WINDS OF CHANGE DUE TO GLOBAL LOCKDOWNS: REFRESHING DIGITAL SOCIAL ENTREPRENEURSHIP RESEARCH PARADIGM

Claudia Yáñez-Valdés[a], Maribel Guerrero[ab1], Sebastián Barros-Celume[a], and María J. Ibáñez[a]

[a] School of Business and Economics, Universidad del Desarrollo, Av. Plaza 680, Las Condes, Santiago, Chile

[b] Global Center for Technology Transfer, School of Public Affairs, Arizona State University, United States

Acknowledgment

Claudia F. Yáñez-Valdés, Sebastián Barros-Celume, and María J. Ibáñez acknowledge the financial support during their Ph.D. studies from the Facultad de Economía y Negocios at the Universidad del Desarrollo in Chile, as well as from the ANID [Agencia Nacional de Investigacion y Desarrollo en Chile].

Suggested citation:

Yáñez-Valdés, C., Guerrero, M., Barros-Celume, S., & Ibáñez, M. J. (2023). Winds of change due to global lockdowns: Refreshing digital social entrepreneurship research paradigm. Technological Forecasting and Social Change, 190, 122454. https://doi.org/10.1016/j.techfore.2023.122454

ABSTRACT

Digital technologies have a significant potential for collaboration, designing, and implementing better business initiatives. COVID-19 global lockdowns have increased the emergence of the Digital Social Entrepreneurship (DSE) phenomenon, which has been key in responding to social needs using digital technologies. The DSE scholarly discussion has been limited to a few studies. Therefore, little is known about theoretical foundations that explain the intersection between digital, social, and entrepreneurship. Based on an integrative literature review and a thematic case study, this study theorizes the micro-foundations of digital-social value-creation and explores the flourishment of the DSE phenomenon during/after the global lockdowns. Our findings contribute to the literature by extending the DSE definition and identifying the fostering (micro, meso, and macro) conditions involved in the digital-social value-creation process. Several implications emerged from the DSE learning, adaptation, and co-creation strategies/practices.

KEYWORDS

Digital Entrepreneurship; Social Entrepreneurship; Digital Social Entrepreneurship; Global Lockdowns; Economic Paradigms

[1] Corresponding author: Maribel Guerrero E-mail: mguerreroc@gmail.com

1. INTRODUCTION

The accumulated entrepreneurship literature has associated economic paradigms and external shakeouts with the emergence of new entrepreneurial phenomena. In this sense, the digital economy has promoted the creation of new ventures using digital technologies as part of these initiatives (Nambisan, 2017); the knowledge-based economy has evidenced the boom of new ventures based on new technologies/knowledge; and the sharing economy has promoted new open business models using social media (Kuratko et al., 2017; Audretsch and Moog, 2020). During the COVID-19 pandemic, Kuratko and Audretsch (2021) debated the losers and winners by highlighting how digital platforms have taken economic advantage of their know-how, technological capabilities, and market adaptability due to the global lockdown restrictions. Especially the imposed COVID-19 restrictive measures led to changes along (non)essential industries as well as fluctuations in international trade and financial market, affecting the global economy and worsening social problems (Leach et al., 2021). In this scenario, (Kuckertz et al., 2020) highlighted initiatives to satisfy demands/requirements from the population, public offices, and research communities. Therefore, given the social distance restrictions and the limited government response to social/health/economic problems, the authors observed an accelerated emergence of multiple digital initiatives with societal purposes with the involvement of several actors (Ibáñez et al., 2021).

By reviewing the accumulated literature, we identify theoretical and empirical contributions that better understand social and digital entrepreneurship as two independent phenomena. Indeed, we identify a few studies that non explicitly recognize the intersection between digital technologies and social purposes but expose the societal meaning in a particular digital/technological sector or vice-versa. Before the pandemic, anecdotal studies recognized the interplay between digital and social orientations (Battisti, 2019; Cangiano et al., 2017; Ibáñez et al., 2021; Masiero & Ravishankar, 2018; Short et al., 2009). Digital Social Entrepreneurship (DSE) differs from traditional social entrepreneurship in that digital technologies allow for reaching a larger number of users and solving local, national, and international problems (Donthu & Gustafsson, 2020), as well as in the adaptability to provide rapid problem-solving solutions (Ratten, 2020; Satar & Alarifi, 2022; Zhiyang et al., 2020). Therefore, little is known about digital social entrepreneurship's theoretical foundations. We assume that the global lockdowns represented the winds of change in the configuration and the refreshing of this research intersection/paradigm.

This study theorizes the micro-foundations of digital-social value-creation, as well as explores the flourishment of the DSE phenomenon during/after the global lockdowns. To achieve these objectives, after developing an integrative literature review, we interviewed twenty-one DSE founders to understand the nature of their initiatives, the role of COVID-19 in their born or adaptation of business models, and the understanding of digital value-creation processes. We find that the DSE refreshes a research paradigm because it explores and exploits the opportunities associated with the uncertainty of the environment to propose innovative solutions to society's needs. In addition, the experience and knowledge of the entrepreneurs allow the association of social objectives with digital technological means; this integration translates into flexible and adaptable value-creation processes that distinguish the DSE from other types of initiatives. Furthermore, we define DSE as "Entrepreneurial initiatives with social purposes developed by incorporating digital technologies into their business model due to the interaction and collaboration between multiple agents". Our work contributes to the entrepreneurship literature by refreshing a

research paradigm that emerged after unexpected external conditions (the COVID-19 pandemic) and proposing a conceptual model with several propositions to inspire future researchers.

This article is structured as follows: Section 2 explains the methodological approach to tackling our objectives. Section 3 presents the main findings per each methodological stage. Section 4 discusses the results, contributions, limitations, and avenues for future research from this study. Then, Section 5 presents the conclusions.

2. THEORETICAL BACKGROUND

2.1.1. DSE: An emerging phenomenon

The entrepreneurship literature has recognized the existence of two phenomena: digital entrepreneurship and social entrepreneurship. While digital entrepreneurship (DE) has represented an agile response to embracing new products, services, and processes that integrates digital technologies within innovative business models (Giones & Brem, 2017; Kraus et al., 2019; Nambisan, 2017), social entrepreneurship (SE) has represented initiatives with an ability to address social problems (Mair & Marti, 2006). In this vein, Battisti (2019) suggested the emergence of an alternative framework that considers the needs/opinion of socially relevant groups as part of the innovation, digital and entrepreneurial processes. Indeed, several actors (entrepreneurs, customers, investors, and governments) have highlighted an interest in the intersection between social value-creation and digital technologies as an alternative to take advantage of scale economies and facilitate geographical penetration (Dong, 2019; Robb & Gandhi, 2016). This value-creation process has represented an opportunity for the emergence of DSE.

Regarding the DSE definitions, we identified five studies in which authors explicitly defined a new phenomenon called DSE in the convergence between digital initiatives with a social orientation (Battisti, 2019; Cangiano et al., 2017; Ibáñez et al., 2021; Masiero & Ravishankar, 2018; Short et al., 2009). First, Short et al. (2009) understood DSE as an entrepreneurial initiative that relies on digital technology as part of its business model and takes advantage of digital technologies to reach social impact. Then, Cangiano et al. (2017) and Masiero and Ravishankar (2018) reinforced that DSE enables individuals to adopt digital technologies to co-create knowledge/solutions for a wide range of social needs and at an unimaginable geographical penetration. Afterward, Battisti (2019) extended the DSE definition by considering the relationship among individuals involved in the innovation process towards reshaping technology to address emerging social problems and co-create a socio-economic impact. More recently, Ibáñez et al. (2021) exposed that DSE emerges by identifying social entrepreneurship initiatives developed by incorporating digital technologies into their business model due to the interaction of multiple agents.

Although the studies have offered an understanding of the DSE phenomenon, several elements still have not been considered in these definitions. Concretely, the critical role of environmental conditions is regarded as a key determinant of technological advances, entrepreneurial initiatives, and social needs (Zaheer et al., 2019). The best example has been the COVID-19 pandemic which has detonated multiple entrepreneurial initiatives via digital technological platforms due to the social distance restrictions with social orientations as a quick response to the health crises and societal needs. Based on this analysis, DSE is understood as:

"Entrepreneurial initiatives with social purposes developed by incorporating digital technologies into their business model due to the interaction and collaboration between multiple agents"

2.1.2. DSE: A multi-dimensional value-creation process

The literature provides insights into different trigger elements that could explain the theoretical foundations behind the emergence of DSEs as a new research paradigm, as well as the social value-creation process. In particular, three levels of trigger elements in the intersection between digital technologies (platforms, artificial intelligence, augmented reality, machine learning, and the internet of things) and social orientation have detonated entrepreneurial initiatives: (a) the micro-level elements mostly related to the entrepreneur exploration-exploitation of social challenges; (b) the meso level elements related to the integration of digital and social entrepreneurial initiative; and (c) the macro level elements related to the influence of environmental conditions. Table 1 summarizes both dimensions and themes identified per level of analysis.

--- Insert Table 1 here ---

At the micro level, whenever entrepreneurs create digital or/and social entrepreneurial initiatives, the accumulated literature reveals that entrepreneurs react to certain triggers that drive them to use digital technologies to solve social problems. In this sense, the importance of exploration and exploitation processes that promote the emergence of DSE initiatives is recognized. On the one hand, DSE entrepreneurs tend to explore opportunities within social domains, despite environmental uncertainty and perceived risks (Ge et al., 2017). Indeed, DSE entrepreneur has distinguished themselves from other types of ventures in their non-profit nature based on the social related-purposed by taking advantage of digital technologies (Trencher, 2019). Exploration will make sense so that adequate coverage of the target social audience is achieved (Farani et al., 2017). As a result, digital social entrepreneurial action generates societal benefits (Bonina et al., 2021). On the other hand, DSE entrepreneurs seek the resources and technological capabilities required to exploit the identified digital-social opportunities (Anagnou et al., 2019; Del Bosco et al., 2019). The accumulated literature has shown that the successful exploitation of digital-social opportunities also demands the participation of customers, the commitment of partners, and the involvement of other stakeholders in capturing societal needs (McDermott et al., 2018). This process requires direct interaction with the ecosystem to establish user-oriented strategies and partnerships (Sadeghi et al., 2018). Therefore, DSE initiatives are expected to be ambidextrous by simultaneously facing exploration and exploitation challenges to solve today's society's problems (Guerrero, 2021).

At the meso level, the DSE entrepreneur integrates digital technologies and business social development to shape the digital-social initiative. At this level, digital technologies represent the interface in which technologies help to connect initiatives with societal users (Nambisan and Baron, 2019; De Luca et al., 2019; Scuotto et al., 2017; Yu et al., 2019). Business development also requires dynamic collaborations and real-time optimization through open-innovation and crowdfunding mechanisms (Chu et al., 2019). Newer digital platforms enable a more rapid and successful open innovation between partners. Therefore, a key requirement for effective inter-organizational processes is the existence of well-established channels of communication and cooperation (Pradhan et al., 2019). DSE must leverage new technological tools to increase efficiency and deliver new business-based service innovations. In addition, user engagement is

critical to the success of technology-based social innovation within digital platforms across the board (Battisti, 2019). Innovative business models are generated by combining digital technologies and social motivation (Elia et al., 2020). Innovation is based on various digital technologies to access a wider market because of their potential reach, lower costs, and greater engagement with multiple stakeholders (Ladeira et al., 2019). For this reason, one of the essential characteristics of a DSE business model is its dynamism. The DSE speeding cycle is even faster if conventional ventures are born, grow, change, and destroyed quickly. Therefore, new organization models must be designed to cope with social problems where traditional innovation models have failed to introduce systemic changes (Battisti, 2019).

At the macro level, the environmental conditions demand quick adaptation and flexibility of DSE. Therefore, the most important consequences of this new digital era of business are the flexibility of venture creation, given the increasing availability and low costs of enabling digital technologies at our disposal (Lehdonvirta, 2018). This action transcends borders to create new ways of implementing business models, innovation networks, communities, and ecosystems, engaging new and broad audiences, and generating new forms of business and social value (Lee et al., 2018). Moreover, in contrast to mature and competitive markets that limit new entrants' chances of success, the digital entrepreneurship field benefits from a lower threshold for entrepreneurs who want to start their businesses (Chen et al., 2018). Systematizing digital information and transforming it into actionable efforts will increasingly become a key driver of social entrepreneurial success (e.g., social development stemming from increased access and reduced inequality, especially in underdeveloped and emerging countries). At the same time, the value created for society by the cooperation between different actors involved in the ventures (Young, 2010) is context-bound. However, the difficulty in measuring the social benefits of these ventures and their real impact on social change represents a threat to the legitimacy of social ventures in terms of government support (Barraket & Yousefpour, 2013; Dahles et al., 2010; Trivedi, 2010). According to Haugh (2006), when considering context, we must distinguish between different social outcomes, such as creating new services for the community, improving access to the services, and contributing to their social capital, among others. The assessment of these outcomes may provide the required evidence for the legitimization of DSE to secure the investment and commitment among stakeholders and interested parties, including public ones.

3. METHODOLOGICAL DESIGN

To investigate the DSE phenomenon, we began by developing an integrative literature review (Snyder, 2019). This type of review is used in the case of emerging topics that have been scarcely investigated in the literature and is characterized by being free of pre-established protocols (Ammirato et al., 2021). We adopted an approach oriented to creative data collection based on the social-digital nature of the topic to combine perspectives and points of view. We used the information in this research phase to lay the theoretical foundations and elaborate on the interview protocol. We implemented a three-step approach: planning, conducting, and reporting the results.

Firstly, we identified the need to study DSE as a new paradigm. Our research protocol involves the following steps: (a) identify reliable scientific databases with quality academic articles (only articles published in indexed journals); (b) establish clear criteria for the selection of papers; and (c) synthesize our findings using the same template by all authors. We sought convergences between digital and social entrepreneurship and their relationship with the environment.

Secondly, we started by searching for the terms "digital enterprise", "digital start-up", "digital venture", "digital social venture", and "social venture" in the Web of Science (WOS) and Scopus databases from 2010 to 2020. The terms were searched independently by title and theme in each database. This timeframe corresponds to the decade of greatest development in theorizing digital phenomena applied to social objectives. Our first search generated a dataset of 469 articles in total. These papers were downloaded and sorted according to their keywords and core subject matter. We eliminated duplicated papers in both datasets, as well as all articles not published in indexed journals. Concretely, we deleted 167 articles that did not meet the mentioned criteria. Afterward, the abstracts of the remaining 302 articles were revised/analyzed in-depth. We selected 136 articles related to digital initiatives and social objectives at this stage. It is important to mention that not all these published papers explicitly recognized the existence of the DSE phenomenon.

Since the field of DSE research is just emerging, we chose a qualitative case study strategy to examine and develop a theoretical understanding of the focal phenomenon in its natural setting (Yin, 1994). By selecting a case study strategy, we were able to analyze specific cases of individual companies in detail concerning how the Covid-19 pandemic has catalyzed their business model innovation and synthesize similar patterns identified across different companies (Ranta et al., 2021). Accordingly, we set out to "ground" the multidimensional process of DSE and the relationships involved in this process. For this, we followed the following steps:

Sample and data collection: Following Eisenhardt's (1989) recommendations, we do not select a representative sample of the population but a theoretical sample in our case study. In other words, our objective was to choose representative cases of our theorization about the DSE multi-dimensional process. The appropriate number of cases depended on existing knowledge, the subject matter, and the information obtained by incorporating additional case studies (Eisenhardt, 1989, 1991). Based on (Eisenhardt, 1989, 1991), gathering several participants that saturate the analyzed elements and triangulate data to ensure consistency is important. In this regard, our sample came from a global directory of 1000 innovations registered that help people cope/adapt to life during the COVID-19 pandemic called Coronavirus Innovation Map. Given the high number of ventures in this worldwide database, we built a contact dataset of ventures that fit the following theoretical criteria of selection: (a) New ventures and small ventures with less than five years of operation in the market (Venkataraman, 2002) that emerged/survived during the first wave of COVID-19 (Faludi, 2020); (b) ventures that use digital technologies as part of their entrepreneurial initiatives (Nambisan, 2017); and (c) ventures with a social value-creation orientation as part of the adapted business model due to the COVID-19 pandemic (Ibáñez et al., 2021). Concretely, we identified the founders' information of 350 ventures that covered the theoretical criteria.

Between October 2020 and December 2020, we sent a survey to these ventures by email with a response time of approximately 10 minutes. In this first contact, we captured information on 100 ventures: sector, foundation year, social orientation, digital orientation, entrepreneurial purpose, stakeholders, and business model. Concretely, twenty-nine DSE's founders responded to the full screening survey and provided the authorization to be re-contacted for an in-depth interview. Based on the response rates, between January 2021 and March 2021, we remotely re-contacted and interviewed the twenty-nine DSE founders via video call (using the ZOOM platform) for 45 to 80 minutes (see Appendix 2). Finally, from May 2022 to June 2022, we followed up on the evolution of the DSE business model post-pandemic in two ways: (a) reviewing the DSE websites and (b)

re-contacting the 21 participants in our in-depth review. The purpose was to identify if each DSE continues operation and the new improvements on their business models post-COVID-19.

Semi-structured interview protocol: Based on the DSE multi-dimensional process identified in our literature review, we designed a semi-structured interview protocol revised by three experts on the interplay between digital and social entrepreneurship (see Appendix 2).

Data processing: The information obtained from the interviews was analyzed using thematic analysis. Our approach assumes that meaning is socially constructed and that people who reflect on their experiences are "knowledgeable agents". Thus, people know what they are trying to do as they explain their thoughts, intentions, and actions better than anyone else. As such, we foreground informants' interpretations while placing ourselves in the role of reporters whose primary function is to account for the informants' expertise (Gioia et al., 2013). We pose that this approach was an appropriate fit for our research objectives because: first, we sought to examine a new phenomenon where not much is known, and second, it fits well with our purpose of early theorization. In this regard, the interviews were transcribed and coded using NVivo, according to the suggestions proposed by Mayring (2015, 2019). We are considering the findings of step 1. In developing the inductive category, we set out the guidelines for evaluating the transcribed interview material (Mayring, 2019). We follow a process model in which the definition of a selection criterion, the step-by-step processing of the material, and the review of the categories are central. Using the deductive application of categories, we agreed on coding guidelines based on a theoretically developed set of categories (step 1), which determines the conditions for assigning a category to a text passage (see Appendix 3).

4. FINDINGS: Theoretical Foundations and DSE Phenomenon

4.1. DSE: An emerging phenomenon that flourishes due to the COVID-19 pandemic

Table 2 shows the characteristics of the twenty-one DSE initiatives that were interviewed for our study and correspond to companies located in various locations around the world (Asia, Europe, North America, Latin America, and Oceania). Most of the analyzed DSE emerged or re-structured their business model to face the COVID-19 societal needs and restrictions. During the COVID-19 period, most businesses focused on social solutions/applications using digital interfaces (platforms, artefacts, and apps) for supporting health issues, educational needs, data collection diseases, and communication tools to respond to real-time needs.

--- Insert Table 2 here ---

According to all interviews, the COVID-19 lockdowns in 2020 triggered the emergence and the transformation of business models with a digital interface, social orientation, and entrepreneurial initiatives (DSE). A few of the interviewed DSE entrepreneurs had their initiatives before the pandemic. Still, this external shakeout provoked their penetration into other social initiatives and geographies by taking advantage of their technological capabilities and market knowledge. At the same time, several DSE entrepreneurs were born due to the digital-social opportunities/needs identified during the first wave of the pandemic, where none was prepared to respond to a global shakeout. Regarding the key resources and capabilities to exploit these ideas, most interviews highlighted how working teams responded by fully committing to their initiatives in light of this

societal challenge. In most cases, the joint efforts successfully met the stakeholders' needs (customers, suppliers, employees, financiers, and communities). For instance, the DSE entrepreneurs explained that they were committed to meeting their users' needs by establishing a close relationship with them. In this sense, digital capabilities enabled immediate feedback to adapt/generate new products/services and business models to solve multiple global problems. In this process, users' feedback reinforced DSE's rapid adaptability/response by asking users for key information to generate more social value-added through better solutions. Therefore, user-friendly interfaces were favored to achieve the (co)creation of common values, allowing multiple possibilities for continuous improvement. Likewise, collaborative efforts with suppliers were adaptive and quite flexible. In addition, most business partners sought to develop sustainability-related solutions (e.g., integrating ecological and social impacts into value-creation). Furthermore, respondents' narratives highlighted the central importance of open-source designs for enhancing collaboration and customization with other business partners and bettering the value-created. Overall, interviews show that COVID-19 has led to greater cooperation with its partners, seeking that everyone benefited from the results.

Concerning the stakeholder dimension of society, it is crucial to establish the motivations behind these DSEs. Global closures posed new game rules for the community, with serious challenges. Our DSEs were mostly non-profit and needed to connect their business models to culture. These initiatives sought to contribute to sustainable development by targeting some of society's poorest and most excluded segments with free, cheap, and adaptive tools and resources. Thanks to the transformations enabled by digitalization, this became possible. Thus, the advances and innovations provided by DSEs made up for what other pre-existing solutions could not cover due to the limitations associated with global closures, geographical barriers, lack of infrastructure, institutional voids, and underdeveloped markets. Regarding financial resources, most initiatives sought multiple public and private funding sources. This was a critical point commented on by all participants, as despite the efforts and importance of their initiatives, some of them were still operating on a very small scale. Indeed, due to financial constraints, most DSE founders faced several barriers to growth. In some cases, public funding was decisive; in others, they even had to finance their initiatives from their own pockets. Despite these setbacks, with hardly any capital resources, they managed to get their initiative off the ground and help those in need. Overall, we found out that a global crisis disruption (i.e., the COVID-19 pandemic) enabled the emergence of DSE. These initiatives drew from digital and social capabilities during severe changes and were fully committed to joint value-creation. Through open, collaborative business models and strong stakeholder orientation, these initiatives met their stakeholders' needs through mutually beneficial value exchanges, despite resource scarcity and local and global contextual constraints.

Interestingly, the follow-up interviews after the COVID-19 pandemic with founders show how the twenty-one DSE initiatives we contacted still continue operating in the market. Indeed, most digital-social business models that emerged during the COVID-19 pandemic were improved, extended, or transformed based on their learning capabilities. These improvements allow DSE to achieve its digital, social, and entrepreneurial purpose by supporting societal challenges and connecting multiple agents across sectors.

4.2. DSE: Dissecting the multi-dimensional value-creation process

Following the integrative literature review findings (see Table 1), our content analysis of the interviews reveals interesting insights about the three levels of components identified in the literature that explain the value-creation process of DSE (see Appendix 3).

At the micro dimension, the DSE entrepreneurs recognized both the exploration and exploitation of opportunities based on social needs during the pandemic and post-pandemic. According to SE18, "the health problems will not end with the pandemic. We will face new challenges". In this view, although pre-existing DSE initiatives focused on improving pre-existing solutions to provide alternatives to their clients, the founders of these initiatives still continue seeing multiple opportunities in the interplay between digital and social components. Indeed, given the uncertain conditions, the DSE entrepreneurs also recognize the relevance of financial resources, collaborative capabilities, and technological know-how to exploit their initiatives. While several DSE captured only resources from public sources (DSE2, DSE3, DSE7, DSE14, DSE15, DSE19), other DSE diversified the access to resources among their value-chain (DSE4, DSE5, DSE10, DSE17, DSE21). In this respect, DSE15 indicated, "Currently, we are 100% dependent on public funding, which is good on the one hand, but after the pandemic emergency passes, we will have to restructure". This information implies the importance of funding for the exploration and exploitation of socially-oriented digital technologies. It also indicates that environmental conditions are what determine the configuration and scale that the business model can achieve over time.

At the meso dimension, the DSE entrepreneurs recognized the integration of digital-social orientations in their entrepreneurial initiatives. According to DSE10, "we faced with the health crisis, all the health alternatives had to rethink the way we were operating. We had to incorporate new technologies that allowed us to be unique and innovative". Therefore, digital and social business integration emerged as a natural response to the limited public capacity to face multiple and simultaneous societal problems that occurred during the health crisis. For instance, the COVID-19 pandemic transformed market behaviors. In this regard, DSE17 states, "People are not always willing to change the way they see the world. We need to be aware that it is an obstacle, that people conceive health as a face-to-face thing. However, market behaviors will never be the same because digital technologies provide successful solutions". Indeed, based on the know-how, post-pandemic gradually, most DSE have incorporated novel technological functionalities that opened opportunities in new markets and industries.

At the macro dimension, the DSE business models are more adaptable and flexible to external shakeouts than traditional entrepreneurial initiatives. Plausible explanations were highlighted during the interviews. First, the expertise DSE5 argues that "our initiative is unique. There is no other venture doing the same thing. Our expertise is the result of our capabilities, know-how, and co-creation process with users". Second, nature and diversity, DSE14 explained that "we have been able to change and modify a lot of things in our business in a short time. It has not been easy, but we have been willing to do it". Third, dynamism, DSE19 mentioned that "since we started this initiative, we have been working remotely, so for us, the working dynamics have not changed. Therefore, we are flexible and adaptable to environmental conditions".

5. DISCUSSION

5.1. Proposed conceptual model

Based on the theoretical findings derived from our thematic analysis, we propose a comprehensive model that summarizes the role of DSE as a processor of stakeholder influences and environmental changes. Hence, stakeholder theory, which emphasizes the mutually beneficial relationships and engagement processes among different stakeholders (Valentinov et al., 2019), provides a useful theoretical lens for analyzing value exchanges through reciprocal relationships. Based on our findings, Figure 1 summarizes the proposed conceptual framework to understand the DSE phenomenon.

--- Insert Figure 1 here ---

Social Challenges: At the micro level, Figure 1 shows that DSE responds to environmental influences and reacts quickly to external shocks, which create new social problems and needs (Bonina et al., 2021). In this sense, intra-organizational characteristics and interactions allow actors who are particularly committed to a specific issue to collaborate. Thus, DSE entrepreneurs must possess the knowledge and experience necessary to overcome the impediments associated with the affordability and feasibility of the project. Indeed, given the prominence of communities as the focus of solutions, technologies that facilitate communication and knowledge sharing are relevant for continuous feedback (Trencher, 2019). This point is not without controversy and mistrust on the part of some users or intermediaries due to the treatment of confidential data. How technology is used can be subject to scrutiny by authorities, leading to bureaucratic hurdles that hinder the functioning of DSE. Consequently, establishing the legitimacy of DSE depends on a country's regulatory framework. This framework is an enabler of DSE when it allows for sharing resources and provides validity for these initiatives to operate (Barraket and Yousefpour, 2013). For this reason, at the micro level, it is necessary to have institutional enablers such as enabling policies, fair regulations, and free competition. As long as the institutional environment is favorable, different actors and stakeholders can build bridges to transfer knowledge and resources. These initiatives can adapt to adverse circumstances (Dahles et al., 2010; Trivedi, 2010). Otherwise, the potential and efficiency of the DSE will be restricted.

> ***Proposition 1: DSE explores and exploits opportunities associated with environmental uncertainties to propose innovative solutions to societal needs by sharing resources and capabilities with stakeholders.***

Digital-Social Integration: At the meso level, the DSE is centered on value-creation and addresses social problems using various digital technologies that enable streamlined service delivery processes (Dong, 2019; Robb & Gandhi, 2016). Technologies employed in developing DSE include artificial intelligence, the internet of things, open innovation codes, and deep learning. DSE business models hire a mix of these technologies, combining them in unique and innovative ways according to their social purposes. Importantly, the confluence of social and digital is the result of the experience, knowledge, and competence of the founders (Gandhi, 2016). The conception of DSEs goes beyond making money and represents a commitment to the common good and the advancement of knowledge and solutions to social problems. Thus, DSEs cannot be considered static; on the contrary, they undergo continuous transformation processes to maximize their performance and serve their solutions' users. In this way, just as the problems of communities change, so does the DSE. In addition, partnerships with strategic actors allow for common goals and value-cocreation (Ladeira et al., 2019).

Proposition 2: The experience and knowledge of entrepreneurs allow associating social objectives with digital technological means; this integration translates into value-creation processes that distinguish DSE from other types of initiatives.

Adaptation and Flexibility: At the macro level, the development of DSE initiatives is subject to stakeholder influences because collaboration among ventures allows them to pool resources, capitalize on complementary capabilities, achieve economies of scale and enhance innovation. Moreover, stakeholder associativity facilitates interconnections for information exchange and the development of common patterns among partners (Soda et al., 2004), which has a positive long-term effect on DSE performance. Collaboration helps organizations address problems that cannot be solved by acting alone. Indeed, interviews with DSE entrepreneurs showed us the importance of employee (internal stakeholder) commitment to the initiatives they are involved in beyond monetary or professional expectations. For example, in the COVID-19 pandemic scenario, many were willing to work overtime for the success of the initiative and the creation of collective benefits (Lee et al., 2018). This capacity for commitment and partnership gives the DSE the adaptability and flexibility to restructure and endure over time.

Proposition 3: The DSE differs from other types of ventures because of the flexibility and adaptability it achieves through stakeholder collaboration and commitment to the initiative's goals.

5.2. Contributions

DSE has developed and evolved in a digitalized world, and the influence of global lockdowns has highlighted its potential and distinctiveness. This research provides some insights into the DSE definition as well as the components involved in value-cocreation due to the intersection between digital technologies, social orientations, and entrepreneurial initiatives. The integrative literature review provides micro foundations related to the definition and illustrates the DSE phenomenon's multidisciplinary nature (Mair and Marti, 2006; Nambisan, 2017; Kraus et al., 2019; Battisti, 2019; Ibáñez et al., 2021). In contrast to previously coined definitions of DSE, this study proposes an understanding of the DSE, seen as the collaborative role of stakeholders in the co-creation of value (customers, suppliers, employees, financiers, and communities) as well as the critical part of environmental conditions.

Building on these theoretical foundations, our qualitative study allows us to identify what differentiates the DSE from other types of entrepreneurship, including social and digital entrepreneurship. In this sense, the DSE is based on the experience and knowledge of digital technologies of its founders, who, motivated by their commitment to social initiatives, develop business models that incorporate these elements. In addition, a vision of the phenomenon is established at a micro level (*Social Challenges*), where innovative business models are shaped through the exploration and exploitation of business opportunities associated with social challenges; at a meso level (*Digital-Social Integration)*, where the integration of social and digital as a whole gives meaning and sets the path of the initiative; and at a macro level (*Adaptation and flexibility)*, where collaboration and partnership with stakeholders lead to the adaptation and flexibility of the business model to provide rapid responses to uncertain environmental conditions. In this sense, some DSEs emerged from leveraging internal capabilities that could be transferred to other COVID-19 priority sectors. In contrast, other DSEs seemed to re-evaluate the

organization's values and intended social impacts. In both cases, stakeholder influence and environmental conditions were key to the development and success of the initiatives.

This view allows us to propose a multi-dimensional and multi-relational model of social value-creation at its core in terms of the association between theory and reality—the case analysis established the importance of links with the environment and stakeholders. Empirical evidence shows how the value-cocreation process depends on collaborative interactions and partnerships with relevant stakeholders (Savage et al., 2010). This value-creation requires a common purpose between DSE and stakeholders and an appreciation of the active contributions of stakeholders (Dentoni et al., 2016). If value-creation is not beneficial for all parties, it will lose its business partners, resources, and legitimacy. This means that value must be created jointly by and for internal and external stakeholders. In addition, as established in previous sections, DSE responds to the influences of the environment to provide a rapid response to external shocks. In this sense, some DSEs emerged from harnessing internal capacities that could be transferred to other COVID-19 priority sectors. In contrast, other DSEs appeared to reassess the organization's values and expected social impacts. In both cases, stakeholder influence and environmental conditions were key to the development and success of the initiatives. This configuration is fundamental for understanding the particularities of the phenomenon and why it develops in times of uncertainty.

Understanding the phenomenon from the point of view of DSEs allows us to incorporate interesting propositions about the dynamics and relationships that actors establish due to limitations of resources, on the one hand, and taking advantage of the accessibility provided by digital technologies, on the other. At a micro level, DSE initiatives have thrived during the current global blockades by showing their potential to explore and exploit opportunities to optimize resources and streamline response processes. At the meso level, communities benefit from solutions that propose innovative goods and services based on digital technologies. While at the macro level, adaptability and flexibility are the main strengths of today's DSEs.

5.3. Implications

While social and digital entrepreneurship phenomena were previously studied as parallel streams, we now propose the foundations of DSE as a new paradigm. DSE represents a claim for the compatibility of social logic based on equality and the democratization of technologies as a great alternative to generating sustainable social value (Freudenreich et al., 2020; Gregori & Holzmann, 2020). Knowing more about DSE initiatives' multi-dimensional and multi-relational nature allows for designing optimal and comprehensive spaces that promote open interaction between entrepreneurs, stakeholders, policymakers, and civil society to reshape social and innovative digital business models. For policymakers, a large-scale implication of this new paradigm is the configuration of adequate policy frameworks that facilitate open collaborations among multiple socio-economic agents, technological and digital democratization as an alternative mechanism to reduce societal problems, reinforcement of human capital, and social legitimatization of the contributions of the multiple DSE that emerged during this health emergency (Audretsch & Moog, 2020; Baldwin-Philippi, 2015). Our insights represent a valuable starting opportunity for practitioners and stakeholders to identify the potential shortcomings of current systems and reconfigure outdated business models. During the pandemic, organizations forced digital and technological transformation have also questioned multiple obsolete operational and business routines. Many organizations have asked about their ethics, values, and social contributions (Santos

et al., 2021). The open interaction/collaboration among practitioners and shareholders represents a way to re-build organizational capabilities, re-enforce social value contributions, and re-share risks/resources to face uncertain times' challenges. For university managers, this study provides insights into the critical role of reinforcing the academic curricula by considering technological, entrepreneurial, innovative, and collaborative abilities/skills (Neumeyer & Liu, 2021).

5.4. Limitations and future research lines

This study also has some limitations. Firstly, the study highlighted the intersection of diverse approaches (e.g., management, entrepreneurship, and innovation) to clarify the theoretical foundations of an emergent phenomenon. However, the diversity and complexity of DSE demand multidisciplinary angles like economic, sociological, institutional, and evolutionary. Future researchers should consider this issue for extending their contributions to the emerging DSE literature (Ibáñez et al., 2021). Secondly, this study adopted an integrative literature review to identify the basic concepts and elements; and a thematic case study. Although our results provide features that allow clarifying definitions and metrics of the DSE phenomenon, longitudinal qualitative or quantitative studies could contribute to extending our results for a better understanding of this phenomenon from multiple levels of analysis (institutional, cross-country, regional, ecosystems, etc.), as well as the dynamic evolution of DSE under both stable and uncertain conditions (Kuratko & Audretsch, 2021). Thirdly, intuitively, DSEs founders highlighted their initial impacts on multiple stakeholders. However, organizational impacts require time to be understood clearly, measured, and evaluated considering stakeholders' satisfaction perception. In other words, future researchers should consider a dual analysis that captures the negative or positive impacts and views other conditions related to tensions, values, logic, ethics, or opportunistic behaviors along with these relationships. Indeed, the process of value co-creation is considered theoretically and empirically across multiple cases. However, it is a dynamic and complex process that takes time to shape. Future research should pay attention to the DSE environment and stakeholders to specify the dynamic relationships of the established linkages and networks. Finally, the DSE demands an identity-building understanding. However, it is a dynamic and complex process that requires time. Future research should pay focus on dynamism in DSE identity-building method (Guerrero et al., 2020).

6. CONCLUSIONS

This study theorizes the foundations of the DSE paradigm driven by the current global COVID-19 lockdowns. In this sense, crises and uncertainty are part of the value-creation process as triggers for large-scale social issues. Furthermore, the analyzed cases extend our theoretical understanding by highlighting the importance of stakeholders as part of the social value-cocreation process. This is the starting point for establishing DSE as a multi-dimensional and multi-relational system, which cannot be analyzed separately.

We can conclude that the DSE refreshes a research paradigm in entrepreneurship research because, firstly, in its development, it explores and takes advantage of the opportunities associated with environmental uncertainties to propose innovative solutions to society's needs by sharing resources and capabilities with stakeholders. Secondly, the experience and knowledge of the entrepreneurs enable the association of social objectives with digital technological means; this integration translates into value-creation processes that distinguish the DSE from other types of initiatives.

Finally, the DSE differs from different types of ventures in the flexibility and adaptability it achieves through stakeholder collaboration and commitment to the initiative's objectives.

This value system cannot be abstracted from the influence and the context of its users, employees, society, government, funders, and business partners. As social researchers, we hope to stimulate scholars from different social science fields to rethink more broadly the opportunities and potential for engaging in further DSE research. We believe it is the perfect time to "make a difference", that is, to "endorse real transformation" for social welfare.

REFERENCES[2]

Agafonow, A., 2015. Value creation, value capture, and value devolution: Where do social enterprises stand? Administration & Society, 47(8), 1038–1060.

* Akhter, F., 2017. Unlocking digital entrepreneurship through the technical business process. Entrep. Sustain. Issues. https://doi.org/10.9770/jesi.2017.5.1(3)

* Alizadeh, T., Grubesic, T.H., Helderop, E., 2017. Urban governance and big corporations in the digital economy: An investigation of socio-spatial implications of Google Fiber in Kansas City. Telemat. Informatics 34, 973–986. https://doi.org/10.1016/j.tele.2017.04.007

Ammirato, S., Linzalone, R., & Felicetti, A. M.; 2022. Business model innovation drivers as antecedents of performance. Measuring Business Excellence, 26(1), 6-22.

* Ammirato, S., Sofo, F., Felicetti, A.M., Helander, N., Aramo-Immonen, H., 2019. A new typology to characterize Italian digital entrepreneurs. Int. J. Entrep. Behav. Res.

* Anagnou, M., Handrich, M., Schnellbacher, B., Heidenreich, S., 2019. Two sides of the same coin - how the application of effectuation and causation shapes business model elements throughout the development stages of digital startups. Int. J. Entrep. Ventur. 11, 309–334. https://doi.org/10.1504/IJEV.2019.101630

* Ansong, E., Boateng, R., 2019. Surviving in the digital era - business models of digital enterprises in a developing economy. Digit. Policy Gov. 21, 164–178. https://doi.org/10.1108/DPRG-08-2018-0046

Arogyaswamy, B., 2017. Social entrepreneurship performance measurement: A time-based organizing framework. Business Horizons, 60(5), 603–611.

Audretsch, D.B., Moog, P., 2020. Democracy and entrepreneurship. Entrep. Theory Pract. 1042258720943307.

Bacq, S., & Janssen, F., 2011. The multiple faces of social entrepreneurship: A review of definitional issues based on geographical and thematic criteria. Entrepreneurship & Regional Development, 23(5–6), 373–403.

Baldwin-Philippi, J., 2015. Using technology, building democracy: Digital campaigning and the construction of citizenship. Oxford University Press.

* Balocco, R., Cavallo, A., Ghezzi, A., Berbegal-Mirabent, J., 2019. Lean business models change process of digital entrepreneurship. Bus. Process Manag. J. https://doi.org/10.1108/BPMJ-07-2018-0194

* Baporikar, N., 2017. Strategies for successful implementation of innovation. Int. J. Innov. Digit. Econ. 8, 16–28.

Barraket, J., Yousefpour, N., 2013. Evaluation and social impact measurement amongst small to medium social enterprises: Process, purpose and value. Aust. J. Public Adm. 72, 447–458.

Battisti, S., 2019. Digital Social Entrepreneurs as Bridges in Public–Private Partnerships. J. Soc. Entrep. 10, 135–158. https://doi.org/10.1080/19420676.2018.1541006

Blake, A., Garzon, M.Q., 2012. Boundary Objects to Guide Sustainable Technology-Supported Participatory Development for Poverty Alleviation in the Context of Digital Divides. Electron. J. Inf. Syst. Dev. Ctries. 51, 1–25.

[2] Note: * indicates the papers included in our integrative literature review

Bonina, C., López-Berzosa, D., Scarlata, M., 2021. Social, commercial, or both? An exploratory study of the identity orientation of digital social innovations. Inf. Syst. J. 31, 695–716.
* Brenner, B., 2018. Transformative sustainable business models in the light of the digital imperative—A global business economics perspective. Sustainability 10, 4428.
Bundy, J., Pfarrer, M.D., Short, C.E., Coombs, W.T., 2017. Crises and crisis management: Integration, interpretation, and research development. J. Manage. 43, 1661–1692.
* Burtch, G., Carnahan, S., Greenwood, B.N., 2018. Can You Gig It? An Empirical Examination of the Gig Economy and Entrepreneurial Activity. Manage. Sci. 64, 5497–5520. https://doi.org/10.1287/mnsc.2017.2916
* Buschow, C., 2020. Why Do Digital Native News Media Fail? An Investigation of Failure in the Early Startup Phase. MEDIA Commun. 8, 51–61. https://doi.org/10.17645/mac.v8i2.2677
* Cahen, F., Borini, F.M., 2020. International Digital Competence. J. Int. Manag. https://doi.org/10.1016/j.intman.2019.100691
Cangiano, S., Romano, Z., Loglio, M., 2017. The growth of digital social innovation in Europe. An Open Design approach to support innovation for the societal good. Des. J. 20, S3546–S3559. https://doi.org/10.1080/14606925.2017.1352857
* Cantu, C., 2018. Discovering the collective entrepreneurial opportunities through spatial relationships. IMP J. 12, 276–295. https://doi.org/10.1108/IMP-05-2017-0033
Caputo, F., Garcia-Perez, A., Cillo, V., Giacosa, E., 2019. A knowledge-based view of people and technology: directions for a value co-creation-based learning organisation. J. Knowl. Manag.
* Cavallo, A., Ghezzi, A., Dell'Era, C., Pellizzoni, E., 2019. Fostering digital entrepreneurship from startup to scaleup: The role of venture capital funds and angel groups. Technol. Forecast. Soc. Change. https://doi.org/10.1016/j.techfore.2019.04.022
* Chen, W.H., Huang, G.J., Miller, J., Lee, K.H., Mauro, D., Stephens, B., Li, X.Q., 2018. "As We Grow, It Will Become a Priority": American Mobile Start-Ups' Privacy Practices. Am. Behav. Sci. 62, 1338–1355. https://doi.org/10.1177/0002764218787867
Choi, S., Kim, N., & Kim, W., 2019. Are social entrepreneurs more risk-averse? Applied Economics Letters, 26(11), 933–937.
Chu, C.-C., Cheng, Y.-F., Tsai, F.-S., Tsai, S.-B., Lu, K.-H., 2019. Open innovation in crowdfunding context: Diversity, knowledge, and networks. Sustainability 11, 180.
Corner, P. D., & Ho, M. (2010). How opportunities develop in social entrepreneurship. Entrepreneurship Theory and Practice, 34(4), 635–659.
Crossan, M.M., Apaydin, M., 2010. A multi-dimensional framework of organizational innovation: A systematic review of the literature. J. Manag. Stud. 47, 1154–1191.
Dacin, P. A., Dacin, M. T., & Matear, M., 2010. Social entrepreneurship: Why we don't need a new theory and how we move forward from here. Academy of Management Perspectives, 24(3), 37–57.
Dahles, H., Verduyn, K., Wakkee, I., Dey, P., Steyaert, C., 2010. The politics of narrating social entrepreneurship. J. enterprising communities people places Glob. Econ.
* De Luca, V. V, Margherita, A., Passiante, G., 2019. Crowdfunding: a systemic framework of benefits. Int. J. Entrep. Behav. Res.
*Del Bosco, B., Chierici, R., Mazzucchelli, A., 2019. Fostering entrepreneurship: an innovative business model to link innovation and new venture creation. Rev. Manag. Sci. 13, 561–574. https://doi.org/10.1007/s11846-018-0318-8
* Delacroix, E., Parguel, B., Benoit-Moreau, F., 2019. Digital subsistence entrepreneurs on Facebook. Technol. Forecast. Soc. Change. https://doi.org/10.1016/j.techfore.2018.06.018
* Dellermann, D., Lipusch, N., Ebel, P., Leimeister, J.M., 2020. The potential of collective intelligence and crowdsourcing for opportunity creation. Int. J. Entrep. Ventur. 12, 183–207.
Dentoni, D., Bitzer, V., Pascucci, S., 2016. Cross-sector partnerships and the co-creation of dynamic capabilities for stakeholder orientation. J. Bus. Ethics 135, 35–53.
* Di Domenico, M., Daniel, E., Nunan, D., 2014. "Mental mobility" in the digital age: entrepreneurs and the online home-based business. NEW Technol. Work Employ. 29, 266–281.

https://doi.org/10.1111/ntwe.12034
* Dobrosotskiy, V.I., Semenova, G.N., Kazarinova, E.B., Falina, N. V, 2019. Venture investments into digital education in the conditions of industry 4.0: problems of attraction and directions of usage. Horiz. 27, 213–218. https://doi.org/10.1108/OTH-07-2019-0035
* Dong, J.Q., 2019. Moving a mountain with a teaspoon: Toward a theory of digital entrepreneurship in the regulatory environment. Technol. Forecast. Soc. Change 146, 923–930.
Donthu, N., & Gustafsson, A., 2020. Effects of COVID-19 on business and research. Journal of business research, 117, 284-289.
* Du, W., Pan, S.L., Zhou, N., Ouyang, T., 2018. From a marketplace of electronics to a digital entrepreneurial ecosystem (DEE): The emergence of a meta-organization in Zhongguancun, China, in: Information Systems Journal. https://doi.org/10.1111/isj.12176
* Dutot, V., Van Horne, C., 2015. Digital entrepreneurship intention in a developed vs. emerging country: An exploratory study in France and the UAE. Transnatl. Corp. Rev. 7, 79–96.
* Dy, A.M., Marlow, S., Martin, L., 2017. A Web of opportunity or the same old story? Women digital entrepreneurs and intersectionality theory. Hum. Relations. https://doi.org/10.1177/0018726716650730
Eisenhardt, K.M., 1989. Building theories from case study research. Acad. Manag. Rev. 14, 532–550.
Eisenhardt, K.M., 1991. Better stories and better constructs: The case for rigor and comparative logic. Acad. Manag. Rev. 16, 620–627.
* Elia, G., Margherita, A., Passiante, G., 2020. Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. Technol. Forecast. Soc. Change 150, 119791.
Faludi, J., 2020. How to create social value through digital social innovation? Unlocking the potential of the social value creation of digital start-ups. Journal of Social Entrepreneurship, 1-18.
* Farani, A.Y., Karimi, S., Motaghed, M., 2017. The role of entrepreneurial knowledge as a competence in shaping Iranian students' career intentions to start a new digital business. Eur. J. Train. Dev.
* Ferguson, S., Henrekson, M., 2019. The Long-Run Performance of Born Globals in Computing: The Role of Digital Platforms. Int. Rev. Entrep. 17, 257-280 WE-Emerging Sources Citation Index (ESC.
*Ferreira, J.J.M., Fernandes, C.I., Ferreira, F.A.F., 2019. To be or not to be digital, that is the question: Firm innovation and performance. J. Bus. Res. 101, 583–590.
Forouharfar, A., Rowshan, S. A., & Salarzehi, H., 2018. An epistemological critique of social entrepreneurship definitions. Journal of Global Entrepreneurship Research, 8(1), 11.
Freeman, R.E., Phillips, R., Sisodia, R., 2018. Tensions in Stakeholder Theory. Bus. Soc. 59, 213–231. https://doi.org/10.1177/0007650318773750
Freudenreich, B., Lüdeke-Freund, F., Schaltegger, S., 2020. A stakeholder theory perspective on business models: Value creation for sustainability. J. Bus. Ethics 166, 3–18.
* Frischauf, N., Horn, R., Kauerhoff, T., Wittig, M., Baumann, I., Pellander, E., Koudelka, O., 2018. NewSpace: New Business Models at the Interface of Space and Digital Economy: Chances in an Interconnected World. NEW Sp. 6, 135–146. https://doi.org/10.1089/space.2017.0028
*Galanakis, K., Giourka, P., 2017. Entrepreneurial path: decoupling the complexity of entrepreneurial process. Int. J. Entrep. Behav. Res. 23, 317–335. https://doi.org/10.1108/IJEBR-03-2016-0079
Garrow, E. E., & Hasenfeld, Y., 2014. Social enterprises as an embodiment of a neoliberal welfare logic. American Behavioral Scientist, 58(11), 1475–1493.
* Ghezzi, A., 2019. Digital startups and the adoption and implementation of Lean Startup Approaches: Effectuation, Bricolage and Opportunity Creation in practice. Technol. Forecast. Soc. Change. https://doi.org/10.1016/j.techfore.2018.09.017
* Ghezzi, A., Cavallo, A., 2020. Agile Business Model Innovation in Digital Entrepreneurship: Lean Startup Approaches. J. Bus. Res. https://doi.org/10.1016/j.jbusres.2018.06.013
Gioia, D.A., Corley, K.G., Hamilton, A.L., 2013. Seeking qualitative rigor in inductive research: Notes on the Gioia methodology. Organ. Res. methods 16, 15–31.
* Giones, F., Brem, A., 2017. Digital technology entrepreneurship: A definition and research agenda.

Technol. Innov. Manag. Rev. 7.
Gregori, P., Holzmann, P., 2020. Digital sustainable entrepreneurship: A business model perspective on embedding digital technologies for social and environmental value creation. J. Clean. Prod. https://doi.org/10.1016/j.jclepro.2020.122817
Guerrero, M. 2021. Ambidexterity and Entrepreneurship Studies: A Literature Review and Research Agenda. Foundations and Trends® in Entrepreneurship, 17(5–6), 436-650
Guerrero, M., Peña-Legazkue, I., 2013. The effect of intrapreneurial experience on corporate venturing: Evidence from developed economies. Int. Entrep. Manag. J. 9, 397–416.
Guerrero, M., Santamaría-Velasco, C. A., Mahto, R. 2020. Intermediaries and social entrepreneurship identity: Implications for business model innovation. International Journal of Entrepreneurial Behavior & Research.
* Guo, H.D., Liu, J., Qiu, Y.B., Menenti, M., Chen, F., Uhlir, P.F., Zhang, L., van Genderen, J., Liang, D., Natarajan, I., Zhu, L.W., Liu, J.L., 2018. The Digital Belt and Road program in support of regional sustainability. Int. J. Digit. EARTH 11, 657–669. https://doi.org/10.1080/17538947.2018.1471790
* Guthrie, C., 2014. The digital factory: A hands-on learning project in digital entrepreneurship. J. Entrep. Educ. 17, 115.
* Hafezieh, N., Akhavan, P., Eshraghian, F., 2011. Exploration of process and competitive factors of entrepreneurship in digital space. Educ. Bus. Soc. Contemp. Middle East. Issues.
* Hair, N., Wetsch, L.R., Hull, C.E., Perotti, V., Hung, Y.-T.C., 2012. Market orientation in digital entrepreneurship: advantages and challenges in a Web 2.0 networked world. Int. J. Innov. Technol. Manag. 9, 1250045.
Halberstadt, J., & Kraus, S., 2016. Social entrepreneurship: the foundation of tomorrow's commercial business models? International Journal of Entrepreneurial Venturing, 8(3), 261–279.
* Hamid, N., Khalid, F., 2016. Entrepreneurship and Innovation in the Digital Economy. LAHORE J. Econ. https://doi.org/10.35536/lje.2016.v21.isp.a12
* Harms, R., Walsh, S.T., 2015. An Introduction to the Field of Technology Entrepreneurship: Editorial to the Special Issue. Creat. Innov. Manag. 24, 552–557.
Haugh, H., 2006. Social enterprise: Beyond economic outcomes and individual returns. In Social entrepreneurship (pp. 180-205). Palgrave Macmillan, London.
* He, X., 2019. Digital Entrepreneurship Solution to Rural Poverty: Theory, Practice and Policy Implications. J. Dev. Entrep. 24, 1950004.
* Hejazi, S.R., Seifollahi, M.R., 2019. A fuzzy-based roadmapping model for enhancing high-tech small firms' technological entrepreneurship capabilities: cases of Iran.
* Ho, S.C., Kauffman, R.J., Liang, T.P., 2011. Internet-based selling technology and e-commerce growth: a hybrid growth theory approach with cross-model inference. Inf. Technol. Manag. 12, 409–429. https://doi.org/10.1007/s10799-010-0078-x
* Huang, J., Henfridsson, O., Liu, M.J., Newell, S., 2017. Growing on Steroids: Rapidly Scaling The User Base of Digital Ventures Through Digital Innovaton. MIS Q. 41, 301–314. https://doi.org/10.25300/MISQ/2017/41.1.16
Ibáñez, M.J., Guerrero, M., Yáñez-Valdés, C., Barros-Celume, S., 2021. Digital social entrepreneurship: the N-Helix response to stakeholders' COVID-19 needs. J. Technol. Transf. https://doi.org/10.1007/s10961-021-09855-4
* Ismail, M.D., Alam, S.S., 2019. Innovativeness and Competitive Advantage among Small and Medium Enterprise Exporters: Evidence from Emerging Markets in South East Asia. South East Asian J. Manag. 13, 74–91. https://doi.org/10.21002/seam.v13i1.9872
* Jean, R.J., Kim, D., Cavusgil, E., 2020. Antecedents and outcomes of digital platform risk for international new ventures' internationalization. J. WORLD Bus. 55. https://doi.org/10.1016/j.jwb.2019.101021
Kedmenec, I., & Strašek, S., 2017. Are some cultures more favourable for social entrepreneurship than others? Economic Research-Ekonomska Istraživanja, 30(1), 1461–1476.
* Konig, M., Ungerer, C., Baltes, G., Terzidis, O., 2019. Different patterns in the evolution of digital and non-digital ventures' business models. Technol. Forecast. Soc. Change 146, 844–852.

https://doi.org/10.1016/j.techfore.2018.05.006 WE - Social Science Citation Index (SSCI)
Kraus, S., Niemand, T., Halberstadt, J., Shaw, E., Syrjä, P., 2017. Social entrepreneurship orientation: development of a measurement scale. International Journal of Entrepreneurial Behavior & Research.
Kraus, S., Palmer, C., Kailer, N., Kallinger, F.L., Spitzer, J., 2018. Digital entrepreneurship: a research agenda on new business models for the twenty-first century. Int. J. Entrep. Behav. Res.
* Kraus, S., Roig-Tierno, N., Bouncken, R.B., 2019. Digital innovation and venturing: an introduction into the digitalization of entrepreneurship. Rev. Manag. Sci. https://doi.org/10.1007/s11846-019-00333-8
Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Reyes, C.A.M., Prochotta, A., Steinbrink, K.M., Berger, E.S.C., 2020. Startups in times of crisis–A rapid response to the COVID-19 pandemic. J. Bus. Ventur. Insights 13, e00169.
* Kuester, S., Konya-Baumbach, E., Schuhmacher, M.C., 2018. Get the show on the road: Go-to-market strategies for e-innovations of startups. J. Bus. Res. 83, 65–81.
Kuratko, D.F., Audretsch, D.B., 2021. The future of entrepreneurship: the few or the many? Small Bus. Econ. 1–10.
Kuratko, D.F., McMullen, J.S., Hornsby, J.S., Jackson, C., 2017. Is your organization conducive to the continuous creation of social value? Toward a social corporate entrepreneurship scale. Bus. Horiz. 60, 271–283. https://doi.org/https://doi.org/10.1016/j.bushor.2016.12.003
* Ladeira, M.J.M., Ferreira, F.A.F., Ferreira, J.J.M., Fang, W., Falcão, P.F., Rosa, Á.A., 2019. Exploring the determinants of digital entrepreneurship using fuzzy cognitive maps. Int. Entrep. Manag. J. 15, 1077–1101.
* Le Dinh, T., Vu, M.C., Ayayi, A., 2018. Towards a living lab for promoting the digital entrepreneurship process. Int. J. Entrep.
Leach, M., MacGregor, H., Scoones, I., Wilkinson, A., 2021. Post-pandemic transformations: How and why COVID-19 requires us to rethink development. World Dev. 138, 105233.
Lee, M., Yun, J.J., Pyka, A., Won, D., Kodama, F., Schiuma, G., Park, H., Jeon, J., Park, K., Jung, K., 2018. How to respond to the fourth industrial revolution, or the second information technology revolution? Dynamic new combinations between technology, market, and society through open innovation. J. Open Innov. Technol. Mark. Complex. 4, 21.
Lehdonvirta, V., 2018. Flexibility in the gig economy: managing time on three online piecework platforms. New Technol. Work Employ. 33, 13–29.
* Lindgren, P., Aagaard, A., 2014. The Sensing Business Model. Wirel. Pers. Commun. 76, 291–309. https://doi.org/10.1007/s11277-014-1689-z
* Liu, J.Y., 2019. Trust trigger and knowledge elicitor: The role of epistemic objects in coordinating the fragmentation and heterogeneity of knowledge in digital innovation networks. Knowl. Process Manag. 26, 332–345. https://doi.org/10.1002/kpm.1613
* Llinas, D., Abad, J., 2019. The role of high-performance people management practices in Industry 4.0: The case of medium-sized Spanish firms. Intang. Cap. 15, 190–207. https://doi.org/10.3926/ic.1485
Luke, B., Chu, V., 2013. Social enterprise versus social entrepreneurship: An examination of the 'why'and 'how'in pursuing social change. Int. Small Bus. J. 31, 764–784.
* Mack, E.A., Marie-Pierre, L., Redican, K., 2017. Entrepreneurs' use of internet and social media applications. Telecomm. Policy 41, 120–139. https://doi.org/10.1016/j.telpol.2016.12.001
Mair, J., Marti, I., 2006. Social entrepreneurship research: A source of explanation, prediction, and delight. J. World Bus. 41, 36–44.
* Marlow, S., McAdam, M., 2012. Analyzing the influence of gender upon high–technology venturing within the context of business incubation. Entrep. Theory Pract. 36, 655–676.
* Martinez Dy, A., Martin, L., Marlow, S., 2018. Emancipation through digital entrepreneurship? A critical realist analysis. Organization 25, 585–608.
Masiero, S., Ravishankar, M.N., 2018. Digital social entrepreneurship: Balancing social and commercial goals in an Indian fintech organization.
Mayring, Philipp (2001). Kombination und Integration qualitativer und quantitativer Analyse [31 Absätze]. Forum Qualitative Sozialforschung / Forum Qualitative Social Research, 2(1), Art. 6, http://nbn-

resolving.de/urn:nbn:de:0114-fqs010162.
* McAdam, M., Crowley, C., Harrison, R.T., 2019. “To boldly go where no [man] has gone before”- Institutional voids and the development of women’s digital entrepreneurship. Technol. Forecast. Soc. Change 146, 912–922.
* McAdam, M., Crowley, C., Harrison, R.T., 2020. Digital girl: cyberfeminism and the emancipatory potential of digital entrepreneurship in emerging economies. Small Bus. Econ. https://doi.org/10.1007/s11187-019-00301-2
McDermott, K., Kurucz, E.C., Colbert, B.A., 2018. Social entrepreneurial opportunity and active stakeholder participation: Resource mobilization in enterprising conveners of cross-sector social partnerships. J. Clean. Prod. 183, 121–131.
Méndez-Picazo, M.-T., Ribeiro-Soriano, D., & Galindo-Martín, M.-Ángel., 2015. Drivers of social entrepreneurship. European Journal of International Management, 9(6), 766–779.
* Moser, K.J., Tumasjan, A., Welpe, I.M., 2017. Small but attractive: Dimensions of new venture employer attractiveness and the moderating role of applicants’ entrepreneurial behaviours. J. Bus. Ventur. 32, 588–610. https://doi.org/10.1016/j.jbusvent.2017.05.001 WE - Social Science Citation Index (SSCI)
* Muraya, E.N., Roganov, V.R., Skiteva, E.I., Evgrafova, I. V, Daudov, I.L., 2019. Digital entrepreneurship and education: Support for innovative projects. Int. J. Adv. Trends Comput. Sci. Eng. 8, 3304–3311.
* Nambisan, S., 2017. Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. Entrep. Theory Pract. 41, 1029–1055.
* Nambisan, S., Baron, R.A., 2019. On the costs of digital entrepreneurship: Role conflict, stress, and venture performance in digital platform-based ecosystems. J. Bus. Res. https://doi.org/10.1016/j.jbusres.2019.06.037
* Nambisan, S., Wright, M., Feldman, M., 2019. The digital transformation of innovation and entrepreneurship: Progress, challenges and key themes. Res. Policy. https://doi.org/10.1016/j.respol.2019.03.018
Neumeyer, X., Liu, M., 2021. Managerial competencies and development in the digital age. IEEE Eng. Manag. Rev. 49, 49–55.
Nga, J. K. H., & Shamuganathan, G., 2010. The influence of personality traits and demographic factors on social entrepreneurship start-up intentions. Journal of Business Ethics, 95(2), 259–282.
* Ngoasong, M.Z., 2018. Digital entrepreneurship in a resource-scarce context: A focus on entrepreneurial digital competencies. J. Small Bus. Enterp. Dev. https://doi.org/10.1108/JSBED-01-2017-0014
Onyeaka, H., Anumudu, C.K., Al-Sharify, Z.T., Egele-Godswill, E., Mbaegbu, P., 2021. COVID-19 pandemic: A review of the global lockdown and its far-reaching effects. Sci. Prog. 104, 00368504211019854.
Onyema, E. M., Eucheria, N. C., Obafemi, F. A., Sen, S., Atonye, F. G., Sharma, A., & Alsayed, A. O., 2020. Impact of Coronavirus pandemic on education. Journal of Education and Practice, 11(13), 108-121.
* Pan, F.H., Yang, B.F., 2019. Financial development and the geographies of startup cities: evidence from China. SMALL Bus. Econ. 52, 743–758. https://doi.org/10.1007/s11187-017-9983-2
Papadopoulos, T., Baltas, K. N., & Balta, M. E., 2020. The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice. International Journal of Information Management, 55, 102192.
Pathak, S., Muralidharan, E., 2018. Economic inequality and social entrepreneurship. Bus. Soc. 57, 1150–1190.
* Pradhan, R.P., Arvin, M.B., Nair, M., Bennett, S.E., Bahmani, S., 2019. Short-term and long-term dynamics of venture capital and economic growth in a digital economy: A study of European countries. Technol. Soc. 57, 125–134. https://doi.org/10.1016/j.techsoc.2018.11.002
Ranta, V., Aarikka-Stenroos, L., & Väisänen, J. M.; 2021. Digital technologies catalyzing business model innovation for circular economy—Multiple case study. Resources, Conservation and Recycling, 164, 105155.
* Ratten, V., 2018. Social entrepreneurship through digital communication in farming. World J. Entrep.

Manag. Sustain. Dev. 14, 99–110. https://doi.org/10.1108/WJEMSD-07-2017-0045
Ratten, V., 2020. Coronavirus (Covid-19) and the entrepreneurship education community. J. Enterprising Communities. https://doi.org/10.1108/JEC-06-2020-0121
* Ratzinger, D., Amess, K., Greenman, A., Mosey, S., 2018. The impact of digital startup founders' higher education on reaching equity investment milestones. J. Technol. Transf. 43, 760–778.
* Reuschke, D., Mason, C., 2020. The engagement of home-based businesses in the digital economy. Futures 102542.
* Rho, S., Lee, M., Makkonen, T., 2020. The role of open innovation platforms in facilitating user-driven innovation in innovation ecosystems. Int. J. Knowledge-Based Dev. 11, 288-304 WE-Emerging Sources Citation Index (ESC.
* Rippa, P., Secundo, G., 2019. Digital academic entrepreneurship: The potential of digital technologies on academic entrepreneurship. Technol. Forecast. Soc. Change 146, 900–911.
* Robb, C., Gandhi, S.J., 2016. Social entrepreneurial ventures: On the edge of chaos? Entrep. Res. J. 6, 111–133.
Sadeghi, V.J., Biancone, P. Pietro, Giacoma, C., Secinaro, S., 2018. How does export compliance influence the internationalization of firms: is it a thread or an opportunity? J. Glob. Entrep. Res. 8, 1–15.
* Sahut, J.-M., Landoli, L., Teulon, F., 2019. The age of digital entrepreneurship. Small Bus. Econ. 1–11.
Santos, S.C., Nikou, S., Brännback, M., Liguori, E.W., 2021. Are social and traditional entrepreneurial intentions really that different? Int. J. Entrep. Behav. Res.
Satar, M. S., & Alarifi, G. (2022). Factors of E-Business Adoption in Small and Medium Enterprises: Evidence from Saudi Arabia. Human Behavior and Emerging Technologies, 2022.
Savage, G.T., Bunn, M.D., Gray, B., Xiao, Q., Wang, S., Wilson, E.J., Williams, E.S., 2010. Stakeholder Collaboration: Implications for Stakeholder Theory and Practice. J. Bus. Ethics 96, 21–26. https://doi.org/10.1007/s10551-011-0939-1
* Schiavone, F., Tutore, I., Cucari, N., 2020. How digital user innovators become entrepreneurs: a sociomaterial analysis. Technol. Anal. Strateg. Manag. 32, 683–696. https://doi.org/10.1080/09537325.2019.1696955
*Scuotto, V., Del Giudice, M., Carayannis, E.G., 2017. The effect of social networking sites and absorptive capacity on SMES' innovation performance. J. Technol. Transf. 42, 409–424. https://doi.org/10.1007/s10961-016-9517-0
* Shen, K.N., Lindsay, V., Xu, Y. Calvin, 2018. Digital entrepreneurship. Inf. Syst. J. https://doi.org/10.1111/isj.12219
Short, J.C., Moss, T.W., Lumpkin, G.T., 2009. Research in social entrepreneurship: Past contributions and future opportunities. Strategic Entrep. J. 3, 161–194.
* Si, S., Ahlstrom, D., Wei, J., Cullen, J., 2020. Business, Entrepreneurship and Innovation Toward Poverty Reduction. Entrep. Reg. Dev. https://doi.org/10.1080/08985626.2019.1640485
Snyder, H. 2019. Literature review as a research methodology: An overview and guidelines. Journal of business research, 104, 333-339.
Soda, G., Usai, A., Zaheer, A., 2004. Network memory: The influence of past and current networks on performance. Acad. Manag. J. 47, 893–906.
*Song, A.K., 2019. The Digital Entrepreneurial Ecosystem—a critique and reconfiguration. Small Bus. Econ. https://doi.org/10.1007/s11187-019-00232-y
* Srinivasan, A., Venkatraman, N., 2018. Entrepreneurship in digital platforms: A network-centric view. Strateg. Entrep. J. https://doi.org/10.1002/sej.1272
*Standing, C., Mattsson, J., 2018. "Fake it until you make it": business model conceptualization in digital entrepreneurship. J. Strateg. Mark. https://doi.org/10.1080/0965254X.2016.1240218
* Steininger, D.M., 2019. Linking information systems and entrepreneurship: A review and agenda for IT-associated and digital entrepreneurship research. Inf. Syst. J. https://doi.org/10.1111/isj.12206
* Sussan, F., Acs, Z.J., 2017. The digital entrepreneurial ecosystem. Small Bus. Econ. 49, 55–73.
* Szalavetz, A., 2020. Digital transformation–enabling factory economy actors' entrepreneurial integration in global value chains? Post-Communist Econ. 32, 771–792.

Tiwari, P., Bhat, A. K., & Tikoria, J., 2017. An empirical analysis of the factors affecting social entrepreneurial intentions. Journal of Global Entrepreneurship Research, 7(1), 9.
* Tohanean, D., Weiss, P., 2019. Digital Entrepreneurship and Green Business Model Innovation: Lean Startup Approaches. Qual. to Success 20.
Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Br. J. Manag. 14, 207–222.
Trencher, G., 2019. Towards the smart city 2.0: Empirical evidence of using smartness as a tool for tackling social challenges. Technol. Forecast. Soc. Change 142, 117–128.
Trivedi, C., 2010. Towards a social-ecological framework for social entrepreneurship. J. Entrep. 19, 63–80.
Valentinov, V., Roth, S., & Will, M. G., 2019. Stakeholder theory: A Luhmannian perspective. Administration & Society, 51(5), 826-849.
Venkataraman, S., 2002. Stakeholder value equilibration and the entrepreneurial process, in: Freeman, R.E. (Ed.), The Ruffin Series of the Society for Business Ethics. University of Virginia's Darden Graduate School of Business Administration, pp. 45–57.
* von Briel, F., Davidsson, P., Recker, J., 2018. Digital technologies as external enablers of new venture creation in the IT hardware sector. Entrep. Theory Pract. 42, 47–69.
* von Briel, F., Recker, J., Davidsson, P., 2018. Not all digital venture ideas are created equal: Implications for venture creation processes. J. Strateg. Inf. Syst. https://doi.org/10.1016/j.jsis.2018.06.002
* Vorbach, S., Maria Poandl, E., Korajman, I., 2019. Digital entrepreneurship education: The role of MOOCs. Int. J. Eng. Pedagog. https://doi.org/10.3991/ijep.v9i3.10149
* Wang, W.X., Mahmood, A., Sismeiro, C., Vulkan, N., 2019. The evolution of equity crowdfunding: Insights from co-investments of angels and the crowd. Res. Policy 48. https://doi.org/10.1016/j.respol.2019.01.003 WE - Social Science Citation Index (SSCI)
* Warner, K.S.R., Wäger, M., 2019. Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal. Long Range Plann. 52, 326–349.
* Westergren, U.H., Holmstrom, J., Mathiassen, L., 2019. Partnering to create IT-based value: A contextual ambidexterity approach. Inf. Organ. 29. https://doi.org/10.1016/j.infoandorg.2019.100273
* Wilkesmann, M., Wilkesmann, U., 2018. Industry 4.0-organizing routines or innovations? VINE J. Inf. Knowl. Manag. Syst. 48, 238–254. https://doi.org/10.1108/VJIKMS-04-2017-0019
*Wong, C.-Y., Hsieh, Y.-C., Wu, C.-Y., Hu, M.-C., 2019. Academic Entrepreneurship for Social Innovation in Taiwan: The Cases of the OurCityLove Platform and the Forest App. Sci. Technol. Soc. 24, 446–464.
* Xu, Y.Q., Koivumaki, T., 2019. Digital business model effectuation: An agile approach. Comput. Human Behav. 95, 307–314. https://doi.org/10.1016/j.chb.2018.10.021
Young, O.R., 2010. Institutional dynamics: Resilience, vulnerability and adaptation in environmental and resource regimes. Glob. Environ. Chang. 20, 378–385. https://doi.org/10.1016/j.gloenvcha.2009.10.001
Yáñez-Valdés, C. 2021. Technological entrepreneurship: present conditions and future perspectives for Latin America. Management Research: Journal of the Iberoamerican Academy of Management.
Yáñez-Valdés, C., Guerrero, M. 2022. Technology transfer and frugal social innovations: looking inside an emerging economy. In Handbook of Technology Transfer (pp. 249-265). Edward Elgar Publishing.
Yáñez-Valdés, C., Guerrero, M. 2021. Technology Transfer Policy Framework in Chile. In Technology Transfer and Entrepreneurial Innovations (pp. 103-113). Springer, Cham.
* Younis, H., Katsioloudes, M., Al Bakri, A., 2020. Digital entrepreneurship intentions of Qatar university students motivational factors identification: Digital entrepreneurship intentions. Int. J. E-entrepreneurship. Innov. 10, 56–74.
* Yu, C.P., Zhang, Z.G., Liu, Y., 2019. Understanding new ventures' business model design in the digital era: An empirical study in China. Comput. Human Behav. 95, 238–251. https://doi.org/10.1016/j.chb.2018.01.027
*Zaheer, H., Breyer, Y., Dumay, J., 2019. Digital entrepreneurship: An interdisciplinary structured literature review and research agenda. Technol. Forecast. Soc. Change 148, 119735.

Zaheer, H., Breyer, Y., Dumay, J., Enjeti, M., 2019b. Straight from the horse's mouth: Founders' perspectives on achieving 'traction' in digital startups. Comput. Human Behav. https://doi.org/10.1016/j.chb.2018.03.002

Zhiyang, L., Chenfang, Z., & Bin, L. (2020). Digital Social Entrepreneurship: Theoretical Framework and Research Outlook. Foreign Economics & Management, 42(4), 3–18. https://doi.org/10.16538/j.cnki.fem.20200228.402

Table 1: Proposed DSE multi-dimensional

Level	Dimension	Themes	Theoretical foundations
Micro Level **[Social Challenges]**	**Exploration**	- Opportunities - Non-Profit - Social action coverage	Hafezieh et al. (2011); Akhter (2017); Buschow (2020); Cantu (2018); Farani et al. (2017); Galanakis & Giourka (2017); Mack et al. (2017); Ratzinger et al. (2018); Reuschke & Mason (2020); von Briel et al. (2018); Wong et al (2019)
	Exploitation	- New Technologies - Social Problems - Available resources	Anagnou et al. (2019); Del Bosco et al. (2019); Dobrosotskiy et al. (2019); Frischauf et al. (2018); Konig et al. (2019); Lindgren & Aagaard (2014); Ratten (2018); Warner & Wäger (2019); Zaheer et al. (2019 b)
Meso Level **[Digital-Social Integration]**	**Digital Technology**	- Technology - Artificial Intelligence - Internet of Things - Digital Platforms - Machine learning	Burtch et al. (2018); De Luca et al. (2019); Ferreira et al. (2019); Harms & Walsh (2015); Huang et al. (2017); Nambisan & Baron (2019); Rippa & Secundo (2019); Scuotto et al. (2017); Srinivasan & Venkatraman (2018); Wang et al. (2019); Yu, Zhang & Liu (2019); Yáñez-Valdés (2021); Yáñez-Valdés & Guerrero (2021)
	Business – Social Development	- Knowledge - Dynamic processes - Open Innovation - Collaboration processes	Ansong & Boateng (2019); Balocco et al. (2019); Ferguson &Henrekson (2019); Ghezzi (2019); Hamid & Khalid (2016); Ho et al. (2011); Le Dinh et al. (2018); Liu (2019); Marlow & McAdam (2012); Nambisan et al. (2019); Pradhan et al. (2019); Rho & Makkonen (2020); Westergren et al. (2019); Yáñez-Valdés & Guerrero (2022)
Macro Level **[Adaptation and Flexibility]**	**Value-Creation**	- Flexibility in venture creation - Association and Network Effects	Brenner (2018); Chen et al. (2018); Dellermann et al. (2020); Ghezzi & Cavallo (2020); Ismail &Alam (2019); Jean et al. (2020); Llinas & Abad (2019); Song (2019); Standing & Mattsson (2018); Wilkesmann &Wilkesmann (2018); Xu & Koivumaki (2019)
	Social Response	- Social development - Inequality reduction	Alizadeh et al. (2017); Dy et al. (2017); Guo et al. (2018); He (2019); McAdam et al. (2020); Moser et al. (2017); Pan & Yang (2019); Si et al. (2020); Tohanean &Weiss (2019)

Source: Authors

Table 2: DSE during/post-COVID-19 pandemic

Case	General characteristics			Adaptation during the pandemic					Follow-up post-pandemic	
	Sector	Country	Foundation	Social orientation	Entrepreneurial purpose	Digital orientation	Business model adaptation due the pandemic	Stakeholders during the pandemic	Is it still DSE?	Business model evolution post-pandemic
DSE1	Helping ventures to survive	Estonia	2020	Life & Business Adaptation	Provide a solution to a social problem	Platforms	We used audience and public opinion feedback to develop our services oriented to the COVID-19 pandemic.	3Fs (family, friends, and fools)	Yes	***Improving platform of products/services***: offering a wide range of products and solutions that fit different needs of customers using professional tools to obtain information about customers and competitors.
DSE2	Software development	Philippines	2020	Control and prevention of diseases	Provide a solution to a social problem	Platforms and GPS	Data privacy-related updates (running without GPS/ Bluetooth-based contact tracing and other features); adding digital logbook and QR scanning for digital prevention of the pandemic.	Government	Yes	***Penetration in new industries by new digital solutions:*** software solutions focused on research and development to ensure quality service to blaze the trail in multiple sectors.
DSE3	ICT development	USA	2015	Diagnosis and monitoring of active cases	Provide a solution to a social problem	Platforms	Users' feedback influenced the technological additions. While upon initial release, generally, requirements were dictated by research or expert input, once a tool has gone live or right before its launch, they attempt to conduct UAT to make it as user-friendly as possible during the pandemic.	Government	Yes	***Certification and new strategic view for connecting frontline workers and communities:*** A certified Benefits Corporation and leading social, a digital enterprise helping organizations bridge their Frontline Workers to deliver critical services and communities in need.
DSE4	AI-equipped Smart Capsules and drones	Italy	2017	Control and prevention of diseases	Introduce incremental innovations previously applied to other users	Artificial Intelligence	Adjustment of the user interface of the capsule to transport blood during the pandemic.	Value chain suppliers (e.g., suppliers, distributors, consultants)	Yes	***Penetration in new markets and patenting:*** A designed-built capsule to transport perishable goods unique worldwide and of their kind. The capsule constantly monitors and checks the state of the materials it carries. Application software is the world's first and only APP that enables air and ground transport.
DSE5	Wellness / Health Services	Philippines	2016	Control and prevention of diseases	Introduce radical innovations for specific users	Platforms	Technological enhancements; new supply chain-related prevention initiatives focused on customer support chat during the pandemic	Value chain suppliers (e.g., suppliers, distributors, consultants)	Yes	***New technological services:*** A digital care app that connects clients with wellness and medical services from wherever they are at the highest standard of care.

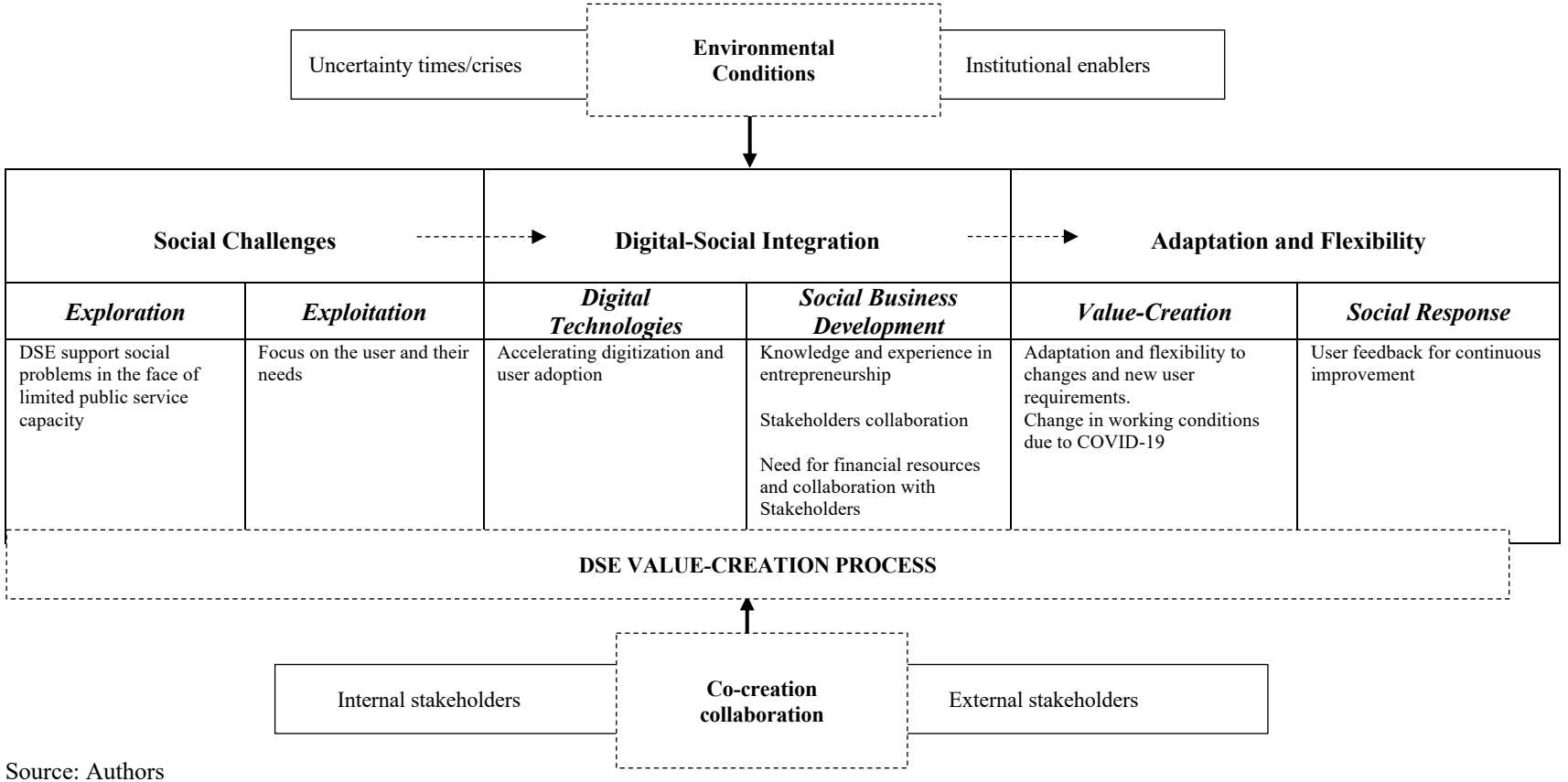
Case	General characteristics			Adaptation during the pandemic					Follow-up post-pandemic	
	Sector	Country	Foundation	Social orientation	Entrepreneurial purpose	Digital orientation	Business model adaptation due the pandemic	Stakeholders during the pandemic	Is it still DSE?	Business model evolution post-pandemic
DSE6	Research sector	Spain	2016	Diagnosis and monitoring of active cases	Provide a solution to a social problem	Platforms and Deep Learning	A system adopted by using the feedback from the diagnosis of users during the pandemic	Universities	Yes	***New collaborators and data producers***: A collaborative endeavour between several universities and research institutions to collect data concerning the COVID-19 pandemic and other diseases in different countries.
DSE7	AI - Natural Language	USA	2018	Control and prevention of diseases	Introduce radical innovations for specific users	Artificial Intelligence	Feature development, additional FAQs added, new channels deployed (SMS) during the pandemic	Government	Yes	***Improving interfaces and clients***: A language-based approach, including knowledge graphs and NLU by using AI chat and voice interfaces at scale to simplify interactions across all digital channels so that organizations and their customers can communicate easily
DSE8	AI-based on the healthcare platform	India	2015	Control and prevention of diseases	Achieve a commercial goal	Artificial Intelligence	Development of portable protection kiosk and type of COVID rapid tests from supply chain	NGO	Yes	***Improving interface model and services:*** A hybrid model that consists of asset lite popup clinics, which can be set up anywhere in 15 minutes or less and provide onsite consults, point-of-care diagnostics and treatment for primary care via a medical team.
DSE9	Software	Brazil	2015	Medical and pharmaceuti cal research	Provide a solution to a social problem	Platforms	User interface needs/feedback during the pandemic	Universities	Yes	***New collaborators and new industries:*** A digital cooperative focused on the technology and communication services market for SMEs, such as software, website and application development, as well as business management programs.
DSE10	The remote patient monitoring platform	Netherlands	2018	Control and prevention of diseases	Provide a solution to a social problem	Platforms	Daily standup and release cycle, with sometimes over three releases a day implemented during the pandemic	Value chain suppliers (e.g., suppliers, distributors, consultants)	Yes	***Improving digital solutions:*** A digital healthcare platform that innovative healthcare providers to guide their patients remotely in control over their care and prevent unnecessary check-ups or admissions with one app for all illnesses.
DSE11	A virtual assistant	Estonia	2020	Life & Business Adaptation	Provide a solution to a social problem	Artificial Intelligence Deep Learning	Based on users' feedback, new topics/areas were trained/added to the VA and the government's COVID-19 FAQ website; a language (Russian) was trained based on users' feedback.	3Fs (family, friends, and fools)	Yes	***Extending new services:*** An automated chatbot to ensure that everyone living in or visiting Estonia gets their questions answered from official sources. For example, DSE continued its work after the emergency ended with limited functionality.

Case	General characteristics			Adaptation during the pandemic					Follow-up post-pandemic	
	Sector	Country	Foundation	Social orientation	Entrepreneurial purpose	Digital orientation	Business model adaptation due the pandemic	Stakeholders during the pandemic	Is it still DSE?	Business model evolution post-pandemic
DSE12	GP and Health Information App Developer	UK	2018	Life & Business Adaptation	Provide a solution to a social problem	App and Platform	User interface update and content improvements for Universities, NHS, third sector, and private healthcare providers during the pandemic	NGO	Yes	***Improving services and penetration to multiple industries:*** Education, health and care apps to support groups that need extra help - from students and people who self-harm to young careers and those with eating disorders.
DSE13	Provide technical solutions	USA	2018	Control and prevention of diseases	Provide a solution to a social problem	Platforms	Target users could be teachers and students from schools, so their needs would be different from other users from corporations. According to their particular needs, our initiative is redesigned and creates a special version for schools during the pandemic	None	Yes	***Penetration in new industries and markets:*** Reliable and innovative digital solutions to the Military, Government, Healthcare, Financial, Security, and Other industries.
DSE14	Digital Health	Ireland	2015	Diagnosis and monitoring of active cases	Introduce radical innovations for specific users	Platforms	New product updates based on the pandemic needs	Government	Yes	***Extending to chronic diseases and collecting data for new treatments***: Remote monitoring solutions for patients living with chronic diseases using real-time data insights to provide continued high-quality care for better patient outcomes and contribute to research to improve treatments.
DSE15	Conversational technology provider	France	2017	Diagnosis and monitoring of active cases	Provide a solution to a social problem	Deep learning and Platform	New features due to the pandemic needs and the English version	Government	Yes	***Extending digital solutions***: Conversational mobile-friendly technologies make the easiest and fastest way to transform and facilitate multi-step processes.
DSE16	Artificial Intelligence Diagnosis	Canada	2017	Diagnosis and monitoring of active cases	Provide a solution to a social problem	Artificial Intelligence	Technological updates based on the pandemic needs	Universities	Yes	***Extending digital solutions***: our award-winning AI, which is the byproduct of years of research by our world-class academic team, introduced new digitalization
DSE17	Inflatables for healthcare	Belgium	2015	Disease treatment and medical supplies	Introduce radical innovations for specific users	Platforms	Many smaller improvements and new features due to the pandemic needs	Value chain suppliers	Yes	***Improving medical devices:*** We design and produce inflatable medical devices allowing optimal patient positioning in hospitals.

Case	General characteristics			Adaptation during the pandemic					Follow-up post-pandemic	
	Sector	**Country**	**Foundation**	**Social orientation**	**Entrepreneurial purpose**	**Digital orientation**	**Business model adaptation due the pandemic**	**Stakeholders during the pandemic**	**Is it still DSE?**	**Business model evolution post-pandemic**
DSE18	3D and map-based surveys	Russia	2020	Life & Business Adaptation	Provide a solution to a social problem	3D technology	Technological updates required by the COVID-19 needs	NGO	Yes	***Improving digital interface***: A service that allows you to create surveys based on maps and 3D models and find out what your neighbours want to see in the city. Participatory design and crowdfunding
DSE19	Open access to genomic data of influenza viruses and novel virus	Worldwide	2018	Control and prevention of diseases	Provide a solution to a social problem	Open Platform	Advanced bioinformatics technology making data play a critical role in response to the COVID-19 needs	Government	Yes	***New market penetration and collaborators***: new initiatives of data that involved public-private partnerships around the world (the Federal Republic of Germany and governmental public-health and academic institutions in Argentina, Brazil, China, Republic of the Congo, Ethiopia, Indonesia, Malaysia, Russia, Senegal, Singapore, South Africa, and others)
DSE20	Interactive custom design products	France	2020	Disease treatment and medical supplies	Provide a solution to a social problem	Deep learning and Platform	Software updates and dedicated mechanical parts to the COVID-19	NGO	Yes	***ExtentendExtendinglients:*** platform of services to help the elderly and dog rescue efforts as a mission charity.
DSE21	Drug Discovery	United States	2017	Medical and pharmaceuti cal research	Incremental innovations previously applied by other users	Deep learning	Capturing data sets related to the COVID-19 trials	Value chain suppliers	Yes	***Reinforcing datasets:*** Data is siloed, the process is inefficient, and biology is inherently complex, leading to a lack of clinical translation. A phenomics-driven approach to drug discovery is taken to address this complexity.

Source: Authors

Figure 1: DSE multi-dimension value-creation process



Source: Authors

Appendix 1: Definition and measures identified in the systematic literature review

Digital social entrepreneurship		
Authors	**Definition**	**Measures**
Short et al. (2009)	It is described as the form of entrepreneurship that uses digital technology as an inevitable part of its business model and uses the advantage of digital technology for social impact and is the future of social entrepreneurship	A latent variable measuring social and digital experience
Cangianoet al. (2017)	Enables people to collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs at a scale that was unimaginable before the rise of internet-enabled platforms (p.1)	The results of a one-year training program aimed at supporting the scalability of digital social innovation projects to have a better impact
Masiero & Ravishankar (2018)	It is the entrepreneurial work of social ventures centred on digital technologies.	Case study evidence from a platform for digital microfinance in India
Battisti (2019)	The relationship among people inside the innovation process toward the reshaping of technology to cope with emerging social issues, and the creation of socio-economic impact (p.2)	A new model to identify the key roles in the innovation process by analyzing ten projects developed and managed by public-private partnerships
Ibáñez et al. (2021)	Represents social entrepreneurship initiatives that are developed by incorporating digital technologies into their business model due to the interaction of N-Helix agents.	Dataset based on information provided by the two most relevant digital platforms (iOS - Apple Store and Android - Google Play)

Digital entrepreneurship			Social entrepreneurship		
Author	**Definition**	**Metrics**	**Authors**	**Definition**	**Measures**
Hair et al. (2012)	Entrepreneurship in which some or all of the entrepreneurial venture takes place digitally instead of in more traditional formats (p.2)	Degree Digital entrepreneurship: Computer-mediated communication (CMC) and electronic communities that permit the rapid exchange of innovative ideas between customers and the organization	Corner and Ho (2010)	SE opportunities focus on social problems; they involve attempts to create social value (p. 636).	Case study on Trade Aid, a social enterprise that survived economic pressures during the 2000s.
Guthrie (2014)	The creation of a venture to produce and generate revenue from digital goods across electronic networks and represents a real career opportunity for those with expertise, passion, or talent (p. 115-116)	A skill set that digital entrepreneurs should have: Production, Distribution, and Promotion	Nga and Shamuganatha n (2010)	In contrast to commercial entrepreneurs, social entrepreneurs are committed to serving basic human needs and facilitating impactful quality of life improvement within society (p. 263).	Questionnaire for social entrepreneurship dimensions: social vision, sustainability, social networks, innovation, financial and returns.
Harms and Walsh (2015)	It is recognizing, creating and exploiting opportunities, and assembling resources around a technological solution, irrespective of the organizational context (p. 552)	Firm performance, such as survival, financial performance, growth, or time-to-market, Technological Entrepreneurship shapes regional transformation	Smith and Stevens (2010)	Innovative and effective activities that focus strategically on resolving social market failures and creating opportunities to add social value system by using a range of organizational formats to maximize social impact and bring about change (p. 577)	Cases social failure
Dutot and Van Horne (2015)	Implies entrepreneurship activities associated with some degree of digital goods or services or other forms of digital activity. (p.81)	Three main constructs influence digital entrepreneurial intention: agility, digital options, and entrepreneurial characteristics. (p. 84)	Bacq and Janssen (2011)	Social entrepreneurship is the process of identifying, evaluating, and exploiting opportunities aiming at social value creation using commercial, market-based activities and the use of a wide range of resources (p. 388)	geographical perspective, social entrepreneurship
Sussan and Acs (2017)	Entrepreneurial activities that optimize the utilization and reconfiguration of digital infrastructure in the form of new systems, new platforms, and new networks (p.71)	The Digital Entrepreneurial Ecosystem framework consists of four concepts: digital infrastructure governance, digital user citizenship, digital entrepreneurship, and digital market- place.	Barraket and Yousefpour (2013)	We define social enterprise as organizations that generate a public or community benefit, trade to fulfil their mission and reinvest a substantial proportion of their income in fulfilling their mission (p. 448).	Action research on social enterprises, according to the definition presented by the authors.

Digital entrepreneurship			Social entrepreneurship		
Author	**Definition**	**Metrics**	**Authors**	**Definition**	**Measures**
Baporikar (2017)	Enterprises/companies that operate based on technologies and the internet. It is quite evident that we are in the knowledge era, and those who are desirous of becoming tech-entrepreneurs need to do many exercises before venturing into these businesses (p.15)	Finding problems or applications for a particular technology, Launching new ventures, introducing new applications, Exploiting opportunities that rely on scientific and technical knowledge, and Working with others to produce technological change	Luke and Chu (2013)	We define a social enterprise as an organization that exists for a social purpose and engages in trading to fulfil its mission, using market-based techniques to achieve social ends (p. 765).	Descriptive research on ten international NGOs in Vietnam
Martinez Dy et al. (2018)	Pursuing opportunities is based on digital media and other information and communication technologies. (p.2)	Social factors and resources enabled or constrained start-ups, technical skills, and benefits and challenges of digital entrepreneurship (p. 6)	Garrow and Hasenfeld (2014)	Not-for-profit private organizations provide goods or services directly related to their explicit aim to benefit the community (p. 1477).	neoliberalism is to undermine the concept of social rights that undergirds the welfare state through the introduction of market principles
Martinez Dy et al. (2018)	the pursuit of opportunities based on digital media and other information and communication technologies (p.2).	Traditional gender roles, Resourcing the firm, and Visibility and invisibility online	Agafonow (2015)	A social enterprise must either maximize profits to have a chance to make investments that have an impact by attracting the capital needed to scale up or must avoid profit maximization to prevent the mission drift that occurs when it forgoes less profitable opportunities that would benefit disadvantaged people (p. 1046)	building on the facts that constrain the daily operation of a social enterprise
Du, Pan, Zhou, Ouyang (2018)	The combination of social, political, economic and cultural elements within a region that supports the development and growth of innovative start-ups pursuing new venture opportunities presented by digital technologies (p. 2)	The theoretical lens of the meta-organization, consists of 2 dimensions for organizational design, i.e., the division of labor and the integration of effort	Kedmenec et al. (2015)	Social entrepreneurship refers to a process of catering to locally existing basic needs that traditional organizations do not address. (p. 120).	Social entrepreneurship (i.e., solving some social problems, investing most of the profit in a particular social mission, and taking into consideration the needs of all the stakeholders) (p. 126)
Shen et al. (2018)	Includes ventures and transformation of existing businesses by creating novel digital technologies and/or novel usage of such technologies. (p. 1125)	digital platforms, crowdfunding and Network Effects	Méndez-Picazo et al. (2015)	Social entrepreneurship is a process that seeks out innovative solutions reading to social problems. This involves, amongst other things, entrepreneurs' pursuit of opportunities that allow them to accomplish such solutions, which, in turn, requires a process of continuous adaptation and learning on the part of the entrepreneur (p. 768).	GEM survey measures "social enterprise activity in new organizations" and "social enterprise activity in start-up organizations"
Delacroix et al. (2018)	More entrepreneurship emphasizes leveraging new digital technologies, such as digital platforms that among producers and consumers and facilitate the exchange of goods and services (p. 1)	Digital subsistence entrepreneurs' activities in P2P platforms and social capital	Puumalainen et al. (2015)	Social entrepreneurship consists of activities that are intended to create a new monetary or psychological benefit that accrues to others who are external to the focal firm (p. 277)	Social enterprise (EE) activity was established in the early stages and as a percentage of the population, according to GEM
Ngoasong (2018)	The reconciliation of traditional entrepreneurship with the new way of creating and doing business in the digital era (p.2)	Living Labs for supporting the activities of the digital entrepreneurship process and as a network for action research, including the university and the community	Stevens et al. (2015)	This paper defines social entrepreneurship as "entrepreneurship with an embedded social purpose", which is sustainable through trading and not limited to a particular organizational form (p. 1053).	The measure of Aupperle et al. (1985) used to draw companies' attention to social and economic objectives

Digital entrepreneurship			Social entrepreneurship		
Author	**Definition**	**Metrics**	**Authors**	**Definition**	**Measures**
Kuester et al. (2018)	The practice of pursuing new venture opportunities presented by new media and internet technologies (p. 66)	Policy interventions to develop the information and communication technology infrastructure, transport and local distribution infrastructure, and training opportunities to develop the Entrepreneurial Digital Competencies of digital entrepreneurs	Robb and Gandhi (2016)	SEVs are "the products of the social, cultural, commercial, and political expectations of the innovation's range of stakeholders, not solely the vision of the social entrepreneur" (p. 113).	SEVs are complex systems that operate in a dynamic and flexible environment and have to be engineered and managed in such an environment (SoS, p. 112)
Von Briel et al. (2018)	New combinations of digital and physical components to produce new products (and services) by combining digital data from heterogeneous sources (p. 281)	Designs of go-to-market strategies for e-innovations serve specific signaling purposes. Trust and uncertainty in e-innovation adoption	Szymanska and Jegers (2016)	'Total Wealth' (TW) is a broader term for social entrepreneurship. (p. 503)	The weighted average of the utilities of stakeholders who influence the social mission and business orientations
Ammirato et al. (2019)	New companies that harness technology to improve their performances and customer service through the digitalization of business are widespread and are important in capitalizing on the Internet by merging digital technologies(p. 924)	Opportunities to engage the Digital Start-up Companies and factors perceived to influence the Digital Entrepreneurship entrepreneurial path. Each item has five alternatives using a Likert scale response format ranging from 1 to 5	Tran and Von Korflesch (2016)	Includes the identification of a specific social problem and a specific solution (or a set of solutions) to address it; the evaluation of the social impact, the business model and the sustainability of the venture; and the creation of a social mission-oriented for-profit or a business-oriented non-profit entity that pursues the double (or triple) bottom line (p. 20)	Raws on intention models in entrepreneurship literature in general and social entrepreneurship in particular to identify gaps
Cavallo, Ghezzi, Dell'Era, Pellizzoni(2019)	A subcategory of entrepreneurship in which some or all of what would be physical in a traditional organization has been digitized (p.24)	Skills, opportunities and risks arising from using MOOCs (massive open online courses) as a new way of teaching entrepreneurship. Agree to use digital media for learning regularly	Alegre et al. (2017)	Narrowing the focus to academic definitions of the terms 'social entrepreneurship', 'social enterprise' and 'social entrepreneur', the paper presents a citation map that serves as the basis for the cluster analysis performed (p. 250).	Maps the existing definitions using a citation map and cluster analysis methods.
Dong (2019)	A digital start-up as consisting of digital technologies and human agents who are capable of monitoring the flow of their activities continuously and expect others to do the same for their own in the context of entrepreneurial actions (p. 2019)	Fast digital adaptation refers to the ability to quickly change the digital features of a digital platform in response to customer needs. IT platform offers digital options that enable agility. New functionalities can be added to digital infrastructure	Arogyaswamy (2017)	Numerous enterprises with social ends in mind have been established, driven by a spirit of activism and the ability to identify and pursue opportunities to create social value, but also based on recognizing the need to develop, perhaps self-supporting organizations. (p. 2).	Rate of social entrepreneurship (SE) start-ups.
Hejazi and Seifollahi(2019)	Digital ventures and digital venture ideas, respectively, are based on product or service offerings that are at least partially embodied in information and communication technologies or enabled by them (p. 2-3)	Digital venture ideas, digital artefacts, and their layered modular architecture. Theorizing how characteristics of a new (digital) venture idea influence the process of (digital) venture creation.	Kedmenec and Strašek (2017)	Social entrepreneurship is a process of creating value by combining resources in new ways (p. 1462).	GEM surveys enterprise activity in new organizations" and "social enterprise activity in start-up organizations" (Terjesen et al., 2011).
Muraya et al. (2019)	Includes those studies exploring and (possibly) theorizing on entrepreneurial processes, outcomes and agency transformed by digitization or by rephrasing it as the digital transformation of entrepreneurial strategies, outcomes, and agency (p. 3305).	Digital Venture (progressive number of new ventures in the database) and Digital Venture Age (numbers of years from the year of birth)	Tiwari et al. (2017)	Social entrepreneurship is a process that begins with perceived social opportunity, transfers it into an enterprise model, determines and achieves the wealth essential to execute the enterprise, initiates and grows the enterprise and yields the future upon goal achievement of the enterprise's goal (p. 3).	The 9-item scale was adopted from Krueger, Reilly, and Carsrud's study.

Digital entrepreneurship			Social entrepreneurship		
Author	**Definition**	**Metrics**	**Authors**	**Definition**	**Measures**
McAdam et al. (2019)	The pursuit of opportunities based on the use of digital media and other information and communication technologies (p. 914)	Female digital entrepreneurs in Saudi Arabia' in both public and private spheres (p. 915)	Araslanov and Zelinskaya (2018)	Social entrepreneurship can be considered as a socially responsible activity of economic entities in the field of small and medium-sized businesses, which is aimed at solving emerging social problems in society under certain (p. 123)	Social entrepreneurship is a socially-oriented non-profit organization.
Steininger (2019)	Start-ups that use Information Technologies as an outcome of their entrepreneurial operations. (p.26)	Diffusion of IT in the business model of the sample ventures: Application of the business model concept in IT-associated entrepreneurship research	Bae et al. (2018)	Social enterprises are broadly defined as organizations that provide goods or services to achieve explicit social aims, such as providing jobs and benefiting the community (p. 75)	Government-certified social enterprises in Seoul, South Korea
Son et al. (2019)	"creating and capturing economic value through the exploration and exploitation of new technology-based solutions" (p. 4-5)	The number of technology license agreements in 2012, the amount of technology licensing income in 2012, and the number of spin-off formations in 2012	Pathak and Muralidharan (2018)	Social entrepreneurship is defined as the recognition, evaluation, and exploitation of opportunities stemming from the basic and long-standing needs of society, which subsequently result in the creation and establishment of social values (p. 1152)	Individual-level likelihood of engaging in social entrepreneurship (possibility measured for the general population), obtained from the GEM data set
Sahut et al. (2019)	Entrepreneurial creation of digital value through the use of various socio-technical digital enablers to support the effective acquisition, processing, distribution, and consumption of digital information (p.4)	Adopting a digital information processing perspective complements existing literature on Digital Entrepreneurship focused at the systemic level (digital entrepreneurship eco-systems and in the digital platforms economy).	Forouharfar et al. (2018)	Social entrepreneurship is a socially mission-oriented innovation that seeks beneficial transformative social change by creativity and recognition of social opportunities in any sector (p. 33).	Social entrepreneurship is a socially mission-oriented innovation that seeks beneficial transformative social change by creativity and recognition of social opportunities in any sector (p. 33).
Vorbach, Poandl, Korajman(2019[a]	An emerging field that combines technology and entrepreneurship disciplines and concentrates on the exploration and exploitation of tech opportunities. (p. 100).	Technological entrepreneurship capabilities for High-tech small firms are based on a fuzzy logic-based model. Awareness Search Technology strategy, Core competency, Technology paradigm, Linkages Learning Leadership	Choi et al. (2019)	Social entrepreneurs can be described as primarily meeting social objectives through running their enterprises rather than generating individual financial profit, while commercial entrepreneurs mainly pursue to be profit-making (p. 933)	GEM social total early-stage entrepreneurial activity (TEA).
Zaheer et al. (2019)	The process of creating a digital start-up as a new business or within an established firm (p.3)	Factors that contributed to the success of 12 digital start-ups are explored from the perspective of their founders.			
Nzembayie et al. (2019)	Entrepreneurship in which digital artefacts platforms are the new venture ideas and market offers. We dissect and elaborate on its distinctive technological basis related to the feasibility of conducting event-driven process research (p.1)	Digital artefacts, platforms and infrastructures. Components form part of a new product or service. Shared is a common set of services and architecture that complementary host offerings, including digital artefacts, Digital technology tools & systems.			
Cahen and Borini (2020)	"new and innovative activities that have the goal of value creation and growth in business organizations across national borders" – seem compatible with ventures that make digital products (p. 2).	(1) Digital companies with all of their revenue from transactions conducted in virtual marketplaces (2) The companies must be independently managed (not subsidiaries); and (3) They must be active with any type of international presence, online or physical operation.			

Digital entrepreneurship			Social entrepreneurship		
Author	**Definition**	**Metrics**	**Authors**	**Definition**	**Measures**
Elia et al. (2020)	Subcategory of entrepreneurship in which some or all of what would be physical in the traditional settings has been digitized based on the use of digital media and technologies (p. 3)	Four dimensions associated with digital actors (who), digital activities (what), digital motivations (why), and digital organization (how) are defined and discussed (p. 01)			
Szalavetz (2020)	Digital transformation has the potential to assist factory economies' progress towards a high-road trajectory of economic development (p. 3)	Global value chains (GVCs). Explore the drivers and enablers of automotive technology-oriented digital entrepreneurs' integration in global value chains			
Schiavone et al. (2020)	Entrepreneurship using new digital technologies (especially social networks, large volumes of solutions for mobile devices, or "clouds") (p.2)	Characteristics of the digital economy, key factors for effective development of business models, digital entrepreneurship, and characteristics of the architectural component of this area.			
Younis et al. (2020)	Digital entrepreneurship involves creating new values with digital products or services, in a digital marketplace, in a digital workplace, using digital distribution channels, or combining all of these (p.57)	Motivational factors Digital Entrepreneurship of Qatar University students, Digital Entrepreneurship Knowledge, Attitudes Towards Digital Entrepreneurship, Subjective Norms and Perceived Behavioral Control			

Source: Authors

Appendix 2: Semistructured Interview Protocol

DSE CHARACTERISTICS

1. Please describe the main digital features of your initiative
2. Who created this initiative, and when? What was the initial entrepreneurial motivation behind it?
3. How does this initiative solve needs/problems associated with the pandemic (life & business adaptation, control & prevention of diseases, diagnosis, information & data, etc.)?
4. What are the main partners of your initiative? (suppliers, distributors, consultants, government, NGO, etc.). Which were the main funding sources?
5. In which countries is your initiative operating?

DSE STAKEHOLDERS' NEEDS

1. Who are your DSE initiative's main clients/target groups (final consumers, corporate, government, NGO, universities, etc.)?
2. Have you received feedback from your customers regarding the products/services offered by your initiative?
3. How do you capture the needs of the final users of your products/services?
4. Have your consumers' consumption patterns changed because of COVID-19?
5. Have you updated/adapted the business model based on the current stakeholders' needs?
6. Have you been able to adapt based on the change in consumption patterns due to the external shakeouts? How?
7. Does your initiative generate benefits for the community? Which ones? Please describe.
8. Along with the COVID-19 crisis, have the demand for your products and services increased/decreased? What is your rationale for this increase/decrease?
9. Do you expect to develop new products/services or business models due to COVID-19?

DSE IMPACT

1. Has the development of your initiative met your initial entrepreneurial expectations and social objectives?
2. How would you evaluate the impact of your startup? Is there a market and social demand for your initiative?
3. Has your initiative been helpful in the fight against COVID-19 and/or in bringing new solutions to this "new normal"?
4. Does your startup/venture have the knowledge and capabilities to meet your stakeholders' current expectations?
5. How do you think your initiative has contributed to solving problems associated with the COVID-19 pandemic?
6. Has your initiative impacted the economy in any fruitful way? Has your initiative impacted society through positive outcomes?
7. Have your initiative pushed technology, research and/or health solution in positive new ways? Has your initiative generated any technological impact in your industry? Please describe.
8. What are the main resources, assets, know-how and/or advantages the venture has to manage this crisis?
9. What are the biggest challenges to the success and continuity of your initiative?
10. How has COVID-19 impacted your organization's culture, strategy, and work environment? Please, describe.

Source: Authors

Appendix 3: Content analysis

Founders' quotes	Key interview information (Open code)	Theme (Content Analysis)	Level
"When we started the company, we faced a rapidly changing scenario with the covid-19 pandemic. Being in those circumstances made us think about how we could adapt our service". "Our focus is on the customer. When we started, we had a phase where we received a lot of user feedback. "Gradually, we incorporated new functionalities in our platform that allowed us to improve our product offer". "Faced with the health crisis, all the health alternatives had to rethink how we were operating. We had to incorporate new technologies that allowed us to be unique and innovative".	They created an initiative that sought to solve the problems and limitations of other pre-existing initiatives. They try to differentiate themselves from the competition by incorporating new services to offer comprehensive solutions better adapted to customers' needs. They perceived deficiencies in the market in which they operated (health). Since COVID-19 was just starting, they tried to anticipate its effects, seeking to solve some shortcomings.	DSE supports social problems in the face of limited public service capacity	Meso
"The relationship with the users has been fundamental to developing the platform. The amount of information we handle is very extensive, so the feedback has allowed us to make it more user-friendly". "Our platform is free and open source, so all knowledge is welcome. The idea is to democratize access to healthcare solutions."	Based on the feedback received, they have been working on the interface of their initiative to make it simpler, more intuitive and easier to use. Various means enabled customers to give feedback on the service. Integration of various platforms and software tools to suit customers' needs. User-friendly platform with good (authoritative) content and free of charge. Integration of various information sources	User feedback for continuous improvement	Maso
"Our open-source solution has already been replicated in poor locations worldwide. In one African country, they didn't have the parts, so they used parts from the automotive industry to replace them". "In Thailand, a large population does not have regular access to health care, and the platforms we are developing address that needs. "Health problems will not end with the F chalet, and we."	Their initiative has been for the benefit of the poorest and neediest people on the planet. They intend their initiative to be a relief and a palatable alternative for people with health problems. Their initiative aims to tackle misinformation and fake news. Focus on improving pre-existing solutions	Focus on the user and their needs	Micro
"Our partners are spread all over the world. We work remotely with friendly experts. Some of them only helped us with the formulation, but we are still working with a smaller group. "Before we faced the pandemic, we had no relationship with other government entities. Now we collaborate with government programs and receive funding". "Our product was innovative, but collaborating with other companies has allowed us to develop the characteristics that allow it to operate legally".	The initiative emerged as a collaboration of partners from several countries. The pandemic led them to modify their innovation to make them more collaborative. Several entities have collaborated in their initiative to make it successful and flourish.	Stakeholders collaboration	Macro

Founders' quotes	Key interview information (Open code)	Theme (Content Analysis)	Level
"The income has been critical for us to be able to put our product on the market. No doubt, with more financial resources, we could make the company grow exponentially". "So far, we have only had private and bank financing. We are a new and innovative company, so we hope in the short term to be able to apply for public funds". "Currently, we are 100% dependent on public funding, which is good on the one hand, but after the pandemic emergency passes, we will have to restructure". "Our initiative is non-profit, so new sponsors would help us grow and put our ideas into action".	With hardly any resources, they have managed to get their initiative off the ground. They believe that with a little more resources, they could be substantially strengthened. As a startup, they do not yet have the necessary private investment to grow. Dependence on public funds Initially, the partners of the initiative did not receive any income for the development of the initiative. New sponsors would help the implementation of their new ideas. Depend on other for-profit initiatives to fund their COVID (not-for-profit) initiative. Development team funded from venture resources.	Need for financial resources and collaboration with Stakeholders	Micro
"We have been working with the same team for three years and have a common vision, although we have developed several projects. "The whole team is a specialist in a different area. We gather everyone's point of view. we need to agree". "When I had this idea, I didn't think I would find people with the same interests and who, despite the difficulties, would be so interested in the processes and the results of our innovation".	They did not have to change the design of their initiative to work in the COVID context. The team of this initiative is multidisciplinary, and each member is a specialist in a different area. Before the pandemic, everyone involved in the initiative had already worked together. It was not difficult to form a team to develop this initiative, and everyone found it interesting and valuable. The team is made up of members from all over the world	Knowledge and experience in the area of entrepreneurship	Meso
"Mobility restrictions make it necessary to use the platform for remote communication, and there is not necessarily a depersonalization of relationships. Very good experiences can be achieved. "The application is very simple and allows easy navigation. The online content is at the level of a book. I'm talking about the specialized content". "People are not always willing to change the way they see the world. We need to be aware that it is an obstacle that people conceive of health as a face-to-face thing".	New technologies can make the online experience more interesting than face-to-face experiences. There is a trend towards digitization in many industries. They operate in a context with a lot of resistance to online. They try to raise awareness through their initiative about the benefits and advantages of taking some things from offline to online. They prefer to develop mobile apps rather than physical content (books). People like the app.	Accelerating digitization and user adoption	Meso
"I think we have been able to change and modify many things in our business quickly. It has not been easy, but we have been willing to do it. "The cohesion team cohesion when facing difficult situations. We are all clear about our roles and act accordingly". "Our initiative is unique. There is no other company doing the same thing. Our is the result of our experience".	One of its main assets: flexibility The advantage of being such a small team is that they are quick to incorporate changes and new functions, unlike large ventures. They were pioneers in the development of their initiative.	Adaptation and flexibility to changes and new user requirements.	Macro
"Since we started this initiative, we have been working remotely, so for us, the working dynamics have not changed". "Of course, it has been a problem to have restrictions on going out and the risk of contagion. Many factors have made it difficult for us to meet and coordinate." "I think we have all understood and assumed that the only way to communicate and access services nowadays is through digital technologies. Users are also getting used to being more open in that sense."	COVID-19 did not affect their work performance, as they were used to working remotely. Moreover, COVID-19 accelerated the development of this and other initiatives. It is very difficult to develop innovations between different professionals if they cannot be in the same physical location. Communication and coordination problems arising from teleworking Due to the pandemic, they operate with teleworking to avoid contagion. Since COVID-19, people have been more open and flexible in considering online technologies and services. The current pandemic has led to increased collaboration at all levels.	Change in working conditions due to COVID-19	Macro

Source: Authors