LEGGERINI<sup>2</sup> MARIASOLE BANNÒ<sup>3</sup>

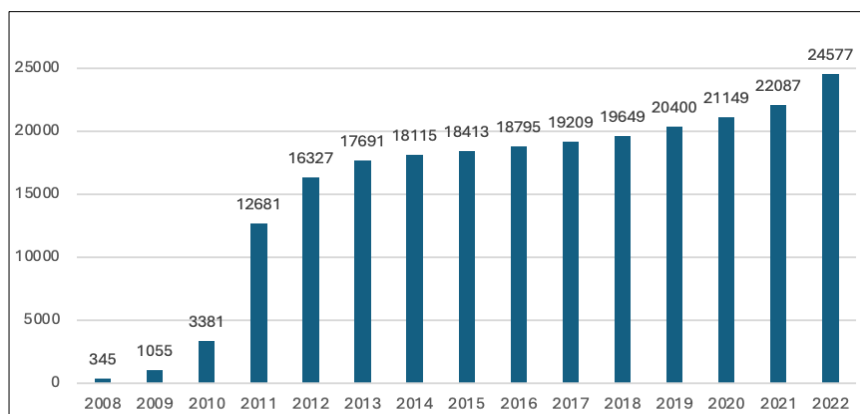
## Abstract

Photovoltaic panel utilisation has grown significantly in Italy and globally during the past two decades. This technology's primary benefit is that it converts sunlight into power without emitting greenhouse gases throughout its operation. The lifespan of solar modules is typically restricted to approximately 25 to 30 years. Hence, it is logical to anticipate a further rise in the generation of associated waste in the upcoming years. We suggest a regional approach to estimate the amount of waste that will require disposal, considering the various types of panels now employed in Italy. This method will allow efficient planning of waste management for solar panels. Furthermore, it will encourage the advancement of innovative recycling and material treatment methods, reducing the environmental footprint and guaranteeing sustainable waste management in the future. The methodology will be applied focusing on the installation of solar panels using different technologies (thin film, monocrystalline silicon, and polycrystalline silicon) in Italian regions from 2000 to 2022. A preliminary economic assessment of the materials that can be recovered from photovoltaic panels will be provided.

**Key words:** circular economy; EoL PV modules; forecasting; PV waste management; sustainability.

**Framing of the research.** Since the 2000s, there has been a significant global spread of photovoltaic energy as a source of electricity in various regions. This technology is adaptable, widely produced, and has affordable installation costs, making it highly popular among individuals and companies. The global installed capacity increased from 224.215 MW in 2015 to 1.055.030 MW in 2022, marking a growth of almost 350% in a span of 7 years (Source: IRENA, 2023). The total installed capacity in Italy has significantly expanded since 2008 and continues to grow rapidly, as shown in Figure 1.

Fig. 1: Cumulative PV power installed in Italy (MW)



Source: GSE reports (2008-2022)

The installed capacity in Italy increased by 20.6% during the year 2022, rising from 22.594 MW to 25.094 MW (GSE Report, 2008-2022). Photovoltaic panels are the third most important renewable energy source in terms of installed capacity, following hydropower and wind (IRENA, 2023). Furthermore, solar energy is anticipated to emerge as one of

<sup>1</sup> Università di Brescia  
e-mail: andrea.franzoni@unibs.it

<sup>2</sup> Università di Brescia  
e-mail: chiara.leggerini@unibs.it

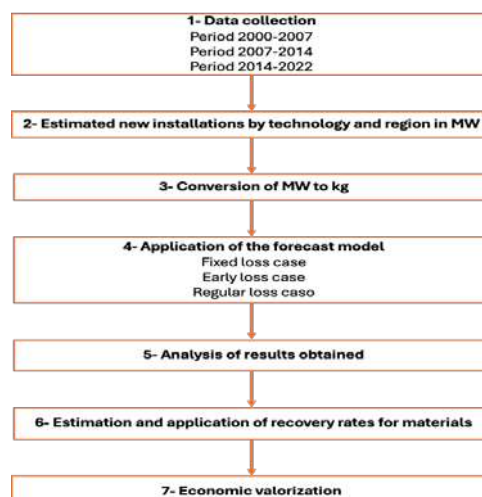
<sup>3</sup> Università di Brescia  
e-mail: mariasole.banno@unibs.it

the most prominent forms of renewable energy in the years to come (Romel et al., 2024; Xu et al., 2018). As a result of these installations, there will be a substantial increase in the quantity of waste that is produced by photovoltaic panels in the coming years. Furthermore, despite the ongoing attempts to create new technologies related to renewable energy sources, there is still a void in the literature concerning relevant solutions for the management of photovoltaic modules when they have reached the end of their life cycle (Mahmoudi et al., 2019; Malandrino et al., 2017). Many studies have made an attempt to forecast the waste stream that will be generated by photovoltaic panels in the European and non-European Countries (Czajkowski et al., 2022; Sharma et al., 2023; Tan et al., 2024). used the Weibull function to make the prediction of the waste load in Australia till the year 2059. The life cycle of photovoltaic cells was also taken into consideration. It was necessary to estimate the degree to which photovoltaic technology has penetrated the market in Australia. The authors also recommended the computation of the individual materials that comprise photovoltaic modules. Furthermore, by evaluating the rate of reuse of individual components, they forecasted savings from the recovery of these components for the creation of new modules. This was done from the perspective of a circular economy. Paiano (2015) suggests doing a study that is comparable to this one in Italy; however, the author assumes a fixed period of 25 years as the span of the lifecycle, and the forecast is carried out up until the year 2050. In addition, various photovoltaic panel technologies from the first and second generations are taken into consideration. Calculations were also made in this instance to determine the quantities of waste that were produced and then separated into the various components. Using the Weibull function and taking into account not only the photovoltaic module but also the Balance of System (BOS), which is the collection of all components that are necessary for the proper functioning of photovoltaic modules, Domínguez & Geyer (2017, 2019) carried out a calculation that was comparable in both Mexico and the United States. The authors of this study took into consideration a life cycle that is typically thirty years long. When applying the Weibull function and taking into consideration an average life of thirty years, Romel et al. (2024) made a prediction regarding the quantity of panels that will be available at the end of the life cycle by the year 2045. After then, the outcomes of this particular case were compared with the reports written by IRENA in order to determine how good the results were. Kim & Park (2018), in contrast to the research that were stated earlier, presented not only the waste prediction modelled by the Weibull function but also a defined usable life duration of 25 and 30 years in two different scenarios. As a result, it was possible to do more analyses using data that was comparable. In conclusion, Sharma et al. (2023) not only made a prediction for the quantity of photovoltaic panels that will reach the end of their useful life in India, but they also investigated the issues of reuse, recovery, and disposal, as well as the implementation of policies and strategies that encourage more sustainable waste management.

**Purpose of the paper.** The present study is still a work in progress. The aim of this research is to provide a regional method that is capable of addressing the developing difficulty connected to the management of waste resulting from the increasing use of photovoltaic panels. Due to the fact that photovoltaic modules have a limited lifespan, it is expected that there will be a significant increase in the amount of generated waste. As a result, the primary purpose of this research is to develop a method that is both efficient and accurate in determining the quantity and nature of waste that will be generated across the nation, as well as the locations where this waste will be generated. By developing the research for each region of Italy. The study serves as a helpful instrument for businesses operating within the sector to evaluate and plan for the management of solar waste in a sustainable manner. This strategy aims to minimize the environmental impact of photovoltaic waste production by estimating the recoverable amount. Additionally, it aims to promote the advancement of recycling and material treatment through research and development of innovative solutions. This will help to ensure that waste management is sustainable over the long term, with the ultimate goal of achieving a circular economy. In order to give data and practical tools that can be used to guide waste management decisions and policies in the solar energy industry, the approach that has been developed is specifically applied by taking into consideration solar panel installations in Italian regions and in various technologies from 2000 to 2022.

**Methodology.** The proposed methodology is divided into seven steps (Figure 2).

Fig. 2: Methodology to estimate photovoltaic waste



The first critical data are the total new installations for each year for each technology in each Italian region from 2000 to 2022 (measured in terms of installed power - MW). We consider three types of photovoltaic modules, which represent almost the entirety of the national market, and consist of monocrystalline silicon, polycrystalline silicon and thin film (GSE Report, 2008-2022). The source data (i.e. the new installations for each year broken down by technology and for each region) were obtained from the GSE (Gestore dei Servizi Energetici) reports and from a personal reworking of the data by the Terna database. Due to lack of obtainable data, assumptions were made:

1) 2000 - 2007: data are not available. It was necessary to consider new installations for each region as:

$$\text{New installations (t)} = \text{Total installations (t)} - \text{Total installations (t - 1)}$$

The only statistics available for this period are the total installations in Italy at the conclusion of period t. It was therefore necessary to consider the breakdowns of photovoltaic modules as zero over this short period. We took this assumption into account due to the limited number of photovoltaic modules in Italy till 2007. In addition, the percentage distribution of different photovoltaic module technologies within Italian regions was considered constant.

- 2) 2008 - 2014: data are not available. Data on new installations in Italy are available for each year. To obtain the data on new installations per region, the percentages of installations per technology in the different regions were considered constant, taking 2015 as the reference year.  
 3) 2015 - 2022: data on new installations are available for each region and for each year.

As a result, in Figure 3 new installed capacity by Italian region for different years are reported, respectively 2012, 2017, 2022.

Fig. 3: New installed capacity by region (MW)



Source: Personal elaboration from data available on GSE Reports 2008-2022

By multiplying the total number of new installations by the percentage of technology used in each region, we obtained the necessary data. The data obtained in MW were converted into Kg of PV modules, obtaining the conversion factor from EPDItaly (Environmental Product Declaration), following the methodology proposed by IRENA (2016) and applied by Mahmoudi et al. (2019) and Paiano (2015). Prediction regarding the generated waste stream was conducted for different scenarios:

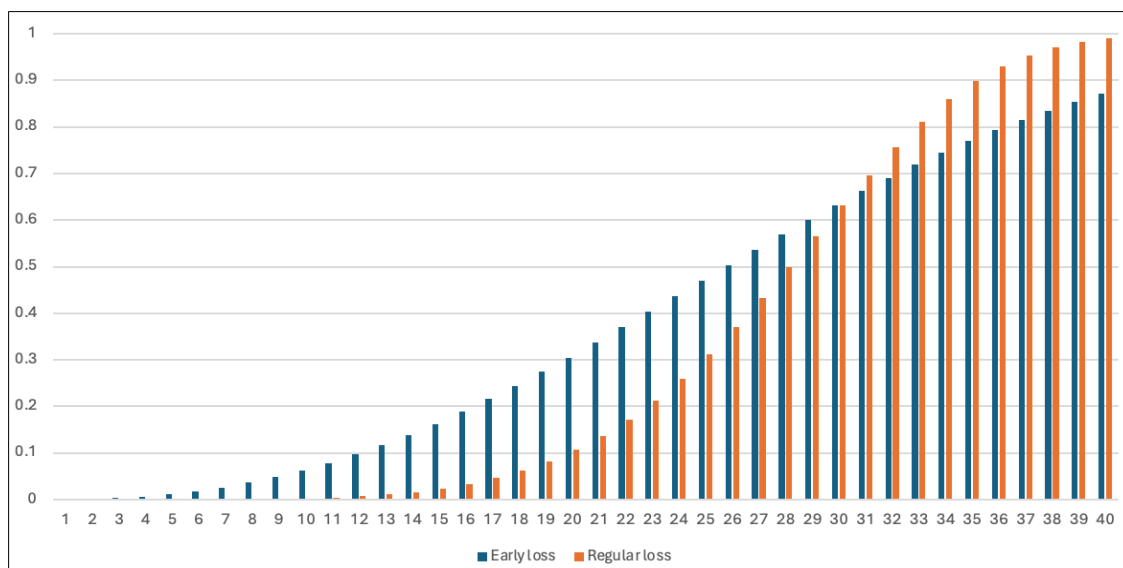
- Fixed loss: considering a useful life of 25 years (Paiano, 2015).
- Early loss e Regular Loss: both modelled using Weibull function.

The Weibull function is reported as follow:

$$F(t) = 1 - e^{-\left(\frac{t}{T}\right)^\alpha}$$

Where t represents the useful life of the photovoltaic module, T represents the considered average life of 25 years, and  $\alpha$  is called the shape factor and is responsible for the shape of the Weibull curve. An  $\alpha$  value of 2.4928 was considered for the Early-loss scenario, and a value of 5.3759 for the Regular-loss scenario. (IRENA, 2023; Mahmoudi et al., 2019; Sharma et al., 2023). In Figure 4 probability of loss based on Weibull function is reported.

Fig. 4: Probability of loss based on Weibull function



In Table 1 average lifetime of photovoltaic modules considered in other studies are reported, divided into different regions.

Tab. 1: Values of average lifetime of PV considered in other studies

Region	Global (IEA, 2016)	Mexico (Domínguez & Geyer, 2017)	Australia (Mahmoudi et al., 2019)	Italy (Paiano, 2015; this study)	Europe (Lugo-Laguna et al., 2021)	India (Sharma et al., 2023)
Average lifetime (year)	30	30	30	25	25	25

Data on the composition of the materials making up the photovoltaic modules and their recovery rates will allow us to proceed to the final stages of the study, namely the estimation of recoverable materials and the resulting savings (Domínguez & Geyer, 2017, 2019; Peeters et al., 2017).

**Results.** It is important to keep in mind that the current study is still considered to be a work in progress. One of the most important findings, is the precise calculation of the quantity of material that may be recycled or reused from photovoltaic cells that have been discarded. This was done within the framework of the circular economy. This computation method was carried out for each of the locations in Italy as well as for a variety of technologies, taking into consideration the time period spanning from the year 2000 to 2047. This particular time span was selected to be reflective of the typical lifecycle of photovoltaic panels, which is anticipated to be somewhere between 25 and 30 years. Taking into consideration the current historical backdrop, we designed an investigation to determine whether components from decommissioned solar panels could be categorised as dangerous or crucial (Lin et al., 2022). It is essential to take this step in order to acquire a comprehensive understanding of the environmental and socio-economic implications of solar waste management, particularly considering the rising issues that are associated with the availability of resources and the safety of materials (Lin et al., 2022). In addition to the quantification of the materials that are recyclable or reusable, a comprehensive economic analysis of these materials will also be carried out. The purpose is to determine the economic value of these materials and, from the point of view of a circular economy, the potential cost savings that the recovery of these materials might entail when it comes to the production of new photovoltaic modules. In addition to evaluating the viability of investing in recycling and reuse processes, this stage is vital for gaining a comprehensive understanding of the economic ramifications of adopting circular economy strategies in the photovoltaic panel industry. We will be able to provide an evaluation of the potential economic value of these materials. In the solar panel business, this gives a strong basis for making informed decisions and developing waste management plans, which in turn contributes to the promotion of responsible and sustainable resource management.

**Research limitations.** The presented research may encounter some limitations. Firstly, the collection of detailed data on the installation and distribution of solar panels may be hampered by the lack of comprehensive information, especially regarding the specific technologies used and accurate waste disposal predictions. As presented in the methodology section, some assumptions were made in order to obtain the necessary data for the completion of the study. This might compromise the replicability of the study for other states. In particular, both national and international databases were used, such as Terna, IEA (International Energy Agency), GSE (Gestore dei Servizi Energetici) and IRENA (International Renewable Energy Agency); despite this, the regional market breakdown per technology used was not always detailed and timely, and needed to be adapted. Another aspect to consider is related to the assumptions made about the

replacement of existing solar panels with new, more efficient technologies over time. Changes in replacement rates could affect waste generation projections. The complexity of photovoltaic waste management is a further challenge, especially if there is no adequate infrastructure for recycling and material treatment. Research may not fully address the practical realities and economic challenges of PV waste management. Environmental and social factors, such as impacts on human health and the environment due to exposure to chemicals during material recycling, would merit further investigation and a dedicated study. Finally, the research conclusions may be specific to the Italian context and may need to be adapted to be applied to other regional or national contexts.

**Managerial implications.** The exponential increase in the use of solar panels over the last 20 years has raised awareness of the importance of managing the technology's life cycle responsibly. When solar panels reach the end of their useful lives, it is essential for businesses and policymakers to make preparations for the management of waste not only during the manufacture and installation phases, but also after the panels have been installed. A strategic approach is required for this planning, which includes not only an accurate assessment of the amounts and types of waste that are generated, but also the creation of new solutions for the recycling and treatment of these wastes. In this context, businesses are being asked to make investments in the research and development of technologies for the recovery and treatment of photovoltaic materials, and they are being asked to achieve this in collaboration with other participants in the industry, governmental organisations, and research institutes. This partnership could be critical in developing sustainable solutions that can adapt to the rapid evolution of technology and environmental legislation.

This research is designed to provide utility for all parties involved. First and foremost, from the perspective of the businesses, it could be interesting to have a clear understanding of the economic return, that the photovoltaic recovery sector will have in the years to come. In this regard, the originality of the research, which consists of the determination of the amounts and regional position of the waste stream that is generated, is an helpful and all-encompassing instrument for the period of strategic business planning. On the other hand, the management implications of the circular economy in the photovoltaic panel industry necessitate a strategic and coordinated approach at the governmental level (Goe & Gaustad, 2014). In the past, policymakers in Italy have provided incentives for the manufacturing and installation of solar systems in order to encourage the growth of the photovoltaic industry so that it may serve both private and corporate consumers. In recent years, the growing utilisation of this technology has resulted in an immediate requirement to handle the issue of waste generated by photovoltaic cells at the end of their useful lives. To handle this new problem, policymakers must also encourage laws and regulations aimed at recovery and maximising the use of available resources (Goe & Gaustad, 2014). In addition to providing incentives for practices that involve the study and development of technology for recycling, recovery, and treatment of photovoltaic materials, these policies should also provide incentives for manufacturers to use recovered end-of-life materials as inputs (Lin et al., 2022; Zhang et al., 2023). Furthermore, policymakers should support the formation of partnerships between the public and commercial sectors, research institutes, and non-governmental organisations to create new and collaborative solutions for the intelligent management of photovoltaic panel waste. In order to achieve this objective, it is necessary to implement monitoring and control methods in the photovoltaic industry in order to guarantee compliance with environmental requirements and to ensure that waste is managed appropriately.

**Originality of the paper.** The originality of this paper lies in the innovative approach proposed to address a growing environmental challenge arising from the expanding use of photovoltaic panels. Although solar technology has provided substantial benefits in the production of clean energy, the research emphasises a frequently underestimated aspect: waste management at the end of the panels' life. As previously mentioned, various studies have been published in recent years to determine the quantity of waste generated by solar modules (Domínguez & Geyer, 2017, 2019; Mahmoudi et al., 2019; Paiano, 2015; Peeters et al., 2017; Santos & Alonso-García, 2018; Sharma et al., 2023). To the best of our knowledge, no one has ever penetrated into the regional context. Instead, our study presents a specialised regional technique for calculating and planning waste management from photovoltaic panels, taking into account the variety of technologies employed and the predicted increase in waste generation. This strategy is innovative because it takes a long-term view on solar waste management, anticipating and minimising potential negative environmental consequences. In particular, the study addresses businesses by providing a useful tool for planning investments to respond to a rising problem in our country, as well as the option to consider an economic return. On the other side, the study addresses policymakers in the same way, encouraging businesses and investors to approach a sensitive and timely problem. As a result, applying the proposed methodology to the specific Italian context makes an important contribution to the political and decision-making context, providing data and concrete tools to help decision makers make decisions about photovoltaic waste management and the promotion of effective environmental policies in the renewable energy sector.

## References

- CZAJKOWSKI A., WAJDA A., PORANEK N., BHADORIA S., REMIORZ L. (2022), "Prediction of the Market of End-of-Life Photovoltaic Panels in the Context of Common EU Management System", *Energies*, vol. 16, n. 1, pp. 284.
- DOMÍNGUEZ A., GEYER R. (2017), "Photovoltaic waste assessment in Mexico", *Resources, Conservation and Recycling*, vol. 127, pp. 29-41.
- DOMÍNGUEZ A., GEYER R. (2019), "Photovoltaic waste assessment of major photovoltaic installations in the United States of America", *Renewable Energy*, vol. 133, pp. 1188-1200.

- GOE M., GAUSTAD G. (2014), “Strengthening the case for recycling photovoltaics: An energy payback analysis. *Applied Energy*, vol. 120, pp. 41-48.
- IRENA. (2023), “*Renewable energy statistics 2023*. International Renewable Energy Agency.
- KIM H., PARK H. (2018), “PV Waste Management at the Crossroads of Circular Economy and Energy Transition: The Case of South Korea”, *Sustainability*, vol. 10, n. 10, pp. 3565.
- LIN M., WU Y., QIN B., CAO W., LIU J., XU Z., RUAN J. (2022), “Response to the Upcoming Emerging Waste: Necessity and Feasibility Analysis of Photovoltaic Waste Recovery in China”, *Environmental Science & Technology*, vol. 56, n. 23, pp. 17396-17409.
- LUGO-LAGUNA D., ARCOS-VARGAS A., NUÑEZ-HERNANDEZ F. (2021), “A European Assessment of the Solar Energy Cost: Key Factors and Optimal Technology”, *Sustainability*, vol. 13, n. 6, pp. 3238.
- MAHMOUDI S., HUDA N., BEHNIA M. (2019), “Photovoltaic waste assessment: Forecasting and screening of emerging waste in Australia”, *Resources, Conservation and Recycling*, vol. 146, pp. 192-205.
- MALANDRINO O., SICA D., TESTA M., SUPINO S. (2017), “Policies and Measures for Sustainable Management of Solar Panel End-of-Life in Italy”, *Sustainability*, vol. 9, n. 4, pp. 481.
- PAIANO A. (2015), “Photovoltaic waste assessment in Italy”, *Renewable and Sustainable Energy Reviews*, vol. 41, pp. 99-112.
- PEETERS J.R., ALTAMIRANO D., DEWULF W., DUFLOU J.R. (2017), “Forecasting the composition of emerging waste streams with sensitivity analysis: A case study for photovoltaic (PV) panels in Flanders”, *Resources, Conservation and Recycling*, vol. 120, pp. 14-26.
- ROMEL M., KABIR G., NG K.T.W. (2024), “Prediction of photovoltaic waste generation in Canada using regression-based model”, *Environmental Science and Pollution Research*. <https://doi.org/10.1007/s11356-023-31628-9>
- SANTOS J.D., ALONSO-GARCÍA M.C. (2018), “Projection of the photovoltaic waste in Spain until 2050”, *Journal of Cleaner Production*, vol. 196, pp. 1613-1628.
- SHARMA A., MAHAJAN P., GARG R. (2023), “End-of-life solar photovoltaic panel waste management in India: Forecasting and environmental impact assessment”, *International Journal of Environmental Science and Technology*. <https://doi.org/10.1007/s13762-023-04953-2>
- TAN V., DENG R., EGAN R. (2024), “Solar photovoltaic waste and resource potential projections in Australia, 2022-2050”, *Resources, Conservation and Recycling*, vol. 202, 107316.
- XU Y., LI J., TAN Q., PETERS A.L., YANG C. (2018), “Global status of recycling waste solar panels: A review”, *Waste Management*, vol. 75, pp. 450-458.
- ZHANG Q., LIU C., ZHENG S. (2023), “Investment and pricing in solar photovoltaic waste recycling with government intervention: A supply chain perspective”, *Computers & Industrial Engineering*, vol. 177, 109044

## Websites

<https://www.gse.it/>

<https://www.iea.org/>

<https://www.irena.org/>

<https://www.terna.it/it>

<https://www.epditaly.it/>

<https://www.enea.it/it/>