*"This is a preprint manuscript of an article that will be published by Elsevier in **TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE,** ISSN: 0040-1625, and will be available at https://www.journals.elsevier.com/technological-forecasting-and-social-change".*

Creating new tech-entrepreneurs with digital platforms: meta-organizations for shared value in data-driven retail ecosystems

Sandro Battisti
Bruno Kessler Foundation
Center for Information and Communication Technology
Via Sommarive 18, 38123, Trento, Italy,
s.battisti@fbk.eu

Nivedita Agarwal
University of Stuttgart
Institute of Entrepreneurship and Innovation Science
Pfaffenwaldring 19, D-70569 Stuttgart-Vaihingen, Germany
nivedita.agarwal@eni.uni-stuttgart.de

Alexander Brem
University of Stuttgart
Institute of Entrepreneurship and Innovation Science
Pfaffenwaldring 19, D-70569 Stuttgart-Vaihingen, Germany and
Mads Clausen Institute, University of Southern Denmark, Denmark
alexander.brem@ets.uni-stuttgart.de

Abstract: Creating technologically focused entrepreneurs is a crucial endeavor worldwide, especially in times of exponential digital innovation and artificial intelligence. Thus, the concept of meta-organizations enables the creation of new business models, acting as a powerful mechanism to support social entrepreneurs to extract value from data. This research carried-out an in-depth and longitudinal unique case study of a meta-organization operating in Italy, Germany, and Finland. This study investigates the process in which the meta-organizations engage users and empowers tech-entrepreneurs to create share value. Results indicate that meta-organization orchestration can effectively guide stakeholders from different mindsets. Digital innovations are a reliable alternative to tackle critical social issues towards improving economic growth and the increase of the quality of life of people working in a stressful and competitive environment such as the retail sector. In this way, meta-organizations are increasingly focusing on sustainable development to allow for greater social cohesion. The findings confirm that digital innovation orchestrated by meta-organizations can enable new business models by techno-entrepreneurs, creating shared value for society in general.

Keywords: meta-organization, artificial intelligence, decision-making, business ecosystem, shared value, retail business.

Biographical notes

Sandro Battisti is a Program Manager at Bruno Kessler Foundation, Trento, Italy. He has received a Ph.D. degree in innovation management from Polytechnic of Milan, Milan, Italy. He has over 20 years of experience in the business and management of ICT-based projects in Brazil, Italy, Finland, the UK, the USA, Germany, and France. His research in the field of innovation, technology, and entrepreneurship has been published in relevant international journals such as IEEE Transactions on Intelligent Transportation Systems, Journal of Business and Industrial Marketing, Journal of Social Entrepreneurship, and International Journal of Innovation and Technology Management. He is an associate editor of IEEE Transactions on Intelligent Transportation Systems.

Nivedita Agarwal is a Program Manager at Siemens Healthineers and research scholar at the Institute of Entrepreneurship and Innovation Science at University of Stuttgart, Germany. Her research focuses on entrepreneurship, innovation and technology management. She has reviewed and published articles in several peer reviewed academic journals and is also the editor of the International Journal of Entrepreneurial Venturing.

Alexander Brem is Chaired Professor of Entrepreneurship in Technology and Digitization, endowed by the Daimler Fund in the Stifterverband, as well as Director of the Institute of Entrepreneurship and Innovation Science at the University of Stuttgart, Stuttgart, Germany. He is a CCSR International Research Associate at De Montfort University, Leicester, UK and a Visiting Professor at the EADA Business School, Barcelona, Spain and HHL Graduate School of Management, Leipzig, Germany. Moreover, he serves as an academic committee member of the Centre of Technological Innovation, Tsinghua University, Beijing, China. In addition, he was appointed an Honorary Professor at the University of Southern Denmark in 2017. His research focuses is on technological innovation and entrepreneurship.

1. INTRODUCTION

This research explores the role of meta-organizations within the retail ecosystems. It focuses on understanding how meta-organizations deliver shared value to the stakeholders through digital innovations based on Artificial Intelligence (AI) technologies. Häfner et al. (2021) argue that AI is a new opportunity for developing digital innovations, specifically in the retail sector. For example, to deliver tailored messages to the smartphones or show promotions on large screens based on shoppers purchasing behavior analyzed through machine learning techniques which can support small-medium retail shops in real-time. In the field of retail analytics, advanced AI-based techniques such as machine learning, deep learning, and text mining offer intelligent data insights based on the huge amount of data generated (i.e., Kumar and Venkatesan, 2019; Shankar et al. 2020; Roggeveen and Sethuraman, 2020; Bradlow et al. 2017). These techniques help physical stores become powerful destinations for shoppers to have unique sensory shopping experiences, unlike online retail experience (von Briel, 2018; Acquila-Natale and Iglesias-Pradas, 2021).

Business-driven data analytics tools developed by entrepreneurial ecosystems play a central role in providing models capable of supporting business-to-business (B2B) goals via advanced data analytics tools (Nalchigar and Yu, 2018). Small-medium retail shops can use such tools to attract new customers, which helps increase their revenues and provide a competitive advantage compared to the large online retail platforms such as Amazon, Zalando, and Alibaba (Battisti and Brem, 2020). Moreover, Marchand and Marx (2020) state that online retail platforms provide accurate customer recommendation that influences decisions purchase based on AI algorithms.

Retail shop owners are buying software solutions that are based on advanced AI tools and are developed by technology-based startups. Such software solutions can help retailers increase conversion rates (i.e., percentage of customers that come from a competitor) based on the creation of memorable physical shopper experience. Furthermore, such tech-based software companies are at the forefront of developing and commercializing big data analytics tools capable of increasing customer and sales assistant interaction in real-time situations for small-medium-sized retail businesses using decision-making algorithms.

Recent research of Erdmann and Ponzoa (2021), and Gavrila and Ancillo (2021) show that established retailers are suffering from the high market competition, and they are generating fewer sales from the received e-commerce visits than in the previous years. Furthermore, Battisti and Brem (2020) show that retailers work with AI-based startups for new software tools capable of enriching shopper experience and increasing sales when shoppers are physically present in-store. This action helps shop owners to refrain shoppers from checking equivalent products on online platforms (e.g., Winter et al., 2018) for lower prices. Therefore, these advanced startups have become vital in the retail market. In particular, data-driven startups are exploring new ways to increase competitive advantage in complex markets, such as obtaining new AI-based models to combine physical and online retail. However, there is a research gap in understanding how these data-driven startups can help impact the entrepreneurial process (Elia et al., 2020). In recent research, Battisti (2019) points to the emerging role of meta-organizations in creating specific ecosystems capable of enhancing the economic and societal impact of such young digital enterprises in target markets.

Meta-organizations enable new business models to support entrepreneurs derive value from data. Recent studies on meta-organizations for innovation suggest further research to explore decision-making in complex ecosystems and understand the organizational design that facilitates entrepreneurship and innovation (Radnejad et al., 2017). Furthermore, Berkowitz (2018) argue that organizing collective practices and process inside meta-organization is fundamental for sustainable innovation, and suggest that further research could study the diffusion of innovation enabled by meta-organizations. Moreover, Berkowitz and Bor (2018) reinforce the importance of research in meta-organizations and suggest that differentiation, competition, and governance are key topics underexplored.

Therefore, this research explores the case of a meta-organization that operates in physical and online retail sectors. In particular, it aims to expand the field of technology and social change by analyzing how meta-organizations engage users and support corporations and small-medium enterprises to create shared

value based on retail intelligence and AI technologies. Thus, the research question is: *How meta-organizations orchestrate user engagement and empower young businesses driven by advanced technologies to create high social and economic value?*

The case of meta-organizations is explored with an in-depth and longitudinal unique case study of a meta-organization operating in Italy, Germany, and Finland. This organization was an integral part of a socio-technical system acting as a public-private partnership. The goal was to disrupt the retail value chain in Europe via advanced technology that improves in-store sales and retailers' competitive advantage in supermarkets, fashion brands, retail electronics, clothing, and footwear accessories.

The rest of the study is structured as follows. Subsequent to the literature review, we discuss the research design in terms of the methodology and data collection process. Next, we discuss the study's findings, and finally, the discussion and implications are illustrated. The study concludes with limitations and suggestions for further research.

2. LITERATURE REVIEW

This research explores meta-organizations at the interplay between organizational structure, user engagement, and technology-oriented entrepreneurship. It takes into consideration data-driven intelligence and decision-making in creating shared value. In particular, this session presents the general framework literature by exploring meta-organization as the most prominent organizational form to orchestrate user engagement. It empowers tech-entrepreneurs to create digital platforms based on advanced information and communication technology (ICT) such as machine learning and big data analytics, which are key areas of the current AI movement.

2.1. Meta-organizations

One of the current business challenges of AI-based startups is to join partnerships with new organizational models capable of explaining data-driven innovations developed through collective processes. In particular, in industries where the intense competition forces companies to create partnerships to have market success. Furthermore, the research of Brass et al. (2004) supports this view by suggesting that actors are embedded within networks to obtain opportunities and overcome constraints, and argue that some actors play a central role node in a network formed by different kinds of organizations.

Exploring the organizational form of public-private partnerships, Battisti (2019) argues that meta-organizations are a powerful instrument for social innovation delivering, in particular, by coping with particular social needs of users on the one hand and addressing companies' needs on the other hand. Furthermore, the seminal work of Ahrne and Brunsson (2005) argue that meta-organizations can attract the affiliation of new members because they are capable of organizing collective action among their multi-stakeholders' perspective and interests.

This research adopts the definition of Berkowitz and Dumez (2016; p.1), which is "*meta-organization refers to a central phenomenon in the contemporary world, namely the increasing importance of collective action at the level of organizations, ensuing from major issues related to sustainable development, human rights, and corporate responsibility*." This way of thinking is based on Ahrne and Brunsson (2005), who suggested meta-organizations could act as large structures towards the benefit of their members, and it must be very attractive to members because they affect the social status of every single organization in the ecosystem.

Meta-organizations such as business accelerators are a viable form to help AI-based entrepreneurs to bring data-driven innovations to the market. In this perspective, an example is Pustovrh et al. (2020) research that explores open innovation ecosystems to support entrepreneurship; in particular, they argue public policy should endorse the open innovation activities of key actors. In this way, such kind of business accelerators is an example of an organizational form that can empower new entrepreneurship, which

benefits from being engaged in a network of relationships. They found the role of orchestrators (i.e., business incubators) of entrepreneurial actions fundamental for business success, in particular, in the early phase of business and high technology development.

Recent research on entrepreneurial ecosystems such as Brem and Radziwon (2017) argue that university-industry-government is a strong organizational model to orchestrate technology-based entrepreneurship to achieve business and social goals. In particular, they argue that social groups bring interesting insights into the entrepreneurial ecosystem dynamics, both on the production and user sides. Moreover, Elia et al. (2020) argue about the importance of digital entrepreneurial ecosystems, particularly those exploring the new socio-technical paradigm to help technology-based new venture creation, which acts as a collective intelligence system.

For example, a compelling case of meta-organizations is a model in which companies organize themselves together with co-location centers located inside public agencies for empowering the local development in order to help them get support to explore new data-driven innovations (Battisti and Brem, 2020). Some examples of innovation are made with advanced big data analytics based on information coming from the sensors that provide the measurement of the pace and routes of walking of people in crowded shopping areas in city centers. In such urban environments, the cost of deployment and maintenance of such outdoor retail infrastructure is too high for small retailers and governments, and taking the right decision of authorizing the opening of new retail stores based on big data analytics is crucial for the public authorities.

On the other hand, meta-organizations benefit from the exponential growth of mobile devices, in which citizens can be very straightforward to use the applications tools that can be based on sensors, for example providing city sensors' information to small shop owners. By using the big data information from sensors spread out in smart cities, companies can perform data analytics on information from people moving by the city centers. Data can be collected from the mobile devices' microphones, and it can be used to support the governments to understand the value of user data and develop new alternatives shopping areas that do not create problems for other citizens (i.e., local inhabitants of city centers). It is a key goal for local public administrations in terms of developing actions to reduce the noise caused by the sales campaign with loudspeakers in front of the stores, for example, during a particular period in the year or every weekend. This problem can be viewed as a business and social opportunity for public-private partnerships structured as meta-organizations, as confirmed by Battisti and Brem (2020).

Meta-organizations via digital platforms can help users engage in the digital world, in which users invest their own time, attention, and emotion to help solve companies' problems (e.g., Battisti and Brem, 2020). Furthermore, Cao et al. (2015) call for research that explores decision-making based on data-driven intelligence in small business organizations, and Zaheer et al. (2019) call for new research on digital startups that explored in-depth new business models. By linking business analytics to decision-making perspective as suggested by Cao et al. (2015) and Wang et al. (2018) with a call for new research that explores big data analytics to understand strategic implications and different technological aspects in a better way.

2.2. User engagement

User engagement is not a new topic, but it is gaining momentum for some years with the development of technological innovations fostering its use through lower resource investments with money and time. The engagement of users is designed to promote active participation, problem-solving, transparency, and collaboration among all stakeholders. Towards capturing users' needs and developing new products and services, entrepreneurs collaborate with meta-organizations to have access to robust digital innovations (e.g., mobile applications for connected online and offline shopping). From this kind of digital ecosystem, managers can foster entrepreneurship by building specific communities of citizens with new collaboration methods, which can be scalable and create value-chain disruption with the broad network in which the meta-organization is inserted.

Users are incentivized to take part in "games with a purpose" (mobile applications that engage users in specific tasks while having fun). Such applications are increasingly being developed in the retail business

with augmented reality (AR). Users on these applications are motivated to participate as the high-end technology offers easy to use gamification actions and the possibility to earn rewards based on their behavior. These actions are a powerful instrument that can be used by companies and governments to obtain a large amount of data and develop together AI-based and AR-based applications tailored to help decision-making in terms of priorities of investment in business opportunities to the companies. Recent research on AR supported this view, such as Dacko (2017), who argue about the changing consumer behavior towards a major propensity of purchasing.

User data intelligence attempts to draw from expert user needs (i.e., more specialized people in the use of AI-based mobile applications or digital platforms) and non-expert user needs (i.e., less skilled people in terms of the technological experience of using mobile applications, such as kids, elderly, vulnerable people, and other non-technical people) as suggested by Battisti (2019). On the one hand, non-experts are more willing than expert users to explore digital platforms for their own specific needs because those experiences can be shared with small efforts. On the other hand, when non-expert users participate in digital platforms without properly structured coordination, they can poorly describe the social problem. This factor is an issue to the platform owners (i.e., companies, public authorizes, public-private partnerships, or meta-organizations) because they can have serious difficulties understanding the problem to be addressed based on that, they cannot deliver a technology-based solution accurately.

Digital platforms empower users to take a central role in innovation idea generation and testing of solutions as a critical factor for sustainable impact, as the recent research of Winter et al. (2018) suggests users take a central role as voluntary to increase the success factors of digital platforms. Furthermore, Luo et al. (2020) argue about the importance of users' perceived trust for the success of commercial transactions on digital platforms, in particular, when it comes to social information sharing, as argued by Bugshan and Attar (2020). Users contribute to social media platforms by sharing experiences when the co-production of innovation is not mandatory to them; it is because the motivational factors are the most important ones.

Research related to users' motivation, Boudreau et al. (2009), found the co-production of innovation that engages users in the open innovation process can be surprisingly heterogeneous, and this wide range can be classified into two principal categories: extrinsic and intrinsic. Extrinsic is mainly the money and user needs; on the other side, intrinsic is primarily having fun and getting personal identity recognized inside a group of interest. Users can also be motivated by getting a direct reduction of tax obligation rates in which citizens can be reimbursed from public authority schemes.

From a user behavior perspective, the recent research of Brem et al. (2019) argues user innovators are leveraging technology-platforms such as crowdfunding to complement their innovative behavior towards helping companies on testing and developing innovation. Similarly, they argue that such platforms positively empower users' motivation for feedback in the product development process. To support this argument, Li (2019) reinforces the importance of social shopping mechanisms of monitoring and incentivizing people, such as social commerce platforms, that can encourage shoppers to share their experiences.

From the amount of time on users' participation in platforms, Ogink and Dong (2019) argue about the high potential of obtaining high-value data of users' feedback from users' involvement in social media platforms created for innovation development. In particular, the found the high-status users (i.e., those who participate better and more than other users on co-developing actions) are more likely to switch their efforts from idea generation to providing feedback on the product.

On the social perspective of platforms for user engagement, Presenza et al. (2019) argue crowdfunding platforms facilitates the user interactions, as well as the relationships among different kind of stakeholders, and explain the importance of social crowdfunding platforms for the creation of social impact, in particular, by encouraging, promoting and supporting users to participate in the innovation process actively. From their point of view, one such platforms' critical activity is the definition of the social problem by the users and the other key stakeholders.

Recent research, such as Li (2019), suggests the need to further research on the shopper side of social commerce platforms. It allows a more targeted development of innovative added-value software services by data-driven startups. On the other side, recent research by Grover and Kar (2020) explores social media

analytics by developing an engagement model to understand user dynamics that aim to help managers plan activities by using targeted social media campaigns.

2.3. Shared Value Creation

The notion of 'shared value' is about addressing the societal needs while generating economic value hence optimizing both corporate performance and social conditions (Pavlovich and Corner, 2014; Porter and Kramer, 2011). Mein Goh et al. (2016) propose that emphasis on social value creation actually offers an opportunity to exploit the dual benefits of technological innovations such as digital platforms. The rich knowledge exchange on these platforms has the potential to generate social value for society and offers indirect economic benefits to the businesses in terms of contributing to corporate social responsibility initiatives and building a good reputation (e.g., Mein Goh et al. 2016). It enables organizations to purposefully integrate various stakeholders' expertise in their innovation process (Arnold, 2011), which can bring forth innovations with economic, social, and environmental benefits (Hansen and Grosse-Dunker, 2013 and Battilana et al., 2020). By considering the capability to reach wider stakeholders across multiple regions and disciplines, digital platforms have immense potential to generate both social and economic value.

Technology entrepreneurship actions can be critical for getting users' data and, based on the advanced machine learning and big data analytics techniques, extract data intelligence. In this way, entrepreneurs can develop digital platforms capable of delivering value to society as a whole, both in terms of business returns and social impact, which is defined by Sinthupundaja et al. (2020) as shared value creation. In the same way, the study of Rawhouser et al. (2019) supported this view by analyzing the FT50 Index, which is the Financial Times list of 50 highly ranked business journals that focus on social impact. Furthermore, this research follows Gupta et al., (2020) recent research that explores social value creation via a systematic review of 188 peer-reviewed SSCI journal articles in the last decade. Profit orientation is the major difference between classical entrepreneurship and social entrepreneurship (Agarwal et al. 2020). Furthermore, Douglas and Prentice (2019) research argues about the importance of exploring the profit elements of social value creation that are understudied.

From this point of view, Gupta et al. (2020) argue that social entrepreneurship is liquefying the boundaries between for-profit and non-profit organizations by enabling the creation of new organizational forms that possess the characteristics of both. Furthermore, this research follows Battisti (2019) that argues that meta-organizations such as public-private partnerships can be the best organizational form to help technology-based entrepreneurs succeed. The process of social entrepreneurship includes the multidisciplinary aspects in terms of organizational, economic, social, political needs, which focus on the improvement of human well-being via the social entrepreneur mindset (Battisti, 2019).

Recent research (e.g., Surie and Groen, 2017) argues about the importance of hybrid social and business value to national ecosystems' development and growth. From this view, AI-based tools are socially constructed, with the intensive interaction of different societal actors, considering economic, organizational, and political issues. In this context, the social construction of data-driven innovation enables citizens to actively participate in creating solutions to address the social issues in a smart city environment (e.g., Kummitha, 2019). These environments are powerful to enable companies to create new data-driven services that directly affect the citizen in their daily activities. Finally, advanced AI-based solutions enable monitoring citizens' mood during new shopping experiences can create huge shared value for the whole stakeholders involved in the innovation process.

Shared value creation is a new opportunity for empowering entrepreneurs to develop new business models that achieve social impact (e.g., Halberstadt et al., 2020). In this way, young tech-entrepreneurs are supported by not-for-profit organizations in strong connection with public authorities, enabling new businesses based on information obtained from users about the priorities in terms of problems to be solved, as suggested by Battisti (2019). It creates significant shared value (Sinthupundaja et al., 2020) in addressing the solution of complex business and social problems; as suggested by Nam (2019), salespeople with a lower level of technology experience are more willing to lose their jobs. Furthermore, van Osselaer et al.

(2020) argue that the lack of proper communication between salespeople and shoppers reduces workers' meaningfulness and satisfaction, thus leading to the worst sales performance. New technology-enabled small-medium companies can play a fundamental role in supporting retail ecosystem development because AI-based digital innovations created by a network of companies are a good way to deal with such social problems while increasing the business results for retail companies.

From the broad business literature on social impact, this research considers shared value creation at the interplay between organizational innovation and user engagement (e.g., Battisti, 2014). Furthermore, this research considers value creation from a multidisciplinary perspective, focusing on providing shared value (Sinthupundaja et al., 2020) in a sustainable manner (e.g., Rosca et al., 2020), which is fundamental to deal with the construction of data-driven innovation that enables decision-making in the context of public-private partnerships. In a nutshell, this study aims to investigate the influence of meta-organizations on technology entrepreneurship for developing shared value creation, as summarized in Figure 1.

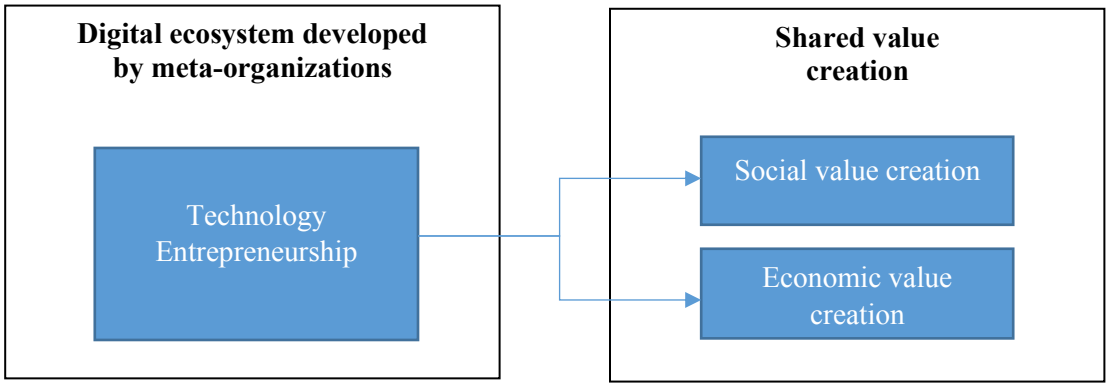

Figure 1: Research Framework

3. CASE DESIGN AND METHODOLOGY

This research focuses on exploring how a meta-organization empowers businesses to create both social and economic value via the use of advanced AI-based technologies such as machine learning and big data analytics. Not much research has been done in this area to date, especially on linking meta-organizations and new technologies like artificial intelligence; this is new ground. Hence, a qualitative approach is a right approach to investigate such a new research area.

Towards understanding this complex phenomenon, the research method was a longitudinal case study (e.g., Yin, 2009) and clinical inquiry research (e.g., Schein, 2008). The clinical inquiry part of the research was fundamental to collecting empirical evidence about AI-based innovations' social aspects. In particular, using clinical inquiry helps to have in-depth access to the data produced during the interaction between the researchers, the managers, the customers, and the shoppers.

The meta-organization was called ABC (the name was hidden for confidentiality reasons), and the data collection was carried out from January 2015 to December 2017 in the cities of Trento, Milan, Berlin, Munich, and Helsinki. ABC was selected considered being a very interesting and unique setting of a European-wide AI-based meta-organization.

ABC is a European-wide private no-profit organization composed of promising companies, universities, and research institutions in the field of digital innovation. ABC is one of the largest meta-organizations, enabling the creation of digital innovation in cities, industries, and other key sectors at the European levels. It has local offices in more than nine European countries, and it develops innovative products and services, taking into consideration the business and social needs of stakeholders. In particular, ABC can be view as an overarching ecosystem for tech-based entrepreneurs to develop business and social impact in different fields, such as smart cities, smart mobility, well-being, digital finance, and smart industry.

The strategic vision of ABC was to act as a meta-organization to integrate the most promising European research institutions, large businesses, and entrepreneurs for the launch of innovative AI-based services that are capable of creating an impact on the lives of people. This strategy is executed via thematic action lines such as digital industry, digital well-being, digital finance, and digital cities. On this framework, a key strategic goal is the creation of a scalable software platform (i.e., strongly based on machine learning and big data analytics techniques) for serving retailers in different segments globally. This platform was called BETA for confidentiality reasons.

The main motivation behind the selection of this case study was the close collaboration of the researchers with the key actors of the meta-organization and the BETA team. It represented an important advantage for the researchers to get not biased data by exploring the way meta-organizations operate in creating new AI-based services and products, considering the complex nature of the organization ABC and its relationship with external partners. Furthermore, ABC was selected because of the researcher's in-depth access to the technical, business, design, and legal people from meta-organization ABC. In particular, ABC was a unique example at the European level that focuses on creating a platform for physical and online retailers. In particular, ABC supports retailers to increase sales and conversion rates, reduce the stress of salespeople at the workplace, and increase employees' well-being in retailer shops, supermarkets, small shops, and even in retail events.

The data collected is based on the interviews, direct observations, participatory observation, and intense joint collaboration between the researchers and the interdisciplinary ABC team, which was formed by directors, innovation managers, project managers, CEOs, CTOs, other entrepreneurs, computer scientists, engineers, sociologists, and businesspersons. More than 60 people were working in key European cities such as Trento, Milan, Berlin, Munich, and Helsinki, collaborating to extract, process, analysis and developed AI-based services in strong synergy with the shoppers. Furthermore, the secondary data came from several sources (i.e., annual report of the organizations, consumer data from purchase transactions, shop owner's data, and sales assistant's data). Moreover, a visual representation of the context in which the meta-organization is operating is presented in Figure 2.

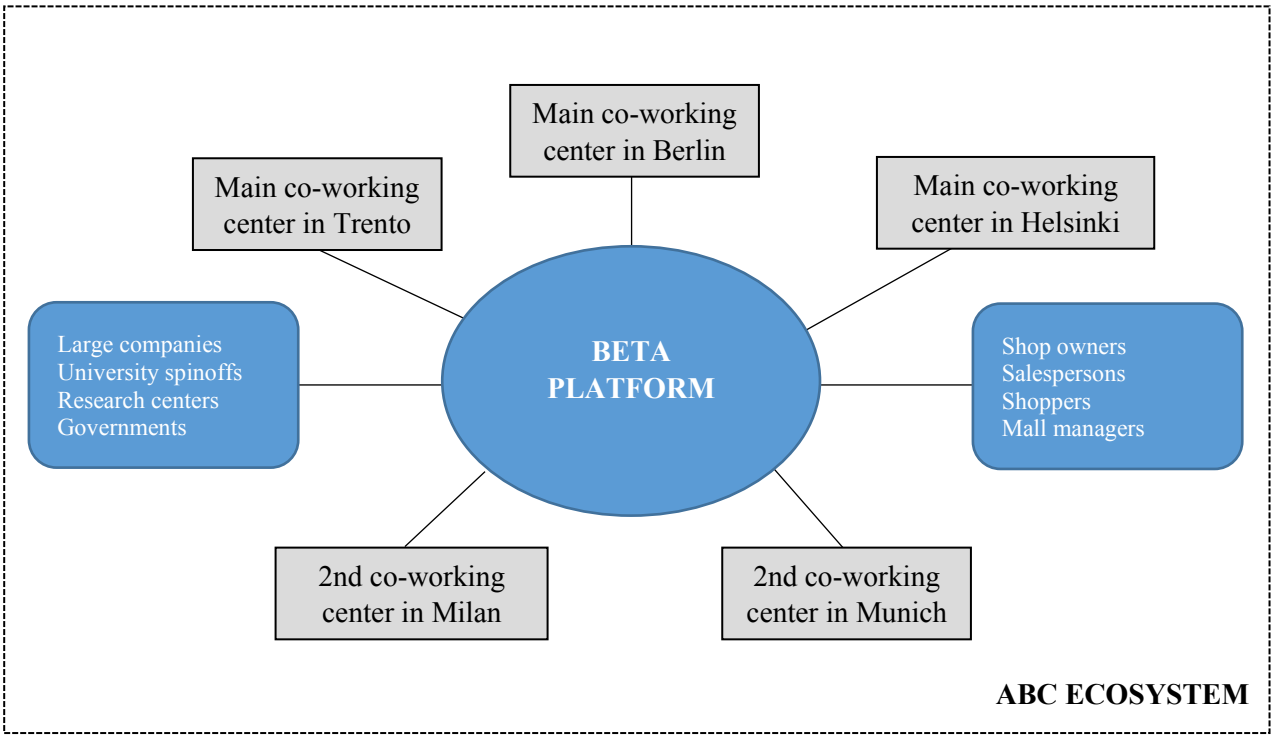

Figure 2: The platform and the meta-organization context of analysis

4. DATA ANALYSIS AND FINDINGS

ABC is considered a meta-organization built to promote both economic and social to the society by delivering data-driven retail innovations to the target markets. The main problem to be addressed by ABC is to help different companies and retailers in different segments to increase profit and create social impact via reducing salesperson stress at the working place and helping them to increase the overall sales performance.

The AI-based platform called BETA launched by the meta-organization ABC and its partners (i.e., shop owners, shopping centers, managers, salespeople, citizens, and entrepreneurs) had a strong root in key European cities. In these cities, the large presence of retailers enables ABC people to test the technology and collaborate with a great improvement of shoppers on daily basis interaction. These actions have been carried out in strong collaboration between public and private organizations based in Italy, Germany, and Finland.

The integrated end-to-end AI-based solution is focusing on empowering retail shop owners to build new shopper experiences, which are implemented on top of BETA was the central benefit of ABC as a meta-organization, thus providing orchestration to the whole community of partners in the entire retail ecosystem. The platform enabled retailers to explore omnichannel data analytics, such as real-time understanding of consumer purchases. The platform was capable of serving different retail segments, ranging from supermarket food distribution to fashion brands with highly professional showrooms. The strategic impact of the ABC as a meta-organization was the creation of the BETA platform and the support to other organizations like large companies, small companies, startups, and spinoffs for the commercialization of compelling retail shopper experiences via the BETA platform (i.e., all different access point that retailers do marketing and selling activities to final consumers).

The BETA platform was organized in three sub-projects (BETA-A, BETA-B, BETA-C), which were reliable interdependent based on the use of integrated software (i.e., using open-source code, as well as proprietary code with specific intellectual propriety right licensees) with several application program interfaces (API). These APIs enable the companies to create tailored solutions for retailers' most varied needs in segments such as supermarkets, shopping centers, showrooms, temporary stores, large events, brick and mortar stores, and electronics.

The new services and products created on top of the BETA platform were commercialized and created a high impact in several targeted markets in selected cities in Italy (Trento, Milan, Turin), Germany (Berlin, Munich, Saarbrücken), and Finland (Helsinki, Tampere, Espoo). In this way, ABC achieved European market diffusion by using the large companies' sales channels that were stakeholders of the meta-organization as a well-connected ecosystem. ABC designed and developed ICT software components (i.e., services, sub-products, or final products) to deliver social and business benefits to customers and investors via the integration of each of the three sub-projects with several interdependencies.

ABC managers created an orchestration mechanism called “benefits alignment”. It was measured monthly, quarterly, and yearly. It was presented to the Board of Directors of ABC to approve the funding, the BETA business strategy, and social plans, and milestones to execute the platform creation and delivery. Furthermore, ABC used key performance indicators (KPIs) implemented by the directors and managers of BETA and the three-sub projects to monitor every component's performance during the whole three years of the BETA platform innovation process.

Entrepreneurs, by exploring data-driven innovation platforms, also increased the competitive advantage of their companies and reduced the health problems of employees, and minimized the absence at work. From the shop owner's perspective, data-intelligence helps increase sales performance, increase the retention of current customers, and increase new customers' conversion rates. This action avoided the risk of bankruptcy of small-medium retailers, particularly small shops inside shopping malls, mainly because of the high costs of rents of spaces in shopping malls. Moreover, the problem of bankruptcy and the "closing doors" of small-medium retails in Italy, Germany, and Finland is a big issue. From this landscape, the ABC way of working was analyzed via a meta-organization framework in collaboration with users and entrepreneurs from different perspectives, and it is presented in the next sub-sections.

4.1. The organizational orchestration and business strategy

From the strategic perspective of the meta-organization ABC, the Board of Directors (BoD) started the BETA design of the ICT platform by the high-level mapping of all partners' expectations involved in the ecosystem. The ABC managers design the BETA since the very beginning, thus developing the mission, vision, goals, and impact of BETA on the market, the BETA duration, and the very high-level estimated budget to acquire the resources and to deliver the benefits to the stakeholders.

Throughout the analysis of the data collected, the intent of ABC was to orchestrate the building and the scale-up of commercialization of a domain-specific software platform for the retail market, firmly based on the most advanced ICT tools rooted in machine learning and big data analytics techniques. It aimed to achieve the business and social needs of the stakeholders, which are the increasing of revenues, creation of spinoff companies, creation of new job positions, and increasing the performance of salespersons in European cities. It reduced the level of salesperson job insecurity, as supported by Nam's (2019) recent research. It was directed related to the adoption of new technologies by retailer shop owners, in particular, an AI-based tool capable of simplifying the everyday work and improving the salespersons' performance while improving the overall shopper experiences.

ABC managers performed the motivation analysis to check the stakeholders' interest to actively participate in the meta-organization design of new products for the retail market. ABC managers studied the list of organization members of the ecosystem and called every stakeholder to get to know more details with their expectations regarding business and social impact in the market. ABC managers designed the BETA business case for the three sub-projects (BETA-A, BETA-B, BETA-C) and goals considering the market dynamics of the different retail segments (i.e., small shops, supermarkets, large retail chains, and retail events). ABC managers also take care of designing ABC structures for getting funding from public and private agencies, local government sponsors, and even from a venture capitalist, and some single top managers called Angel investors.

ABC business people started developing business cases based on the high-level intention of creating an integrated retail platform for increasing the online and offline revenues of customers in different segments. From this perspective, the three key business cases focused on the sectors of shopping centers, supermarkets, and large events. Thus, ABC managers carried out a marketing and regulatory analysis to understand competitive solutions, risks, and opportunities, as well as the potential for delivering a highly scalable software solution that enabled to cover at least the three key segments. ABC had the central role of the ecosystem, and because of this fact, contacted potential local sponsors from the government in the cities of Trento, Helsinki, and Berlin to get the support of regulatory nature and to increase local awareness of the business and social services and products that will be appearing on the market in the coming years.

The three business cases of BETA were taking into consideration the business and social impact and the cultural and political differences among the three key European countries involved in the meta-organization orchestration of BETA (i.e., Italy, Germany, and Finland). ABC managers carried out an in-depth evaluation of the risks to guarantee the BETA's alignment with the meta-organizations' strategic plan towards the success in the market. The business case documentation included the high-level costs, milestones, and outcomes, considering the technological readiness and the business feasibility, regarding the commercialization of the solution to all defined retail segments. Moreover, ABC developed the business model canvas to put together public and private resources to guarantee sustainability in return on investment for the public and private partners' organizations. Finally, the motivations to create the BETA and the three business cases were validated and approved by the ABC board of directors. It was a structured way to guarantee equality in the distribution of financial resources to the partners involved in the meta-organization.

4.2. The process of engagement of users and key stakeholders

The ABC Head of Innovation started identifying the stakeholders and expert users by creating a matrix that

included each one's single and collective expectations. It considered every stakeholder's nature: European bodies, local governments from three different countries, large corporations with offices in several European countries, universities, research centers, small-medium companies, and startups. It also included some small-medium retail shop owners in the stakeholder mapping because they agreed to participate in the BETA product development to test the software solutions in real-life environments, and they agree to provide a vast base of shoppers from segments such as retail electronics, supermarkets, fashion brands and clothing, and footwear accessories.

The researchers collected historical data from all users and stakeholders, which included the business report from the large corporations that helped to identify the market trends and new business opportunities, which explored the social side required by the public institutions. The researcher carried out informal interviews with large corporations' top management to confirm the data collected from secondary sources. Based on this cross-information (i.e., historical data and interviews data), the Head of Innovation started organized meetings with the stakeholders to negotiate the expectation of the benefits and developed the first set of KPIs, in a way they could have clear visibility of the BETA execution and the delivery of the benefits with the expected quality over time.

The BETA Head of innovation built effective relationships with the key people from the large companies, small-medium companies, and spinoffs created during the whole period of BETA. The BETA project managers built effective relationships with shop owners, salespersons, and shoppers as the key users of the BETA platform application. These business actors and the key users were fundamental to the big data-driven analysis and AI-platform integration. The users helped with the validation of the quality of the high standards in terms of state-of-art of advanced deep learning algorithms, machine learning tools, and big data analytics dashboard embed in final products for the retail market. Based on that, the BETA Head on Innovation was capable of speeding up the delivery process, with the key software features and the achievement of the expected results set by the stakeholder in a timely manner.

The evaluation of internal and external risks by the ABC managers was based on a formal risk management plan, frequently updated together with the stakeholders, mostly business people with several years of experience in the retail sector. Based on that plan, ABC managers were able to anticipate roadblocks on BETA development and negotiate with the stakeholders to help mitigate the risks and act rapidly to introduce the changes in the BETA software platform. It was fundamental to align BETA goals and ABC goals to keep aligned the current AI software development and the future of the AI-based new technology evolutions to guarantee market continuity and high diffusion rates. Finally, ABC managers interact with external financial sponsors to deal with the most business and organizational pressing issues towards increase the competitive advantage of the companies in the European market.

The Head of Innovation, the project managers, and the researchers had weekly meetings with the Board of Directors of ABC, with the participation of some critical external sponsors to get the support of funding and align BETA features with ABC's strategy as a whole. It was fundamental to keep the continuous alignment of retail owners request in terms of product development and the ABC strategy to achieve business and social impacts at the global level. This action helps the ABC Board of Directors to get all stakeholders actively involved and committed to providing the planned resources (e.g., money, IT infrastructures, high skill personnel, and dedicated project managers) to achieve the common goal under the orchestration of the meta-organization structure.

4.3. The organizational model to support entrepreneurs and market impact

The organizational way of working applied by ABC is deeply rooted in agile methodologies such as tracking tools to do key timely market actions. It is a less formal structure that helped to speed the go-to-market of the AI-based innovations. It means that ABC project managers propose the changes to the BETA platform, and these changes were implemented in the fast-track model, without too much heavy organizational structure. This model enables the meta-organization partners to improve sub-projects development, visibility, efficiency and align all stakeholders to get support to achieve the expectations successfully. ABC managers developed an updated governance model frequently to be capable of analyzing all target results

set by the top management of ABC, the so-called board of directors of the meta-organization. The model considers that stakeholders came from different backgrounds, different countries, and with different expectations, in particular considering the business environments and the external risks, as well as the change management mindset from three different countries, which are Italy, Germany, and Finland.

ABC managers developed the essential BETA standards, and the project managers responsible for the development of the whole BETA report the results of software development and commercialization. ABC managers developed on time and shared with the stakeholders the BETA development progress status. BETA Head of innovation communicated to the stakeholders via email every quarter by obtaining written feedback with the proposal of product improvements. This report was based on stage-gate reviews with top management and external experts, used to monitor the BETA platform performance, and approved the BETA roadmap to go to the next phases in software development.

The BETA Head of Innovation created and delivered high-impact presentations, which were carried out every year and via face-to-face mode for different stakeholders and the external public. The external public was governments that would like to have the solutions implemented in their cities, small-medium companies that would like to act as resellers, new potential customers, and current customers who would like to have the most updated ICT software features.

The organizational alignment for innovation development led by the Head of Innovation was carried out with the retailers, the high-tech entrepreneurs, and the large companies. He adopted the use of advanced software platforms for tracking the work to be done. This action focuses BETA on keeping the planned scope and aligned with the meta-organizational goals. ABC provide and evaluate a clear set of key performance indicators (KPI) using a transparent management tool that shares with the whole team members, the project members, the top management, and the external stakeholders. In particular, in the third year of the BETA development, ABC managers revised the business and social strategic planning to guarantee the meta-organization will achieve the strong capacity of enabling the creation of a cloud-based services solution. The solutions were built by high-tech spinoffs to support retail shops' sales assistants from different business segments, enabling shop owners to increase sales and increase conversion rates and retention rates.

Based on the third-year plan, the BETA Head of Innovation monitored every quarter results and developed the lessons learned, as well as presented to the top management of the meta-organization ABC and the external partners. It enables the BETA Head of Innovation to get support on the implementation of timely changes in the product, and it guarantees the continuous alignment of BETA features to guarantee business and social results. By monitoring the external competition in the retail market, ABC project managers of the three sub-projects proposed to the top management of ABC some essential changes on the ICT software development of every single project, which were fundamental to facilitate the integration of the software functionalities in the whole BETA platform.

4.4. Allocation of resources, entrepreneurial support, and performance measurement

Resource allocation was carried out by the ABC Head of Innovation, who looked at the technology interdependencies of the three sub-projects of BETA, in strong collaboration with entrepreneurs, which were presented on the three business cases as following:

i) New tools to help customer to find goods via indoor location analytics in supermarkets and shopping malls;
ii) Scalable showroom services for small business in brick and mortar shops, which are based on content management software and customer engagement;
iii) The hardware and software infrastructures enabled BETA-C deployments in airports, retail banking stores, and shopping malls. These infrastructures included virtual reality experiences for innovative purchase techniques.

Based on the scenarios presented above, ABC managers defined the project's high-level descriptions to select the best-skilled project managers with core competencies on technical and business sides, as well as the ones with strong team leader experience. After the BETA platform official kick-off date, the ABC Head of Innovation initiated the projects BETA-A and BETA-B with a kick-off meeting together with the two project managers, the team members, the CEOs, and CTOs of the spinoffs created by ABC to carry out shared value creation actions. The third project BETA-C, was initiated after 12 months from the creation of ABC meta-organization for strategic and business motivations. It considered the higher level of maturity of the AI-based technology of BETA-C, based on the technology readiness index (TRL), which is a well-known global index ranging from 1 to 9 to measure the way technology is ready to be used by the final consumers.

The Head of Innovation assigned project managers to manage costs, schedule, and the performance of every project and talked to the project managers on a weekly basis in order to motivate them to get the work done via the integrated execution of the BETA technology roadmap. BETA project managers strongly interacted with team members, shop owners, and salespersons to design and develop the BETA platform's software components. The Head of Innovation led the project managers to engage customers to run the pilot experimentations of the solutions, and after that phase was being concluded, thus be sure that the shop owners would buy the solution. That action is fundamental for the sustainability of the operation. The return on investment (ROI) is critical in meta-organizations because several different stakeholders are expecting social and business impact and dividends, money-back to continue as a partner of the meta-organization.

The ABC Head of Innovation kept the BETA technology scope's continuous alignment with the meta-organization strategic plan by having weekly meetings with the project managers to guarantee the platform integration. The Head of Innovation coordinated the sharing of resources among the projects to guarantee the delivery of the main BETA goal, which was creating the BETA and applying the three business cases tailored to different customer segments. The Head of innovation selected the team members with varying mindsets considering the technical and business skills and combined the best technical and human resources to facilitate the integration among the BETA tools delivery, to guarantee the maximization of results considering the complexity of the several interdependencies. For example, some interdependencies of the three projects were based on machine learning algorithms, augmented and virtual reality tools embedded in the layout of physical stores, which were integrated with the promotions presented in displays, and integrated with inventory management and store management systems.

To properly manage the high quantity of technology interdependency in the meta-organization structure, the Head of Innovation used agile software to track and monitor the work to be done. It was carried out with the key business people inside ABC, particularly experienced entrepreneurs who launched spinoffs and entrepreneurs from small-medium companies. Furthermore, the Head of Innovation had monthly meetings with the project managers to solve issues, remove roadblocks and resolve conflicting situations among the project managers, as well as prioritizes technological components for delivering, as well as to support the speed-up of the software developed, thus finally achieving BETA goals on time. ABC project managers were physically based in the co-working spaces in the cities of Trento, Berlin, and Helsinki and traveled at a very frequently pace among the co-working cities to meet the team, the stakeholders, the shop owners, the salesperson, the shoppers in order and to guarantee the BETA development alignment with the strategic meta-organizational goals.

The ABC Head of Innovation selected the first set of Key performance indicators (KPI) proposed by the BoD of the meta-organization to start evaluating the preliminary results of the BETA platform. After that, he developed the meta-organization management plan to align the stakeholders' expected benefits with the KPIs. It was used to measure the BETA sub-projects' performance against the expected results agreed with all stakeholders (i.e., sponsors, managers, team members, shop owners, salespersons, and shoppers). ABC projects orchestrate face-to-face meetings with the whole team members, directors, and other ABC stakeholders to guarantee commitment for the BETA technology development, considering the complexity of monitoring interdependencies among the three sub-projects of BETA. The ABC Head of Innovation developed the KPIs to measure the performance every three months and to check the expected results were achieved alignment. At the end of every project year, ABC managers presented the results of the

quantifiable target KPIs to the public and private partners. The KPIs are the number of customers involved with BETA development and piloting applications; the number of products and services components developed on top of BETA; the amount of generated revenue from the sales of BETA sub-projects software's; the number of customers using the software components; the innovations that have achieved the targeted innovation delta based on TRL.

In the second and third years after the BETA formation, the Head of Innovation developed what-if scenarios to monitor the impact of a lack of a particular expected achievement. Based on that, ABC project managers updated the BETA roadmap to guarantee the delivery of the benefits in a coordinated manner by the on-time management of the process of delivering the BETA products and pilot applications to the customers. ABC meta-organization orchestrates the pilot applications in several countries such as the key ones Italy, Germany, Finland, and additionally started the global expansion to Norway, UK, Holland, Luxembourg, Spain, China, Canada, the US, Brazil, and Chile. ABC project managers coordinated the sharing of human and technical resources among the three sub-projects of BETA to guarantee the overall results of the ICT software solutions to the shop owners in the retail sector's various segments in the above-presented countries. It considers the business and social needs of stakeholders, as well as the cultural, legal, and regulatory schema based on data protection rules.

The ABC Head of Innovation measured the impact of the products delivered to shop owners at the end of every year and recorded it in a financial system register. The register officially confirmed the shop owners accepted the product, and it increases the revenue as planned. ABC project managers measured the outputs of the three-year participation of the partners of the meta-organization, which were highly successful. ABC was capable of helping small, medium, and large and spin-.offs to sell more than 50 customized ICT-based service solutions to the retail market, thus enabling the new shopping experiences for shopping malls, small shops, supermarkets, retail chains, luxury brands, and retail event organizers. Finally, the ABC head of innovation monitored the transition of the products created as meta-organization to the single organization. It means several intellectual propriety rights (IPR) agreements signed among ABC partners to guarantee the freedom to commercialize the products. Moreover, the marketing actions were required to consolidate the brand of the ABC. From this perspective, the partners of the meta-organization ABC focused on the standardization of the branded ICT service solutions to keep business and social goals sustainably.

5. DISCUSSION AND IMPLICATIONS

This research explores how a meta-organization orchestrates user engagement to enable new tech-entrepreneurs for the achievement of business and social needs in the retail market, which creates shared value for the whole ecosystem of involved stakeholders. In particular, the research argues that meta-organizations offer a robust model to create collaborative data-driven tools to help employee-customer interaction in a physical store, extending the research of von Briel (2018) and Battisti and Brem (2020). The software platform developed by the new tech-entrepreneurs and other corporations in the meta-organization uses the data available from several different sources, such as social media platforms and customer relationship management systems.

With sharp big data analytics tools for decision-making, the BETA platform enabled retailers to be aware of individual shoppers' purchasing decisions and accordingly engage those shoppers in tailored shopping experiences, which created a high impact on sales performance. ABC meta-organization facilitated the connection between shop owners and technology companies, which helped them to obtain real-time customer needs based on tailored AI- tools. This helped retailers to bridge electronic and physical commerce, which eventually helped shoppers to make an efficient purchasing decision as compared to the retail shops that did not use these data insights.

It is important to note that ABC gathered this data from the final customers in an anonymized and integrated way for its partner network, which is also referred to as omnichannel data analysis (e.g., Bell et al., 2014). ABC succeeded in creating a well-recognized BETA platform based on the omnichannel data,

which successfully blended electronic and physical commerce. The three sub-projects of BETA enabled retailers to increase B2C e-commerce sales via data-driven innovation tools. It was an influential model considering the B2B strategy of ABC business companies and retailers and the participation of SMEs, universities spinoffs, and startups.

In line with the research of von Briel (2018), findings show that the omnichannel data provided by the meta-organization became an essential source to identify business opportunities in all the different retail segments. This is due to the fact that consumers want to have a seamless experience in-store and online to make an informed purchasing decision. Advanced recommendation tools offer this kind of seamless experience (Marchand and Marx, 2020) and hence become essential for retailers. Thus, retailers should be aware of the best technologies to compete in the new era of the digitally connected customer where shoppers can get the best recommendations from the salesperson.

In a nutshell, our research found that data-driven innovations in meta-organizations are a promising way of organizing future AI-based software developments, particularly in complex and highly competitive European large cities such as Milan, Munich, Berlin, London, Paris, Amsterdam, and Helsinki. It became apparent that meta-organizations supported technology-based entrepreneurs in creating new business opportunities. The critical success factors (CSF) of meta-organizations are presented as a summary in Table 1.

Factors	Key concept	Description
CSF1	Guarantee the final user satisfaction	The needs of final users of the AI-based technology (i.e., salesperson and shop owners) were achieved because of the meta-organization orchestration of daily interaction between the software developers, the end-users, and the shoppers.
CSF2	Strongly support fundraising for new-technology entrepreneurs	Meta organizations help find new sponsors and business people capable of providing some risk funding for the launch of AI-based new ventures that used machine learning and big data analytics tools as main assets.
CSF3	Guarantee the partners satisfaction	The meta-organization model is very well structured to orchestrate the analysis of the partner's expectations compared to the common goals. It is fundamental to guarantee alignment of business and social needs achievements when the AI-based digital innovations are delivered on the market.
CSF4	Orchestration AI-based platform development	The high capacity for orchestrating the development of data-driven innovative products, from AI-based platforms, under the umbrella of meta-organization is a guarantee of higher levels of stakeholder satisfaction.
CSF5	Speed on time-to-market to guarantee a faster product launch	The structure of the meta-organization is agile enough to help small, medium, large, and spinoff companies to commercialize AI-based digital innovation based on intellectual-property agreements, as well as based on the delimitation of countries and particular areas of commercialization per product and company.
CSF6	Digital spinoff entrepreneurs as key actors	The spinoff entrepreneurs of the meta-organization with an AI-based mindset were the key actors in keeping shop owners satisfied. It mainly because AI-based spinoffs were the fastest organizational form to get information from the customers and provide it internally to the meta-organization. It is fundamental because several meta-organization partners can be very supportive in terms of different resources (i.e., HR, funding, business advice, and social advice) to help the spinoff succeed on the market.
CSF7	Understanding the needs of people from varied mindsets	Meta-organizations were fundamental for understanding the needs of stakeholders from different mindsets in AI-based complex business ecosystems like the digital and physical retail environments.

Table 1: Critical success factors in meta-organizations

Furthermore, digital platforms created by meta-organizations could be viewed in a new business model perspective, in which data-driven innovations enable the creation of an environment where retailers can provide to their customers' key experiences of online and highly connected retail. This related model is presented in Figure 2.

It increases the competitive advantage of small-medium retailers, enabling them to access shoppers via new products available on multiple channels and to differentiate against global competitors. With software solutions created from meta-organizations, the large European retailers and small-retail shops can

leverage opportunities coming from omnichannel retailing platforms such as BETA to win on the global markets via bridging B2C e-commerce with physical commerce. Furthermore, platform-based meta-organization uses omnichannel data to enables a global competitive advantage to shop owners in the retail sector. It opens new business opportunities for entrepreneurs to achieve and keep a long-term competitive advantage in helping small-medium retail shops to play against well-established global e-commerce players.

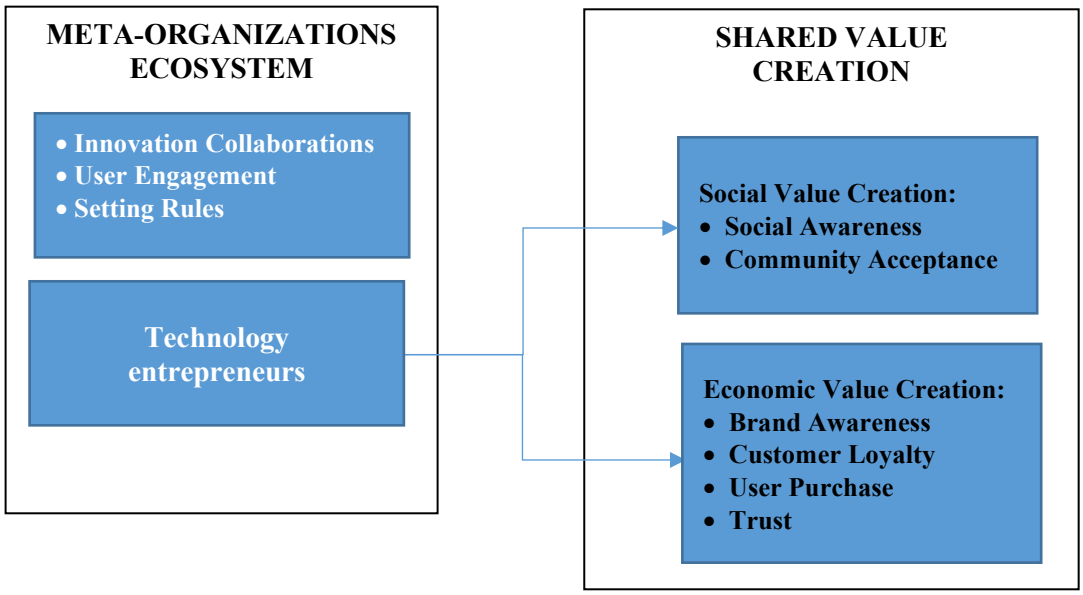

Figure 2: Model for meta-organization orchestration of AI-based solutions

5.1 Implications

Answering the research call from Berkowitz (2018) on collective practices and processes inside meta-organization for diffusing innovations, this study shows that meta-organizations support entrepreneurs with engaging users via altruistic mechanisms. This means that the high involvement of people with a different mindset in innovation development is fundamental for innovation's social side perspective, as for example, via the use of augmented reality (AR) tools as suggested by Dacko (2017).

This research shows that meta-organization orchestration can effectively guide stakeholders from different mindsets and supported by citizens to create shared value solutions, in particular via the high scalable capacity of new tech-entrepreneurship of achievement innovation diffusion and increasing sales rates. In this context, digital innovations are a reliable alternative to tackle critical social issues towards the improvement of economic growth and the increase of the quality of life of people in stressful working places, in which the competition is very high such as the retail environments. Following this line of thinking, meta-organizations are increasingly focusing on sustainable development (i.e., creation of social and economic value) to allow for greater social cohesion. Meta-organizations focus on social problems that could be solved and are relevant for the different stakeholders (i.e., citizens, salesperson, private companies, public organizations, and entrepreneurs).

Meta-organizations help tech-based entrepreneurs in product development, in particular with financial rewards to recruit people to participate in high tech-based innovation development, extending the research of Elia et al. (2020). As soon as money is involved in the new technology co-creation process, meta-organizations help finds both public and private funding sources, fundamental to keep the user highly

involved in the process. User engagement appears to be crucial in digital innovation platforms to increase social impact and keep the shared value perspective in the mind of the entrepreneurs.

Digital innovation development orchestrated by meta-organizations structures is a considerable competitive advantage comparing with companies going along to compete in the retail market. These advantages for partners to collaborate in meta-organization to develop digital innovation involve all stakeholders and the end-users of the data-driven platform. Moreover, local governments are able to explore the potential of AI-based tools in new locations with minimal costs and high impact. High levels of social relationships embedded in meta-organization further enable the expansion to other municipalities for testing and developing data-driven innovation based on digital platforms.

Data-driven innovations in the retail market are an opportunity for meta-organization, entrepreneurs and employees, and shoppers to create shared value. This research study the way meta-organizations orchestrate different actors for shared value creation in the retail sector. This process observed meta-organization build socially recognized machine learning and big data software solutions that cope with customer needs by achieving business and social impact. It could be considered as a continuous and dynamic process, reproduced by people who act based on their interpretations and their knowledge of the business and social opportunities.

This research has linked business intelligence based on big data analytics and machine learning tools with the orchestration of meta-organizations. It also studies the social process of data-driven innovations developed by entrepreneurs with a strong AI-based mindset. From that point, social value creation could be seen as a necessary alternative option to be sponsored inside meta-organizations. It enables public managers to create new policies for sustainable economic growth in European countries, especially in Italy, Germany, and Finland, where this research was carried out longitudinally.

The findings confirm that digital innovation orchestrated by meta-organizations can enable the generation of new business models by techno-entrepreneurs, which creates shared value for society in general. Digital platforms orchestrated by meta-organizations is a relevant field of study and further research. It opens new avenues for researchers to explore new business intelligence tools that can keep shoppers involved throughout the innovation process. In particular, big data analytics can provide new ways to understand omnichannel touchpoints (i.e., the huge amount of data coming from different sources, which are both located in physical and virtual spaces) that can be orchestrated by meta-organizations in a way to empower entrepreneurs to increase competitive advantage.

The co-creation of digital innovation aims to address social needs via agile co-working places coordinated by meta-organizations. Salespersons, shoppers, and business owners are actively involved in this process. They can participate creation of better working places, which in turn increases retail shops' profit and supports them to the increasing of competitive advantage under intense competitive situations.

Well-defined social issues by meta-organizations are beneficial for business and social impact creation because the shared value can be perceived by the whole community of actors involved in data-driven innovation development. Meta-organizations that properly orchestrate data-driven innovations enabling economic development, affecting social and business needs. People are motivated to contribute to tech-based entrepreneurs because they see the shared value of digital innovations in their daily lives. Furthermore, small business owners could benefit from engaging a higher number of shoppers motived to collaborate in AI tools enhancement and positively impact salesperson productivity and business profit.

6. LIMITATIONS AND FUTURE RESEARCH

As indicated earlier, this research tapped into new ground. Hence, a qualitative approach was chosen, which has naturally several limitations considering the uniqueness of the meta-organizations that could be complex for replication studies. Further studies are necessary to discuss these findings in other contexts, focusing on other meta-organizations from East European countries where the competitive scenarios between large e-commerce platforms and small-stores can be different when it comes to shared value creation (e.g., diffusion of social and economic value by new-technology entrepreneurs). Beyond other

continents, these results might look very different considering cultural aspects in Asia; for example, retail banking in physical stores is highly developed, and it can help diffuse in-store purchases. Another aspect is the limitation to one large period of time. With a research assessment over different periods of time of the meta-organizations, the competitive situation could also be different considering the speed of AI-technology evolution.

Moreover, a key interesting topic is an unprecedented situation that happed with the covid-19 pandemic, which changed the current situation in retail dramatically, in which large e-commerce platforms scale-up sales at worldwide levels and several small-stores close the doors at high rates. This also could be evaluated in future research projects by assessing the social impact on local territories caused by the loss of jobs due to the explosion with AI-based technologies powered by the global e-commerce players and their network of delivering courier companies.

REFERENCES

Acquila-Natale, E., and Iglesias-Pradas (2021), S. A matter of value? Predicting channel preference and multichannel behaviors in retail. *Technological Forecasting and Social Change*, *162*, 120401.

Agarwal, N, Chakrabarti, R, Prabhu, JC, Brem, A. (2020) Managing dilemmas of resource mobilization through jugaad: A multi-method study of social enterprises in Indian healthcare. *Strategic Entrepreneurship Journal*. 14: 419– 443. https://doi.org/10.1002/sej.1362

Ahrne, G., and Brunsson, N. (2005). Organizations and meta-organizations. *Scandinavian Journal of Management*, 21(4), 429-449.

Arnold, M.G. (2011). The role of open innovation in strengthening corporate responsibility. International Journal of Sustainable Economy (3:3), pp. 361-379.

Battilana, J., Obloj, T., Pache, A. C., and Sengul, M. (2020). Beyond Shareholder Value Maximization: Accounting for Financial/Social Tradeoffs in Dual-Purpose Companies. *Academy of Management Review*, https://doi.org/10.5465/amr.2019.0386.

Battisti, S. (2014). Social innovation in living labs: the micro-level process model of public-private partnerships. *Int. Journal of Innovation and Regional Development*, Vol. 5, Nos. 4/5, pp.328-348.

Battisti, S. (2019). Digital social entrepreneurs as bridges in public–private partnerships. *Journal of Social Entrepreneurship*, Vol.10, Issue 2, pp. 135-158.

Battisti, S. and Brem, A. (2020). Digital entrepreneurs in technology-based spinoffs: an analysis of hybrid value creation in retail public-private partnerships to tackle showrooming. *Journal of Business & Industrial Marketing*. doi: 10.1108/JBIM-01-2020-0051.

Bell, D. R., Gallino, S., and Moreno, A. (2014). How to win in an omnichannel world. *MIT Sloan Management Review*, 56(1), 45.

Berkowitz, H. (2018). Meta-organizing firms' capabilities for sustainable innovation: A conceptual framework. *Journal of Cleaner Production,* 175, 420-430.

Berkowitz, H., and Bor, S. (2018). Why meta-organizations matter: A response to Lawton et al. and Spillman. *Journal of Management Inquiry*, 27(2), 204-211.

Berkowitz, H., and Dumez, H. (2016). The Concept of Meta-Organization: Issues for Management Studies. *European Management Review*, 13(2), 149-156.

Boudreau, Kevin J., and Karim R. Lakhani. (2009). How to manage outside innovation. *MIT Sloan management review*, 50.4, 69-76.

Bradlow, E. T., Gangwar, M., Kopalle, P., and Voleti, S. (2017). The role of big data and predictive analytics in retailing. *Journal of Retailing*, *93*(1), 79-95.

Brass, D. J., Galaskiewicz, J., Greve, H. R., Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal,* Vol. 47, No. 6, 795-817.

Brem, A., and Radziwon, A. (2017). Efficient Triple Helix collaboration fostering local niche innovation projects–A case from Denmark. *Technological Forecasting and Social Change*, Vol.123, pp.130-141.

Brem, A., Bilgram, V., and Marchuk, A. (2019). How crowdfunding platforms change the nature of user innovation–from problem solving to entrepreneurship. *Technological Forecasting and Social Change*, Vol.144, pp.348-360.

Bugshan, H., and Attar, R. W. (2020). Social commerce information sharing and their impact on consumers. *Technological Forecasting and Social Change*, *153*, 119875.

Cao, G., Duan, Y., and Li, G. (2015). Linking business analytics to decision making effectiveness: A path model analysis. *IEEE Transactions on Engineering Management*, 62(3), 384-395.

Dacko, S. G. (2017). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological Forecasting and Social Change*, *124*, 243-256.

Douglas, E., and Prentice, C. (2019). Innovation and profit motivations for social entrepreneurship: A fuzzy-set analysis. *Journal of Business research*, 99, 69-79.

Elia, G., Margherita, A., and Passiante, G. (2020). Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological Forecasting and Social Change*, Vol.150, 119791.

Erdmann, A., and Ponzoa, J. M. (2020). Digital inbound marketing: Measuring the economic performance of grocery e-commerce in Europe and the USA. *Technological forecasting and social change*, *162*, 120373.

Gavrila, S. G., and Ancillo, A.D.L (2021). Spanish SMEs' digitalization enablers: E-Receipt applications to the offline retail market. *Technological Forecasting and Social Change*, *162*, 120381.

Grover, P., and Kar, A. K. (2020). User engagement for mobile payment service providers–introducing the social media engagement model. *Journal of Retailing and Consumer Services*, Vol. 53. Article in press.

Gupta, P., Chauhan, S., Paul, J., and Jaiswal, M. P. (2020). Social entrepreneurship research: A review and future research agenda. *Journal of Business Research*, Vol.113, pp. 209-229.

Häfner, N., Wincent, J., Parida, V., and Gassmann, O. (2021). Artificial intelligence and innovation management: A review, framework, and research agenda. *Technological Forecasting and Social Change*, *162*, 120392.

Halberstadt, J., Niemand, T., Kraus, S., Rexhepi, G., Jones, P., and Kailer, N. (2020). Social entrepreneurship orientation: Drivers of success for startups and established industrial firms. *Industrial Marketing Management*. In press.

Hansen, E. G., and Grosse-Dunker, F. (2013). Sustainability-Oriented Innovation. In S. O. Idowu, N. Capaldi, L.Zu, & A. Das Gupta (Eds.), *Encyclopedia of Corporate Social Responsibility*. (Vol. Volume 1, pp. 2407–2417). Heidelberg, New York: Springer-Verlag.

Kumar, V., and Venkatesan, R. (2019). Journal of Retailing Special Issue-Metrics and Analytics in Retailing. Journal of Retailing, Vol.95, Issue.2.

Kummitha, R. K. R. (2019). Smart cities and entrepreneurship: An agenda for future research. *Technological Forecasting and Social Change*, Vol.149, 119763.

Li, C. Y. (2019). How social commerce constructs influence customers' social shopping intention? An empirical study of a social commerce website. *Technological Forecasting and Social Change*, Vol. 144, pp.282-294.

Luo, N., Wang, Y., Zhang, M., Niu, T., and Tu, J. (2020). Integrating community and e-commerce to build a trusted online second-hand platform: Based on the perspective of social capital. *Technological Forecasting and Social Change*, *153*, 119913.

Marchand, A., and Marx, P. (2020). Automated Product Recommendations with Preference-Based Explanations. *Journal of Retailing.* Volume 96, Issue 3, pp. 328-343.

Mein Goh, J., Gao, G., and Agarwal, R. 2016. The Creation of Social Value: Can an Online Health Community Reduce Rural-Urban Health Disparities?, MIS Quarterly (40:1), pp. 247–263.

Nalchigar, S., and Yu, E. (2018). Business-driven data analytics: a conceptual modeling framework. *Data & Knowledge Engineering*, Vol.117, pp.359-372.

Nam, T. (2019). Technology usage, expected job sustainability, and perceived job insecurity. *Technological Forecasting and Social Change*, *138*, 155-165.

Ogink, T., and Dong, J. Q. (2019). Stimulating innovation by user feedback on social media: The case of an online user innovation community. *Technological Forecasting and Social Change*, Vol.144, pp.295-302.

Pavlovich, K., and Corner, P. D. (2014). Conscious Enterprise Emergence: Shared Value Creation Through Expanded Conscious Awareness, Journal of Business Ethics (121:3), pp. 341–351

Porter, M. E., and Kramer, M. R. (2011). "Creating Shared Value: Interaction," *Harvard Business Review* (89:4), pp. 16–17

Presenza, A., Abbate, T., Cesaroni, F., and Appio, F. P. (2019). Enacting social crowdfunding business ecosystems: The case of the platform Meridonare. *Technological Forecasting and Social Change*, Vol.143, pp.190-201.

Pustovrh, A., Rangus, K., and Drnovšek, M. (2020). The role of open innovation in developing an entrepreneurial support ecosystem. *Technological Forecasting and Social Change*, Vol. 152, 119892.

Radnejad, A. B., Vredenburg, H., and Woiceshyn, J. (2017). Meta-organizing for open innovation under environmental and social pressures in the oil industry. *Technovation*, 66, 14-27.

Rawhouser, H., Cummings, M., and Newbert, S. L. (2019). Social impact measurement: Current approaches and future directions for social entrepreneurship research. *Entrepreneurship Theory and Practice*, 43(1), 82-115.

Roggeveen, A. L., and Sethuraman, R. (2020). Customer-Interfacing Retail Technologies in 2020 & Beyond: An Integrative Framework and Research Directions. *Journal of Retailing*, *96*(3), 299-309.

Rosca, E., Agarwal, N., and Brem, A. (2020). Women entrepreneurs as agents of change: A comparative analysis of social entrepreneurship processes in emerging markets. *Technological Forecasting and Social Change*, Vol.157, 120067.

Schein, E. H. (2008). Clinical inquiry/research. In: P. Reason & H. Bradbury (Eds.), *Handbook of action research*. 2nd edition. pp. 266-279, Sage, London.

Seltzer, E., and Mahmoudi, D. (2013). Citizen participation, open innovation, and crowdsourcing: Challenges and opportunities for planning. *Journal of Planning Literature*, 28(1), 3-18.

Shankar, V., Douglass, T., Hennessey, J., Kalyanam, K., Setia, P., Golmohammadi, A., Tirunillai, S., Bull, J.S., and Waddoups, R. (2020). How Technology is Changing Retail. *Journal of Retailing*. In press. Doi: https://doi.org/10.1016/j.jretai.2020.10.006.

Sinthupundaja, J., Kohda, Y., and Chiadamrong, N. (2020). Examining capabilities of social entrepreneurship for shared value creation. *Journal of Social Entrepreneurship*, 11(1), 1-22.

Surie, G., and Groen, A. (2017). The importance of social entrepreneurship in national systems of innovation—An introduction. *Technological Forecasting and Social Change*, Vol. 121, 181-183.

van Osselaer, S. M., Fuchs, C., Schreier, M., and Puntoni, S. (2020). The Power of Personal. *Journal of Retailing*, *96*(1), 88-100.

von Briel, F. (2018). The future of omnichannel retail: A four-stage Delphi study. *Technological Forecasting and Social Change*, *132*, 217-229.

Wang, Y., Kung, L., and Byrd, T. A. (2018). Big data analytics: Understanding its capabilities and potential benefits for healthcare organizations. *Technological Forecasting and Social Change*, Vol.126, pp.3-13.

Winter, J., Battisti, S., Burström, T., and Luukkainen, S. (2018). Exploring the success factors of mobile business ecosystems. *International Journal of Innovation and Technology Management*, 15(03), 1850026.

Yin, R.K. (2009). *Case study research: design and methods*. 4th ed. Applied Social Research Methods. Vol.5. Sage Publications, Thousand Oaks, CA.

Zaheer, H., Breyer, Y., and Dumay, J. (2019). Digital entrepreneurship: An interdisciplinary structured literature review and research agenda. *Technological Forecasting and Social Change*, *148*, 119735.