



# Reconceptualizing socio-tech entrepreneurship: A systematic literature review and research agenda

Maria Eugénia Leitão<sup>a,\*</sup>, Miguel Amaral<sup>b</sup>, Ana Carvalho<sup>c</sup>

<sup>a</sup> IN+ Center for Innovation, Technology and Policy Research, Centre for Management Studies (CEG-IST), Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1, 1049-001, Lisbon, Portugal

<sup>b</sup> IN+ Center for Innovation, Technology and Policy Research, and Engineering and Management Department, Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais No. 1, 1049-001, Lisbon, Portugal

<sup>c</sup> Centre for Management Studies (CEG-IST), Instituto Superior Técnico, Universidade de Lisboa, Av. Rovisco Pais, 1, 1049-001, Lisbon, Portugal

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## ABSTRACT

Socio-Tech Entrepreneurship is a growing observable phenomenon, often referred to as tech4good, and highly valued in society due to the major benefits it provides in meeting the United Nations' Sustainable Development Goals. However, academic research specifically dedicated to socio-tech entrepreneurial ventures is still incipient. To address this research gap, the paper develops a systematic literature review of 238 peer-reviewed studies on social, technology and socio-tech entrepreneurship published from 1988 to 31 December 2023. Through descriptive and content analysis methods, the paper develops the first framework conceptualizing Socio-Tech Entrepreneurship as an autonomous topic within the entrepreneurship research domain. Drawing on the literature, the conceptual framework shows that Socio-Tech Entrepreneurship is distinct from Social Entrepreneurship or Technology Entrepreneurship, which legitimates it as a conceptually relevant group of organizations/practices and as an autonomous research topic within the business sciences field. The paper's comprehensive assessment of the literature and the proposed conceptual framework also unveil topics that are specific to Technology or Social Entrepreneurship but have not been addressed yet for Socio-Tech Entrepreneurship, offering potential future research opportunities and contributing to a research agenda. Implications for theory and practice are discussed.

## 1. Introduction

While economic inequality between countries has partly decreased, inequality within most countries has increased (WID.world, 2022). And the higher the gap between a wealthy minority and a poor majority, the higher the social problems, exacerbating divisions, slowing economic and social development and undermining social cohesion (Aiyar and Ebeke, 2020; United Nations, 2020; WEF, 2022). Consequently, the evolution of social performance standards and their impact on human rights have gathered heightened attention (Schmalor and Heine, 2022; Ahmed, 2022).

Social Entrepreneurship (SE), which is characterized by the intention or promise to solve a social problem (Aliaga-Isla and Huybrechts, 2018), has been meeting several social needs (Diaz-Sarachaga and Ariza-Montes, 2022). Simultaneously, an increasing number of ventures

resort to technology to address critical challenges facing society (Poonamallee et al., 2020), widely and enthusiastically known by the catchphrase "Tech for Good" in managerial and entrepreneurial environments (Sargent and Ahmed, 2017). Since they can scale faster and with declining costs, they enable higher impact than non-tech-enabled solutions (TechNation, 2018). Consequently, this new organizational category (Gidron et al., 2021) generates effects that range from a micro level, like new products or services that lower costs and increase adoption by underserved markets (Scillitoe et al., 2018), to a meso level, like bridging the gap for disadvantaged communities (Leong et al., 2022) by providing services or products that promote their well-being, such as access to healthcare services or clean water (Mor Barak, 2020), to a broader, macro level, helping fulfill the Sustainable Development Goals (Gidron et al., 2021). These ventures are clearly a new paradigm of entrepreneurial companies – a new and unique

\* Corresponding author.

E-mail addresses: [meugenialeitao@tecnico.ulisboa.pt](mailto:meugenialeitao@tecnico.ulisboa.pt) (M.E. Leitão), [miguel.amaral@tecnico.ulisboa.pt](mailto:miguel.amaral@tecnico.ulisboa.pt) (M. Amaral), [anacarvalho@tecnico.ulisboa.pt](mailto:anacarvalho@tecnico.ulisboa.pt) (A. Carvalho).

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entrepreneurial genre (Arena et al., 2018; Calderini et al., 2021; Grassi and Toschi, 2021) – that goes beyond the single objective of promoting social growth through technology to a more inclusive concept of growth (Calderini et al., 2021), focusing on the resolution of societal problems, mainly those affecting more vulnerable and critical social groups (Scillitoe and Joy, 2018b; Thesing, 2023; Tan, 2023). It is a social and economic phenomenon growing exponentially worldwide (EU, 2021; NASSCOM, 2021; Thesing, 2023; Tan, 2023), recognized and supported by policymakers (Arena et al., 2018). By promoting the power of technology for social benefit (Wright, 2018; Gregori and Holzmann, 2020) and providing solutions to new needs and problems, increasingly complex and interdisciplinary (EU, 2021), these companies are defining sociotechnological innovation.

However, in academic literature, this phenomenon is not yet established (Scillitoe et al., 2018a). There is already some consensus regarding Socio-Tech Entrepreneurship (STE) definition. This type of entrepreneurship comprises companies created to generate social value through technological innovation (Desa and Kotha, 2006a). Yet, conceptual literature is still incipient (Poonamallee et al., 2020) and scattered, which is natural given the considerable newness of STE. Besides, theoretical frameworks are required to understand the development of ventures (Scillitoe et al., 2018a) that aim to demonstrate the use of technology for the common good. And academic engagement plays a crucial role in establishing learning hubs for the sharing of knowledge and the development of networks among practitioners (Gupta and Srivastava, 2021).

Although at the intertwining of Technology Entrepreneurship (TE) and SE, STE is neither SE using technology nor TE with a social twist (Scillitoe and Joy, 2018b). However, Socio-Tech Entrepreneurship's distinction vis-à-vis these two types of entrepreneurship has only been briefly performed regarding SE by drawing on two STE ventures to conclude that the significant differences are the innovative use of technology and replication capacity (Ismail et al., 2012). Although STE companies use technology, TE knowledge cannot be directly transferred to STE (Scillitoe Poonamallee and Joy, 2016). Further, STE ventures do not fit the TE concept, which does not imply a social mission. In fact, TE is defined as companies that create and capture value for the firm by deploying specialized individuals and assets derived from scientific and technological knowledge (Bailletti, 2012).

Although there is growing interest from academia in the relationship between technology (mainly digital technology), entrepreneurship, innovation (especially frugal innovation) and social impact (Si et al., 2020; Park et al., 2021; Zahra et al., 2022), conceptual literature on Socio-Tech Entrepreneurship is still incipient (Grassi and Toschi, 2021). In fact, to the best of our knowledge, there are only four conceptual peer-reviewed papers specifically designed to conceptualize STE: (1) Ismail et al. (2012) on “Technology Social Ventures”; (2) Scillitoe et al. (2018a) on “Socio-tech Ventures”, (3) Gidron et al. (2021) on “Impact Tech Startups”, and (4) Grassi and Toschi (2021) on “Technology Social Ventures”. Ismail et al. (2012), in general, replicate the ideas developed in two book chapters by Desa and Kotha (2006a; 2006b) and argue that STE differs from SE for its innovative use of technology and replication capacity. Scillitoe et al. (2018a) draw on examples from the healthcare sector to analyze how four levels of analysis (founder, innovation, organization, and external environment) affect the innovation adoption process and how they can influence changes in the strategic social market orientation balance of socio-tech ventures. Gidron et al. (2021) provide a conceptual framework for studying the “Impact Tech Startup” (ITS), a specific type of entrepreneurial company, in its initial stage, with technological foundations that adopts “innovative strategies to tackle a variety of social and environmental challenges within a for-profit framework and are usually backed by private investment”. Grassi and Toschi (2021) carry out a systematic literature review (from 2007 to July 2020) of “Technology Social Ventures” categorized at micro, meso and macro levels and conclude that (1) this type of entrepreneurial ventures presents “unique features” and, therefore, “deserve a

standalone study”; (2) “they play a pivotal role in the development of technological solutions for complex problems”, and (3) “the field is still in its infancy and lacks a basis of shared definitions and frameworks” (Grassi and Toschi, 2021).

Other 21 conceptual papers mention an assortment of subjects related to STE, such as consumers vs. beneficiaries (Prahald, 2002); mergers and acquisitions (Austin and Leonard, 2008); social technology embeddedness (Katz and Page, 2010); resource-mobilization and bricolage (Desa, 2012; Desa and Basu, 2013; Linna, 2013); e-empowerment (Ariza-Montes and Muniz, 2013; Ajah et al., 2022); competitive strategies and open innovation (Yun et al., 2016); innovation diffusion (Javed et al., 2021), namely through public-private partnerships (Battisti, 2019), models for Social Entrepreneurial Action (Khefacha and Belkacem, 2016; Chavez et al., 2017; Mor Barak, 2020); Social Innovation Technopoles (Znagui and Rahmouni, 2019), funding instruments (Arena et al., 2018), the business-social opportunities nexus (Leong et al., 2022), nonmarket strategies (Ghauri et al., 2022) and the transformative capacity of digital technologies (Ghatak et al., 2023; Holzmann and Gregori, 2023; Yáñez-Valdés et al., 2023) Overall, so far, there is still no study providing a thorough assessment of peer-reviewed conceptual literature on TE, SE and STE to uncover their similarities and differences, proposing a comprehensive conceptual framework and contributing to a detailed research agenda on the topic of STE.

The present research aims to fill these knowledge gaps by answering the following research questions:

**RQ1:** *What is the research profile of existing studies on Technology, Social, and Socio-Tech Entrepreneurship?*

**RQ2:** *What does Socio-Tech Entrepreneurship have in common with, and how does it differ from (a) Technology Entrepreneurship with no explicit social aims and (b) Social Entrepreneurship with no technological base?*

**RQ3:** *What are the research gaps and potential research questions on Socio-Tech Entrepreneurship providing avenues for future research?*

Considering the research questions defined, this study follows a systematic literature review (SLR) (Chaudhuri et al., 2021) of 238 peer-reviewed studies on TE, SE, and STE. The study is consistent with recent top-quality SLR studies (e.g., Pereira et al., 2023). And this SLR is needed in order to: (a) identify the characteristics of the STE phenomenon vis-à-vis TE and SE, considering its double feature of using technology and having social aims, which need to be balanced in order to maintain financial sustainability, (b) provide a descriptive analysis of STE, TE and SE literature reviewed, to understand the evolution, main methodologies and theories used by each field and how theories used to study STE enable characterizing its main elements, (c) present a content analysis of STE, TE and SE literature, to enable the identification of the distinguishing features of STE, (d) identify the main research gaps to define potential research questions that can provide further knowledge on STE (Kraus et al., 2022).

The contribution of this review to extant literature is fourfold. First, to the best of our knowledge, this is the first comprehensive, systematic analysis of literature on SE, TE and STE, including only peer-reviewed literature aimed at establishing the individual features of Socio-Tech Entrepreneurship, a new and increasingly growing social and economic phenomenon (Wright, 2018). Second, this study contributes to the entrepreneurship literature by conceptualizing Socio-Tech Entrepreneurship, opening the door to understanding a new entrepreneurial genre (Calderini et al., 2021). Third, both the descriptive analysis of STE, TE and SE literature reviewed, and the content analysis, performed around five main entrepreneurship dimensions (Morris et al., 2001) and several subdimensions (guided by various theoretical positions) enabled the development of a framework on the main characterizing features of STE, which contributes to reducing the lack of theoretical frameworks to understand this new type of entrepreneurial companies (Scillitoe et al., 2018a) and allows an overall snapshot of Socio-Tech Entrepreneurship. Fourth, the analysis led to the identification of research gaps in STE.

Consequently, this study presents helpful research questions for each subdimension to guide future research on Socio-Tech Entrepreneurship as an independent research topic, which, although sharing similarities with both TE and SE, evidences its individuality.

Given that scholars and public policies have started to consider technological innovation as a key instrument to address and alleviate the pressing environmental and social challenges of our era (Dwivedi et al., 2022; Papagiannidis and Marikyan, 2022; Holzmann and Gregori, 2023), improving clarity on what is already known on socio-tech innovation, and uncovering areas that require further investigation on a phenomenon worth scholarly inquiry (Scillitoe and Joy, 2018b) will enable researchers to advance this field of knowledge. Simultaneously, it will also provide practitioners with an overall perspective of this area. Moreover, it will support policymakers in making research-based decisions for industrial and innovation policies (Calderini et al., 2021) that include these companies with excellent societal impact and economic growth (Aït-Si-Selmi et al., 2020) in their frame of reference (Calderini et al., 2021).

The rest of the paper is organized as follows: Section 2 details the methodology used to undertake the current research project; Section 3 presents the analysis and synthesis of results, both from a descriptive and a content analysis perspective as well as a comparative perspective of the findings and proposes a framework for STE; Section 4 identifies existing knowledge and future research avenues for Socio-Tech Entrepreneurship; and, finally, Section 5 concludes this work by reporting the main findings as well as the relevant theoretical and practical implications of this study, and a summary of suggestions for future research.

## 2. Methodology

Entrepreneurship is multifaceted and manifests itself in many ways (Shepherd et al., 2019), making it a complex and broad field of knowledge. Given this complexity, literature reviews can be a powerful method to produce new insights into the entrepreneurship domain (Rauch, 2020). Systematic reviews offer relevant insights, allowing for grouping, comparing and prioritizing research domains (Arun et al., 2021), understanding the roles and interactions among the dimensions and subdimensions represented in the frameworks, creation of taxonomies and theory-building (Kuratko et al., 2015).

The present study follows a systematic literature review methodology (Fink, 1998), aligned with the recommendations of Tranfield et al. (2003) and other recent systematic reviews in management and entrepreneurship studies (Popovic et al., 2018; Bubicz et al., 2019; Gupta Chauhan et al., 2020). High-quality literature reviews are systematic, explicit, comprehensive, and reproducible (Fink, 1998; Tranfield et al., 2003; Santos et al., 2019). Four sequential steps are followed in the present study (in line with Denyer et al., 2009): (1) question formulation, (2) search for studies, (3) selection and evaluation, and, finally, (4) analysis and synthesis procedures, which are detailed below.

### 2.1. Question formulation

To establish the review's focus, it is fundamental to define well-formulated research questions (Denyer et al., 2009), which were presented in the introduction Section.

### 2.2. Search for studies

The identification of studies on technology entrepreneurship and social entrepreneurship was performed according to the following search protocol:

- The search engines used were Science Direct (SD) and EBSCO Discovery Service (EDS), which are top-quality and widely used academic search engines (Fellnhöfer, 2019; Mor Barak, 2020; Gusenbauer and Haddaway, 2020);

- Each database was searched individually, and then the results on each of the two literature streams were combined;
- Only review articles written in English and published in peer-reviewed journals and proceedings were selected;
- The keywords used, on titles, keywords, and abstracts, were: (1) “technology-based entrepreneurship” AND review, and (2) “social entrepreneurship” AND review;
- No specific time frame for the articles' publication dates was defined.

The search for the “technology entrepreneurship” literature stream in SD provided 87 results, whereas the search in EDS provided 199 results, which amounts to 286 results. The search for the “social entrepreneurship” literature stream in SD provided 255 results, and EDS provided 774 results, amounting to 1029 results.

### 2.3. Selection and evaluation

Several articles were duplicated over the databases, and those cases were removed. After eliminating duplicates, 225 papers on TE and 677 papers on SE were obtained, accounting for a total of 902 results originating from both fields and databases. To address the research questions, inclusion criteria were defined, paper abstracts read, and only those papers that met the following inclusion criteria were selected:

- The papers' core research theme should be: (1) “Social Entrepreneurship”, “Social Enterprise”, “Social Venture”, or “Social Entrepreneur”; (2) “Technology Entrepreneurship”, “Technological Venture”, or “Technology Entrepreneur”; or (3) both areas;
- The research objective of the papers should be conceptually related to “Social Entrepreneurship” and/or “Technology Entrepreneurship” and not any other main area (e.g., education, COVID-19 pandemic, specific sectors, case studies on single companies or countries, gender studies, corporate social responsibility, crowdfunding, cultural entrepreneurship, sports entrepreneurship, or philanthropy).

During this filtering stage, 149 articles on TE were excluded, leaving 76 results. Regarding SE, 414 articles were excluded, leaving 263 results. Therefore, after the abstracts' thorough analysis, the sample comprised 339 articles dating from 1988 to 31 December 2023.

Subsequently, the 339 articles were fully read to ensure their relevance to answering the research questions. Additionally, the secondary sources derived from these papers were reviewed recursively, i.e., if authors of the initial articles cited other sources, the cited references were also studied to get additional information. Besides, the whole reading process revealed some articles addressing both TE and SE, which were grouped into a different (third) cluster (TE+SE).

Thus, the final sample covers 238 results split into three literature streams: 47 articles on TE, 166 on SE and 25 on TE+SE, as illustrated in Fig. 1 below.

### 2.4. Analysis and synthesis procedures

Through multi-step qualitative coding as an analytical method (Gaur & Kumar, 2018), a detailed analysis of the results was performed. In the first phase, all articles were methodically examined, and data was extracted into an Excel spreadsheet with basic publication information (author(s) name(s), year published, paper title, journal) as well as specific information on each article (methods used, theories followed, main conclusions/results and research gaps mentioned). The Kipling Method was applied to better understand the selected articles' scope (Kipling, 1902, as referenced by Irfan et al., 2018). Results were used to address the first research question by performing a descriptive analysis of the material collected, presented in Section 3.1.

In the second phase, after data were descriptively examined, the contents of all results were analyzed and synthesized, as presented in Section 3.2. Given that coding scheme validity is crucial for generating

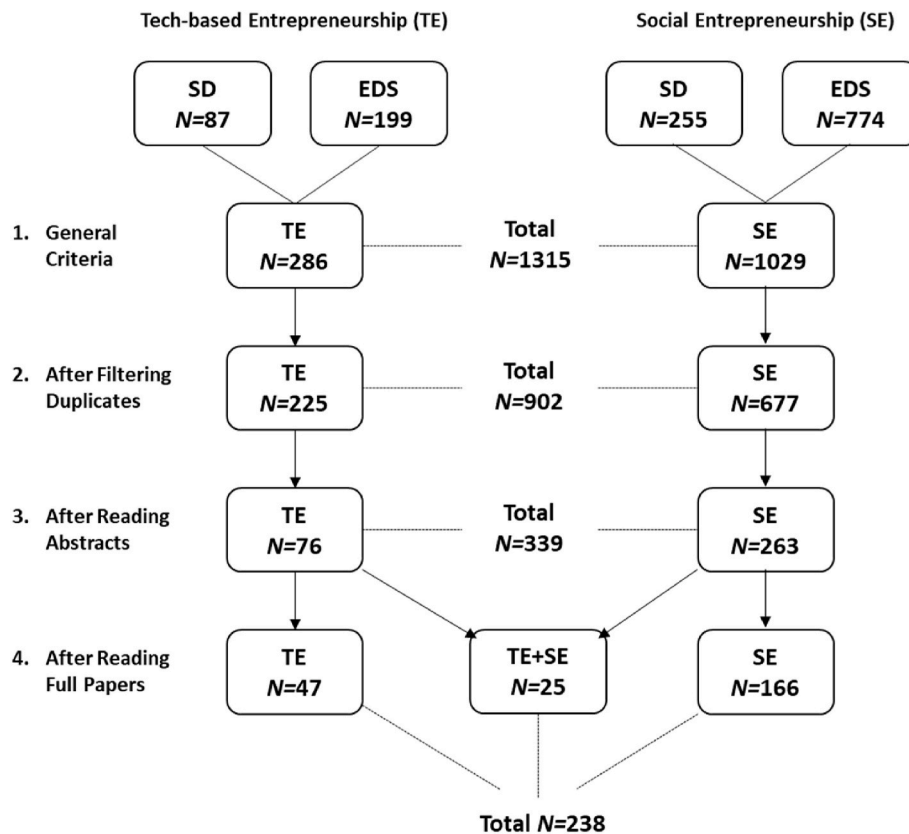


Fig. 1. Systematic Literature Review: key paper selection stages.

confidence in content analysis (Gaur & Kumar, 2018; Williams and Moser, 2019), the literature coding (Flick, 2009) followed a non-linear process (Williams and Moser, 2019), moving between the three coding methods: open coding, axial coding and selective coding (Strauss and Corbin, 1990). First, the literature was read to identify broad distinct concepts and themes in an analytic process to code literature according to five dimensions, capturing the five critical factors that, according to Morris et al. (2001), must come together for entrepreneurship to occur: (1) the business concept, (2) the environment, (3) the entrepreneur, (4) the organizational context, and (5) the resources.

Morris et al.'s (2001) framework was selected for coding results for six main reasons: (i) it faces entrepreneurship as a process approach (Morris et al., 2001; Meyskens et al., 2010) and an experience (Morris et al., 2012) rather than as a single event (Lukes and Laguna, 2010), which allows a global look at any type of entrepreneurship; (ii) it can be applied to any organizational context, from start-ups to corporations or public enterprises (Morris et al., 2001); (iii) this framework allows for entrepreneurship to be considered as continuous both at individual and organizational level, which is useful to understand entrepreneurship, given that it considers exogenous and endogenous factors (Lin, 2021); (iv) it offers a broad view of entrepreneurship that can be applied to a wide range of contexts and industries, and to both social and commercial entrepreneurship (Meyskens et al., 2010); (v) it is flexible enough to accommodate new developments and changes in the entrepreneurial landscape, which accounts for its ability to be applicable since it was first developed in 2001 until the current date when the entrepreneurship landscape is quite different; and, furthermore, (vi) it is more complete than other models, which include only four out of these five aspects: the individual, the process, the organization and the environment (Gartner, 1985) or the opportunity, the resources, the individual and the context (Morris et al., 1994; Austin and Wei-Skillern, 2006). Its broad scope is considered an advantage mainly because it is a heuristic based on dimensions wide enough and transversal to any type of entrepreneurship.

This is particularly relevant mainly when looking at a new and changing phenomenon since it allows for a more comprehensive understanding of the phenomenon in question when it is important to consider its boundaries (Fisher et al., 2021), as is the case of STE. Contrarily, a narrow perspective may result in a limited understanding of the phenomenon and its implications. Besides, Morris et al.'s (2001) framework is used as the starting level of analysis of the SLR findings. To perform the comparative analysis, which enabled the creation of an original conceptual framework, we detailed each dimension into subdimensions (as described below), providing a more fine-grained and focused analysis of STE.

Second, after open coding, axial coding was performed to refine data organization. Articles included in each of the five dimensions were re-read and again deductively coded into 30 *a priori* subdimensions based on theoretical considerations (Crabtree and Miller, 1992; Mayring, 2000), given the broad range of themes included in each dimension. Conceptual literature on each dimension was read to determine the adequate subdimensions. Details are provided in Section 3.2. *Synthesis and analysis of results along five dimensions.* For the Business Concept (BC) dimension, literature on organizational strategy was read (Alvesson, 1998; Ormiston and Seymour, 2011; Hambrick and Fiedrickson, 2005), and the results of the SLR performed that had been coded as part of the BC dimension were again coded according to the subdimensions identified. This step was completed for all other four dimensions: for the Environment (Env.) dimension, given its interchangeable use with context and ecosystem, to identify Env. subdimensions; for the Entrepreneur (Entr.) dimension, literature on the Planned Behavior (Ajzen, 1991), Human Capital (Becker, 2009) and Agency Theories (Jensen and Meckling, 1976) were read to identify Entr. subdimensions; for the Organizational Context (OC) dimension, literature on organizational identity and the balanced scorecard (Kaplan and David, 1992) were read and the OC subdimensions identified; finally, for the Resources (R) dimension, literature on the RBV Theory was read and R subdimensions

identified. This was an iterative process and a constant comparison method was followed. Authors discussed the subdimensions and literature coding among themselves. Whenever there were doubts, literature passages were reread and authors discussed their coding until consensus was achieved.

Third, selective coding was performed to select and integrate subcategories of organized data from axial coding. Some subcategories were eliminated, while others had to be recreated to fit the literature. The coding process was not linear, and there were iterations between the three coding techniques. Throughout the process, inter-coder reliability (Mayring, 2014) was assured by comparison between analysts coding the same material as a measure of objectivity. Moreover, when there were doubts, specialists were consulted, and coding changes were accordingly performed.

A complete list of articles reviewed and a general analysis of those articles are included in Appendix A. Through this analysis, it is possible to summarize the results obtained to provide a comparative perspective of the findings, which is broader than the individual studies alone (Crossan and Apaydin, 2010), and develop an original framework on STE, presented in Section 3.3. This Section allows answering the second research question. Subsequently, by expanding on the results, in Section 4, this article suggests possible avenues for further research on Socio-Tech Entrepreneurship, answering the third and last research question.

### 3. Analysis and synthesis of results

This Section presents the results from the analysis and synthesis of the 238 articles reviewed. To provide valuable contributions to the field (Rauch, 2020), results are divided into three main Subsections, as described below: 3.1 a descriptive analysis of data, 3.2 the synthesis of main results arising from the analysis of data according to the five dimensions mentioned above (Morris et al., 2001), and 3.3 a comparative perspective of the findings and STE framework.

#### 3.1. Descriptive analysis

To better understand the main characteristics of the articles reviewed and perform their research profile, addressing the first research question, the articles were segmented using the Kipling Method or 5W1H using the “six trigger questions: What? Why? Where? When? Who? And How?” (Kipling, 1902, as referenced by Irfan et al., 2018).

As mentioned in Section 2.3. Selection and evaluation, the final sample covers 238 results: 47 articles are on TE, 166 on SE and 25 on STE. The literature on SE surpasses that on TE by far. However, research in both fields is still not consolidated. In fact, “SE scholarship has been characterized by substantial debate concerning the definitional (...), theoretical (...), and methodological challenges of the field” (Saebi et al., 2019, p.71). Regarding TE, “most existing studies are fairly limited and, therefore, current knowledge on TE has not been driven efficiently” (Ferreira et al., 2016, p.715); consequently, “The field appears to be fragmented and so far lacks a common theoretical integration or a common definition of the phenomenon” (Harms and Walsh, 2015, p.554).

The articles included in the final sample are primarily published in the following journals (as shown in Fig. 2): regarding SE, 16 articles were published in the *Journal of Social Entrepreneurship*, which also published four articles on STE and is, therefore, the journal where the majority of the literature reviewed was published; regarding TE, most papers (11) were published in *Technology Innovation Management Review*, which also published three articles on SE; , other articles on STE have been published in several different journals. *Entrepreneurship Theory and Practice* is the journal where all three research streams were published (3 in SE, 2 in TE and 1 in STE). To make it more legible, the figure only considers journals with up to three articles; therefore, journals that just published one or two articles have been grouped as “Others” (for full details, see Appendix B). However, since nearly half of the articles on STE were part of the “Others” group, Fig. 2 also details the 12 journals where studies on STE were published.

Regarding the distribution of papers published over the years, it is possible to see in Fig. 3 that the first papers on TE in our review were published in 1988, the first papers on SE in 1998, and the first paper on STE was published in 2002. The year with most studies published on TE was 2012 (6 papers), on SE was 2019 (18 papers), and on STE was 2013, 2021 and 2023 (3 papers each).

The number of articles authored or co-authored by each researcher was computed to know the prominent authors publishing in each research stream. It is possible to conclude that 563 researchers have studied these subjects and that TE has been studied mainly by S. T. Walsh (3 papers), who also published a paper on STE; for SE, the topmost published author, with four articles published, is S. Bacq (who published 21 papers overall, as reported by Gupta and Srivastava, 2021), whereas, on STE, G. Desa published two articles (Appendix C). When analyzing the theories used or cited (in the case of literature reviews), it

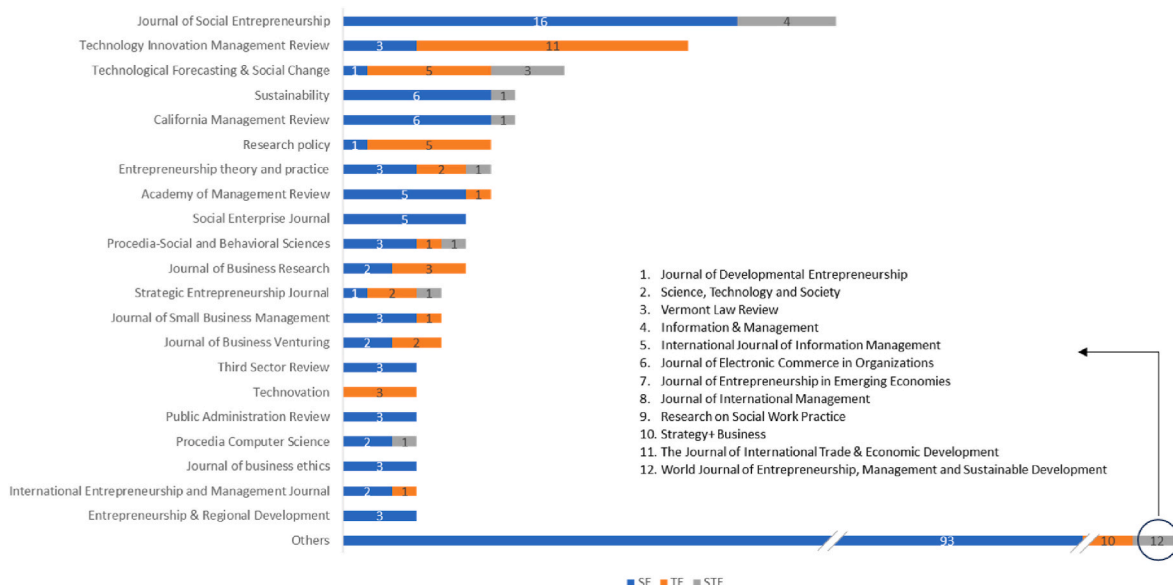


Fig. 2. Number of papers published per journal on TE, SE and STE (up to 3 papers) and disaggregation of the 12 journals that published STE papers.

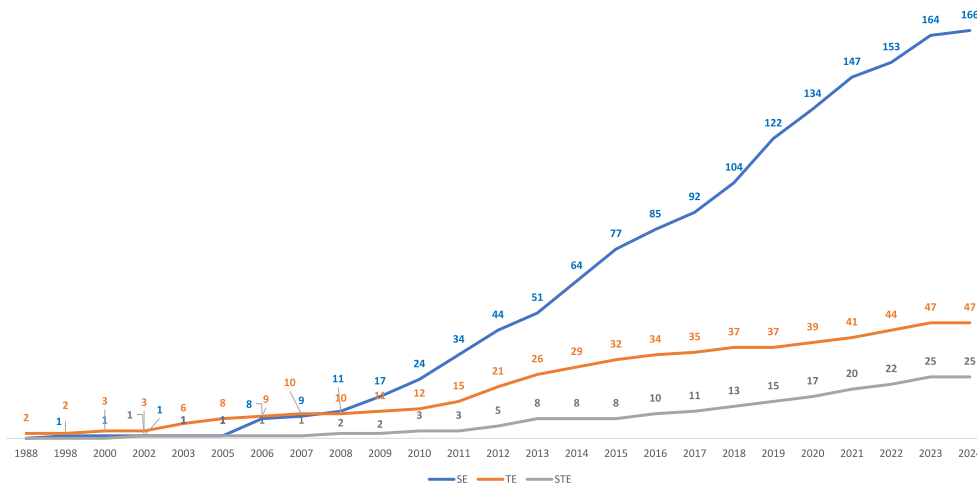


Fig. 3. Distribution of the number of papers published on TE, SE and STE throughout the time.

was possible to conclude that the large diversity of theoretical lenses used in both TE and SE has resulted in low consensus around the ideological, epistemological and ontological dimensions of each type of entrepreneurship (Harms and Walsh, 2015; Saebi et al., 2019). It is also possible to observe (in Appendix D) that the Resource-Based View of the Firm (RBV) (Wernerfelt, 1984) is the most frequently used (TE: 3 papers, SE: 6 papers and STE: 2 papers), which is not surprising, given that resources are the key drivers of innovation. Regarding TE, besides RBV, the Network Theory (Granovetter, 1973), which considers networks of relations as critical, is used in 3 papers. Regarding SE, besides RBV, the Institutional Theory (IT) (Scott, 1995), which considers that entrepreneurship is embedded in a broader environment, including the political and economic systems, is one of the most used (6 papers), along with the Theory of Change (Bacq, 2017; Kickul and Lyons, 2020), which focuses on the steps required to implement change (6 papers). For studying STE (Appendix D), from the total of 25 studies, only nine draw on a theoretical lens. First, one paper (Desa, 2012) draws both on Resource Mobilization Theory (RMT) (McCarthy and Zald, 1977), which defends that success depends on resources and the ability to use them, and Institutional Theory (also one of the theories most used to study SE). This indicates that STE relies on the entrepreneur's ability to gather and effectively utilize resources (RMT). Like SE, it is embedded in a broader environment, including the political and economic systems that condition STE (IT). Second, another paper (Desa and Basu, 2013), besides RBV, already mentioned, also uses the Resource Dependence Theory (RDT) (Pfeffer and Salancik, 1978), which demonstrates how external constraints affect resource acquisition by organizations. Using these two theories to study STE implies that the literature considers resources and the environment as fundamental for STE ventures. Third, another one (Linna, 2013) relies on the Bricolage Theory (Baker and Nelson, 2005) to explain how STE entrepreneurs work within existing constraints to create new solutions with existing resources. Fourth, another paper (Khefacha and Belkacem, 2016) uses the Theory of Creative Destruction (Schumpeter, 1942), implying that STE starts with an innovation that replaces the existing *status quo*, i.e., the environment. Fifth, another paper (Chavez et al., 2017) resorts to the Competency Theory (Harter, 1978) to explain how STE entrepreneurs develop competencies through innate abilities, learned skills, and experiences. Their motivation increases when successfully mastering a task. Sixth, another study (Mor Barak, 2020) uses the Social Capital Theory (Bourdieu, 1986; Coleman, 1990) to refer to the importance of social networks and relationships for the benefit of the entrepreneur and resources of STE ventures. Seventh, (Gidron et al., 2021) studies STE under the Organizational Ecology Theory (Hannan and Freeman, 1989) to understand how these organizations compete for resources and survival, adapting and evolving in response to changing environmental conditions. It also uses the Social

Origins Theory (Salamon and Anheier, 1998), considering that the social origins of STE entrepreneurs impact their life chances and opportunities (while social origins are influenced by entrepreneurs' environment). An eighth paper (Javed et al., 2021) uses the Diffusion of innovation theory (DOI) (Rogers, 1995), besides RBV, to explain the diffusion of innovation, within the environment, from one sector to another, integrating both TE and SE, resulting in the creation of STE. Finally, a ninth paper (Ghatak et al., 2023) studies STE from the perspective of the antecedents of the entrepreneur's intentions towards this type of entrepreneurship based on the frameworks of Entrepreneurial intention theory (Krueger, 1993), postulating that prior work experience and family exposure lead to positive entrepreneurial intentions. It also uses the Theory of planned behavior (Ajzen, 1985) to conclude that perceived social support impacts entrepreneurs' intentions, and Expectancy theory (Vroom, 1964), which explains that the entrepreneur's perceived viability of achieving successful entrepreneurship serves as a proxy for the anticipation of outcomes. The analysis of theories used to research STE and their correspondence to the five key dimensions into which the literature was coded (referred to in 2.4. Analysis and synthesis procedures) allowed a relevant conclusion, presented in Fig. 4. Theories used are primarily related to the Entrepreneur (8 occurrences), the Resources (7), and the Environment (6). No theories relate to the Business Concept or the Organizational Context.

The literature was also reviewed regarding the research methodology and techniques used, following the criteria used by recent research (Gupta Chauhan et al., 2020). As demonstrated in Table 1, the methodology most frequently used in SE is qualitative (40.3%), followed by theoretical and conceptual methods (23.5%). The same happens with STE, where most literature is qualitative (6.3%), followed by theoretical and conceptual methods (2.9%); this is unsurprising, given that researchers are still in an exploratory phase (Handfield and Melnyk, 1998; Trochim and Donnelly, 2006; Creswell and Clark, 2018). Furthermore, since this is an emerging research area, to the best of our knowledge, there are no STE databases (Gidron et al., 2021) besides the Technology Social Venture Database of the Technology Museum of Innovation in the USA, mentioned by Desa (2012). Contrarily, in TE, theoretical and conceptual methods are the most used (8.8%), followed by qualitative methods (6.3%). Papers with both quantitative and qualitative methods are residual (3.4% in SE, 2.9 in TESE, and 1.3% in STE); quantitative methods are rarely used in SE and TE (2.5% and 1.5% correspondingly) and have never been used in STE.

### 3.2. Synthesis and analysis of results along five dimensions

As discussed in the Methodology chapter (Section 2.4. Analysis and synthesis procedures), the results from the three literature streams – SE,

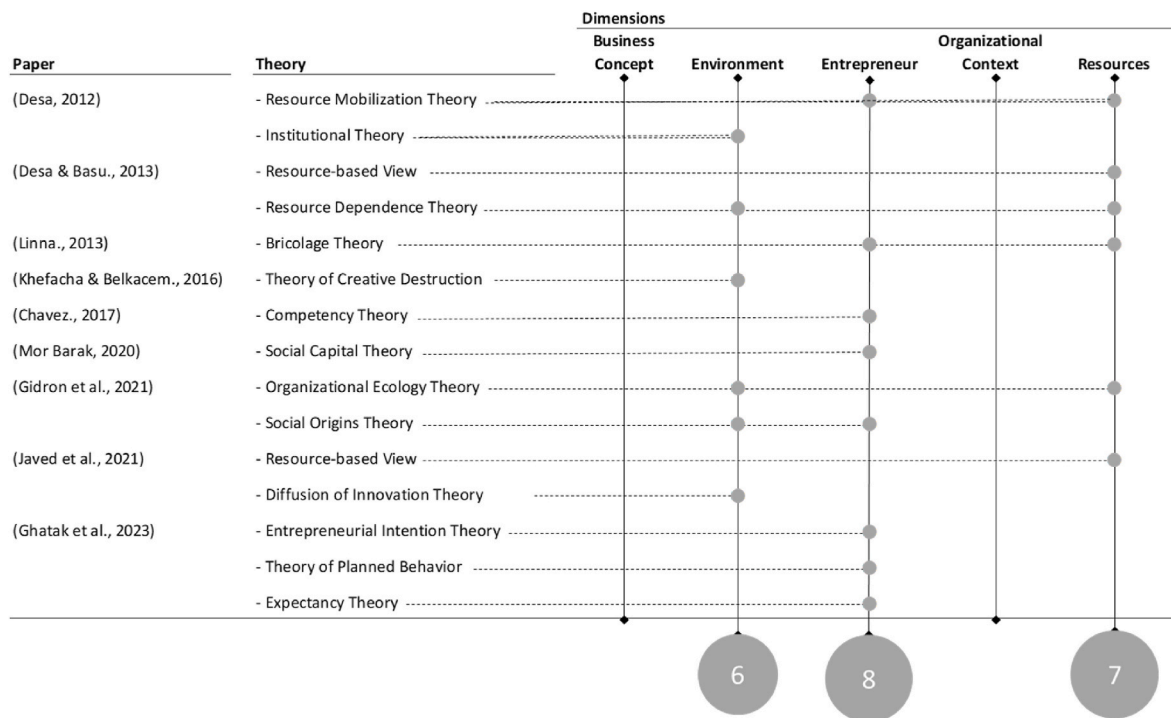


Fig. 4. Correlation between the theories used to study STE and the five dimensions used to code the literature.

Table 1  
Topmost used methodologies in SE, TE and STE.

Research Methodology	Techniques used	SE	TE	STE	Total
		%	%	%	%
<b>Qualitative</b>	Content analysis, Archival research, Bibliometric analysis, Bibliometric survey, Case study, Citation analysis, Content analysis, Descriptive research, Discourse analysis, Ethnography, Field case study, Field observation, Grounded theory, Hypotheses, Integrative review, Interview/survey, Literature review, Meta-analysis, Natural language processing content analysis, Observations, Science mapping, Secondary data analysis, Systematic literature review, Text Mining Analysis, Thematic analysis	40.4%	6.3%	6.3%	53.0%
<b>Theoretical and conceptual</b>	Concept review; Conceptual model development, Examples; Conceptual model development; Examples; Framework development; Theoretical model development; Theory development; Theory development, Examples	23.5%	8.8%	2.9%	35.2%
<b>Mixed methodology</b>	Quantitative: ANOVA; Bibliometric analysis; Cluster analysis; Causality test, Cointegration analysis, Content analysis; Descriptive statistics; Discriminant analysis; Econometric model; Factor analysis; Meta-analysis; Observations; Regression analysis; Secondary data analysis Qualitative: Archival research; Cointegration analysis; Comparative analysis; Content analysis; Error correction model (ECM); Hypothesis; Interview/survey; Literature review; Secondary data analysis; Systematic literature review	3.4%	2.9%	1.3%	7.6%
<b>Quantitative</b>	Centering Resonance Analysis (CRA), Network analysis, Factor analysis, Regressions, Correlations, Meta-analysis, Meta-analytic structural equation modeling (MASEM), Questionnaire, Descriptive statistics, Univariable analysis of variables, Bi-variable analysis, ANOVA, Nonprobabilistic sampling	2.5%	1.7%	0.0%	4.2%
<b>Total</b>		69.8%	19.7%	10.5%	100.0%

TE, and STE – were clustered around **five key dimensions** that contribute to entrepreneurship: (1) the *Business Concept*, (2) the *Environment*, (3) the *Entrepreneur*, (4) the *Organizational Context*, and (5) the *Resources* (Morris et al., 2001). The numerical representation of each dimension, per literature stream, is distributed as detailed in Fig. 5 (since the content of each paper may include data on more than one dimension, the total number of results in the figure exceeds the total amount of papers reviewed).

To better analyze the literature reviewed, the results included, during open coding, in each of the five dimensions and for each type of entrepreneurship (STE, TE and SE) were again deductively coded into 30 *a priori* subdimensions based on theoretical considerations (Crabtree and Miller, 1992; Mayring, 2000) mentioned above, bringing aspects of analysis in connection with the text (Mayring, 2000). Through axial and selective coding, literature was divided into subdimensions, detailed in

specific Subsections, which enabled a finer-grained interpretation of the findings and led to the development of an integrated framework, presented below in Section 3.3. *Comparative perspective of the findings and STE framework.*

### 3.2.1. Business concept

The *business concept* is “a unique combination of resources” that leads to the product, service or process offered by the entrepreneurial venture in a specific organizational form, in a defined market and, thus, it constitutes the company’s “uniqueness or innovativeness” (Morris et al., 2001). Business concepts are often used as synonyms for mission statements (Alvesson, 1998), where the *mission* is the starting point for strategy definition (Ormiston and Seymour, 2011). Although strategy design has many different approaches, Hambrick and Fiedrickson’s (2005) concepts were selected as subdimensions besides the already

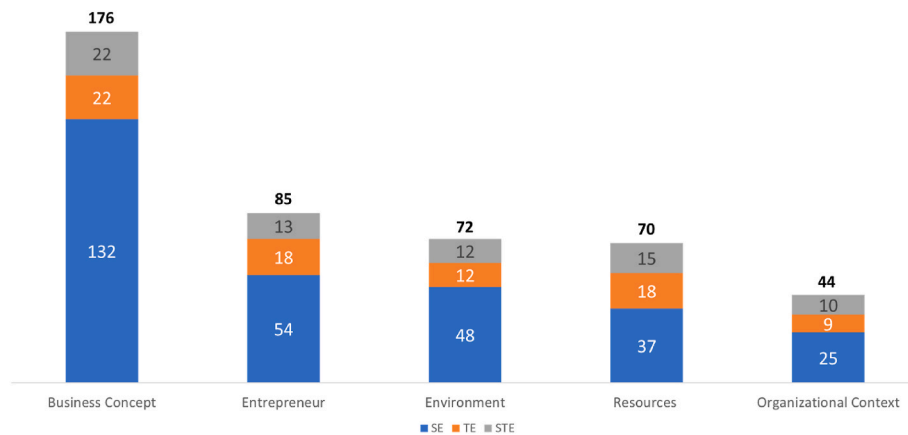


Fig. 5. Distribution of results on SE, TE and STE per dimension.

mentioned mission subdimension. In summary, the six subdimensions adopted to organize the results from the review on the business concept dimension of STE, TE and SE, which will subsequently be detailed, are (1) *mission*, the purpose of a company, the reason why it exists (Ormiston and Seymour, 2011); (2) *arenas*, the fields where the company acts (namely, product categories, market segments, geographic locations, and value-creation stages); (3) *vehicles*, the means that the company uses to pursue its strategy (e.g., acquisitions or joint ventures, internal development, licensing/franchising); (4) *differentiators*, the ways through which the company distinguishes itself in the marketplace (e.g., pricing, image, product reliability); (5) *staging*, the pace and sequence of actions that the company follows (including speed of expansion); and (6) *economic logic*, the way that returns are obtained (e.g., low prices for scale advantages, premium prices for proprietary features) (Hambrick and Fiedrickson, 2005).

**Mission:** Each type of entrepreneurial company has a different mission. Consequently, the three types of entrepreneurship under analysis have distinguishing missions. The mission of STE ventures is to satisfy a social need or societal problem in a resource-scarce context through technological innovation in a financially sustainable manner and a strong market orientation (e.g., Ismail et al., 2012; Desa and Basu, 2013; Gidron et al., 2021). Differently, TE's mission is to create and capture value through scientific and technological knowledge (Bailletti, 2012), whereas SE's mission is mainly to create social value (e.g., Acs Boardman and McNeely, 2013; Lorenzo-Afable et al., 2023; Palil et al., 2023) leading to beneficial social change (Ran and Weller, 2021; Hietschold et al., 2023).

**Arenas:** Literature on STE states that a critical decision regarding market segments is to focus on customers and/or beneficiaries for product or service trials and subsequent offerings (Scillitoe et al., 2018). This decision has obvious consequences not only on revenue results but also on the company's entire organization. Regarding TE, new companies usually follow the business models of existing ones (Doganova and Eyquem-Renault, 2009), while SE ventures can be divided into different types according to the convergence of social mission and economic efficiency (Sparviero, 2019; Nair, 2022).

**Vehicles:** Technology-push-based entrepreneurial activities are often more challenging to achieve but produce "disruptive" innovations that disproportionately serve society (Chavez et al., 2017). For this reason, when STE companies are acquired by multinational corporations, which gain access to a "social technology" mastered by the STE company, STE ventures get new market segments, qualified managerial skills, and access to capital able to increase their scale and social impact (Austin and Leonard, 2008). Similarly, SE companies gain scale via social franchising (Asemota and Chahine, 2017) or by establishing a joint venture with a multinational corporation (Chen, 2012), depending on how well they are supported (Diaz Gonzalez and Dentchev, 2021). Differently,

given their mission, critical vehicles for TE companies' success are technology transfer between universities or other R&D facilities and companies that commercialize technologies (Spiegel and Marxt, 2011; Głodowska et al., 2023) and knowledge spillovers (Pathak and Laplume, 2013; Sobel and Clark, 2018).

**Differentiators:** One of the differentiators of STE is its "delicate social technology" (Austin and Leonard, 2008). This is considered a unique know-how (Austin and Leonard, 2008), a self-defined identity (Scillitoe et al., 2018), which is present in its production processes, product characteristics, organizational cultures and relationship with stakeholders (Austin and Leonard, 2008; Katz and Page, 2010; Scillitoe et al., 2018a). Therefore, this balancing act between technology adoption and social value generation should not be viewed as a dichotomy but as a continuum (Scillitoe et al., 2018). Another differentiator of STE is that, like SE, it influences community members' approaches and conduct by changing how they view social problems and how they are approached (Znagui and Rahmouni, 2019). In fact, SE acts as a civic change catalyst, turning critical societal problems into opportunities (Teasdale et al., 2023) while mobilizing other members of the local community to work towards collective well-being (Douglas, 2008; Lisetchi and Brancu, 2014). Along a different line, "modern technology entrepreneurship is fundamentally about solving-knowledge problems" and "it is the embodied knowledge in a technology that gives it value" (Sobel and Clark, 2018).

**Staging:** In developing countries, STE initially focuses on the development of the appropriate low-cost technical solution that addresses the problem to be solved through sustainable product design, which leaves almost no time or resources to dedicate to strategic planning, and, consequently, leads STE entrepreneurs to improvise along the way (Linna, 2013). Contrarily, in developed countries, the intensive use of new technologies engenders innovation and scales impact effects on society (Ariza-Montes and Muniz, 2013). In fact, technology development implies "rational design planning" before TE execution (Giones et al., 2013) and also a technological-path dependency (Shane and Venkataraman, 2003; Spiegel and Marxt, 2011). Regarding SE, its mission creates a certain "strategic specificity" (Austin and Wei-Skillern, 2006), which means that the capacity to motivate and attract people and funding and to take strategic decisions is tied to the specific social problem or need to be addressed (Austin and Wei-Skillern, 2006). As to staging approaches, SE grows through scaling organizations directly, working in partnership with other organizations, or combining both (Austin and Wei-Skillern, 2006).

**Economic logic:** In resource-scarce settings, financial profit is not the primary motivator of STE; what drives entrepreneurs to find technological solutions is, like SE, to solve poverty-related problems through entrepreneurial means by developing practical solutions to needs in their home communities (Linna, 2013). Further, the use of technology



can help reduce negative externalities (Hietschold et al., 2023). For this reason, local knowledge is valuable, as mentioned in other sub-dimensions. Consequently, in SE, revenue-generating strategies are designed to serve the mission directly, thus creating economic value (e.g., Zahra et al., 2009; Betts et al., 2018; Gupta Chauhan et al., 2020), balancing the level of integration between social and commercial activities (Saebi et al., 2019), and generating “positive externalities [that] are continuously being identified and internalized in the economic system” (Santos, 2012). As to TE, it is “about creating and capturing value for the firm through projects that combine specialists and assets to produce and adopt technology” (Bailetti, 2012), and the value of a TE company is based on the assets it can crowdsource rather than the assets it owns (Sobel and Clark, 2018).

### 3.2.2. Environment

The environment includes the macro forces or “rules of the game” (Baumol, 1990) that both facilitate and constrain entrepreneurial behavior (Morris et al., 2001; Kuratko et al., 2015) and therefore provide the “specific set of conditions that create the opportunity for a particular entrepreneurial concept” (Morris et al., 2001). Entrepreneurship is, thus, “embedded in environmental conditions” (Shepherd et al., 2019). Whether analyzing entrepreneurship through “Discovery” or “Creation Theory” perspectives, the perceptions of entrepreneurs regarding opportunities and resource availability mediate between objective environmental settings and projected entrepreneurial action (Edelman and Yli-Renko, 2010). Furthermore, the concept of “entrepreneurial environment” is used interchangeably with “context” and “ecosystem” (Autio et al., 2014; Ács et al., 2014; Martínez-Fierro et al., 2020). Although the ecosystem concept includes other variables that are not relevant to this research, Audretsch and Belitski’s (2017) four main domains of an entrepreneurial ecosystem are followed to analyze results on the environment dimension: (1) *culture and norms* are a “specification of the formal institutions and culture” and relate to a sense of trust and safety among community members, which favors entrepreneurship; (2) *physical conditions*, such as *infrastructures and amenities* (like green parks or transport links) stimulate or constrain interactions among agents of the entrepreneurial ecosystem; (3) *formal institutions*, when efficient, generate a sense of support and trust, which fosters startup creation; and (4) *information technologies and the internet*, when accessible, provide access to information and its faster dissemination, creating new opportunities for entrepreneurial ventures.

**Culture and norms:** STE ventures (like TE and SE) that align their services with local government policies and political and legal environments find it easier to get resources from granting organizations (Desa, 2012; Linna, 2013; Znaoui and Rahmouni, 2019). However, STE can also overcome environmental constraints generated by societal norms and restrictive practices or rules through “emancipatory endeavors”, which are creative solutions that transform pre-existing structures of power that traditionally limit opportunities (Leong et al., 2022). Equally, SE changes the *status quo* and builds a stable new equilibrium (e.g., Aliaga-Isla and Huybrechts, 2018; Alonso et al., 2020). As to TE, the legal framework in which companies operate is decisive for company success since it can foster or hinder economic and political national and international success (Nacu and Avasilcăi, 2014).

**Physical infrastructures and amenities:** In STE and SE, physical infrastructures and amenities are crucial (Linna, 2013), especially when entrepreneurs experience environmental factors (Nascimento and Salazar, 2020), know them well and use those factors as local strengths (Linna, 2013). Also, for TE to embrace the value of opportunities, companies must understand the different opportunities in emerging markets and investigate their ability to address them in uniquely valuable ways (Thukral et al., 2008).

**Formal institutions:** Apart from the fundamental role of national innovation policies for STE (Grassi and Toschi, 2021), also the “implementers of public policies fostering entrepreneurship” (Doganova and Eyquem-Renault, 2009), such as incubators, accelerators, technology

parks, and test and research centers, such as universities’ R&D facilities (Grassi and Toschi, 2021), play an essential role developing STE, TE and SE companies. This is because they help scale projects, connect, access funding and venture capital networks, and activate demand (Florida and Kenney, 1988; Garud and Karnøe, 2003; Ariza-Montes and Muniz, 2013). However, contrarily to TE, both STE and SE provide value in a reactive response to “institutional voids” (e.g., Desa and Koch, 2014; Torres and Augusto, 2020; Álvarez-Castañón et al., 2023), i.e., public failures unrecognized by the market or governmental forces (Austin and Wei-Skillern, 2006; Scillitoe et al., 2018a; Leong et al., 2022). Besides, STE helps face the uncertainty of the environment by proposing innovative solutions to social needs (Yáñez-Valdés et al., 2023).

**Information technologies and the internet:** As expected, this is an essential subdimension for STE and TE. The expansion of new technology companies strongly depends on developing local technological systems. Besides, e-empowerment provided through the internet offers unlimited resources and global scope for a significantly lower infrastructure cost, promoting digitally-enabled inclusiveness (Holzmann and Gregori, 2023), and for this reason, virtual incubators are extremely useful to STE (Ariza-Montes and Muniz, 2013; Javed et al., 2021).

### 3.2.3. Entrepreneur

The *entrepreneur* is the person who implements the entrepreneurial venture (Morris et al., 2001). There has been extensive research on topics related to the entrepreneur’s sociological and psychological characteristics (Matthews and Moser, 1995; Zhao and Seibert, 2006), entrepreneurial cognition (Busenitz, 1999; Mitchell et al., 2002) and individual determinants (Simoes et al., 2016), among others, based on the belief that there is “a fit between the type of entrepreneur and the type of venture he/she pursues” (Morris et al., 2001). To analyze and synthesize the literature reviewed regarding the characterization of the entrepreneur, this study was guided by three main theories: the Theory of Planned Behavior (TPB) (Ajzen, 1991), the Human Capital Theory (HCT) (Becker, 2009) and the Agency Theory (AT) (Jensen and Meckling, 1976). TPB establishes that entrepreneurial intention has three cognitive antecedents: i) *attitude*, which refers to the person’s favorable or unfavorable evaluation of the target behavior; ii) *subjective norms*, which include the opinions of social reference groups; and iii) *perceived behavioral control*, which comprises the perceived ease or difficulty of performing the behavior (Kautonen et al., 2015). HCT defends that human capital attributes are critical for the success of entrepreneurship (Unger et al., 2011). In reviewing the literature, Marvel et al. (2016) find that the most common human capital constructs investigated have been i) *working experience* (past work in an industry or the number of previous management positions held), ii) *education* (years of education or completion of a university or technical degree), iii) *entrepreneurial experience* (past startup experience or prior business ownership), iv) *demographics* (age, whether family members were entrepreneurs or gender), and v) *cognitive and/or psychological measures*. Further, AT guided the argument that human *motivations* influence “who pursues entrepreneurial opportunities, who assembles resources, and how people undertake the entrepreneurial process” (Shane et al., 2003). To summarize, the nine subdimensions that guide the analysis of the role of the entrepreneur in STE, TE and SE are (1) *attitude*, (2) *subjective norms*, (3) *perceived behavioral control*, (4) *work experience*, (5) *education*, (6) *entrepreneurial experience*, (7) *demographics*, (8) *cognitive and/or psychological measures*, and (9) *motivations*, as detailed below.

**Attitude:** The attitude of entrepreneurs is mainly influenced by personal features (Whetten and Mackey, 2002; Ardichvili et al., 2003; Ariza-Montes and Muniz, 2013), which, in fact, do not differ much for STE, SE and TE entrepreneurs. STE entrepreneurs are characterized as being empathetic, having a sense of perceived desirability (Grassi and Toschi, 2021; Ghatak et al., 2023) and an extremely high level of passion and commitment to their ideas, which makes them persistent in realizing their vision but also conscient as to the obstacles they will face (Ariza-Montes and Muniz, 2013). TE entrepreneurs have vision, creativity,

charisma and persuasion, perseverance and determination, positive thinking, passion for their business and trust in people (Nacu and Avasilcăi, 2014) and SE entrepreneurs want to be “transformative forces” (Bornstein, 2007), “change agents” (Dees, 1998) or “architects of change” (Mair et al., 2012).

**Subjective norms:** Subjective norms, such as moral obligation, impact the decision to engage in STE (Ghatak et al., 2023). Besides, STE entrepreneurs tend to direct their visions collaboratively, thus achieving the involvement and commitment of very different kinds of stakeholders (Ariza-Montes and Muniz, 2013; Battisti, 2019). Regarding TE, inexperienced entrepreneurs mostly rely on their network of direct personal ties, while experienced entrepreneurs select the appropriate peers from their pre-existent network (e.g., Beckman et al., 2012a; Löfsten et al., 2022; Haessler et al., 2023).

**Perceived behavioral control:** STE entrepreneurs act like creative do-it-yourselfers who refuse to be constrained by limitations (Yáñez-Valdés et al., 2023) and instead create “something out of nothing” (Linna, 2013). Still, in doing so, especially when dealing with BoP markets, these entrepreneurs develop reasonable quality solutions that are affordable and satisfy the needs of low-income people (Linna, 2013). As to high-technology entrepreneurs, most do not perceive exceptionally high levels of risk when deciding to start a TE company (Corman et al., 1988) and SE entrepreneurs, given their emotional intelligence and self-efficacy (L. P. Tan et al., 2020), can be strong-minded to make their vision work and inspire others (e.g., Fyke et al., 2016; Blaga, 2018; Nashchekina et al., 2019).

**Work experience:** Tenure and a pro-innovation stance of STE founders guide further innovation activities that later influence the strategic orientation of the venture (Scillitoe et al., 2018). Besides, STE needs to count on experienced managers with greater awareness and capability within their sectors to manage potential critical contingencies (Scillitoe et al., 2018a; Grassi and Toschi, 2021; Yáñez-Valdés et al., 2023). Differently, most high-technology entrepreneurs have never had prior business experience and are associated with research in a university or research institute (Corman et al., 1988). However, experience depth (based on years of experience) is positively and significantly related to radical innovation (e.g., Marvel and Lumpkin, 2007; Beckman et al., 2012b).

**Education:** Given the technological component of this type of venture, STE entrepreneurs’ education and technological knowledge influence STE creation (Scillitoe et al., 2018; Ghauri et al., 2022; Holzmann and Gregori, 2023). Likewise, TE entrepreneurs’ higher formal education is vital to acquiring rich technology knowledge (Colombo and Grilli, 2005).

**Entrepreneurial experience:** When large firms acquire STE companies, all acquiring companies try “to keep the founding entrepreneurs engaged in the business” because their specialized knowledge is considered “a valuable asset to capture synergies and benefits emerging from “reverse osmosis” (Austin and Leonard, 2008). Regarding TE entrepreneurs, when experienced entrepreneurs start a company, their pre-existent networks influence opportunity conceptualization (Giones et al., 2013).

**Demographics:** STE and SE entrepreneurs’ socio-cultural-economic background and diversity of experiences play a significant role in the success of their companies (Sengupta et al., 2018) since it is precisely their complex background that encourages them to believe in their skills and work towards their mission (Linna, 2013). However, personal indicators do not significantly affect TE firm survival (Gimmon and Levie, 2010).

**Cognitive and/or psychological measures:** STE entrepreneurs who work in BoP situations require creativity, imagination, tolerance for ambiguity, stamina, passion, empathy, courage, analytical skills, intelligence, and knowledge (Prahald and Hart, 2002). Besides, their attitude and personality can influence innovation adoption and actions regarding technological innovation by building confidence and supporting organizational members (Scillitoe et al., 2018). Regarding TE

entrepreneurs, their prior knowledge and a certain degree of technological-specific knowledge (e.g., Gimmon and Levie, 2010; Beckman et al., 2012a; Muegge, 2012) are seen as precursors of entrepreneurial alertness to business opportunities and are particularly significant for ventures with complex technological advancements (Corman et al., 1988; Beckman et al., 2012a); additionally, their growth orientation is crucial for success (Löfsten et al., 2022). The Human Capital Theory becomes evident when literature considers that the entrepreneurial team rather than the individual entrepreneur is more often than not the unit cell of TE (Colombo and Grilli, 2005; Harms and Walsh, 2015). Also, high-technology entrepreneurs possess a “strong need for control, independence, keen intuition, a need to build and create, and an ability to simplify complex problems” (Corman et al., 1988). The personality of SE entrepreneurs is one of the top factors that lead to SE intention formation (e.g., Ahuja et al., 2019; Tan et al., 2020; Luc, 2021), given their “prosocial personality” (e.g., Betts et al., 2018; Saebi et al., 2019), high degree of agreeableness (Upadhyay, 2022) along with compassion (Miller et al., 2012).

**Motivations:** STE and SE entrepreneurs share a sense of commitment and ethical responsibility to help others (e.g., Linna, 2013; Betts et al., 2018; Gupta Chauhan et al., 2020). STE entrepreneurs have a passion for identifying and solving pressing challenges (Holzmann and Gregori, 2023) while high-technology entrepreneurs have a sense of an “internal reward system” and are therefore highly motivated to act because implementing their ideas is essential to their self-satisfaction (Corman et al., 1988).

### 3.2.4. Organizational context

To implement the business concept, entrepreneurship requires an *organizational context* (Morris et al., 1994), which has “implications on the type and timing of the entrepreneurial activity” (Morris et al., 2001). It can be diverse and include various aspects related to the context in which the company is created (e.g., home-based business, franchise, partnership, incubator) (Kuratko et al., 2015). Consequently, the organizational arrangements of a new venture are restrained or encouraged in a specific direction (Morris et al., 2018). Since organizational identity is an organization’s most distinctive, central and enduring characteristic (Whetten and Mackey, 2002), the organizational and *legal structures* were first considered for the treatment and grouping of results regarding this dimension. Both are considered essential variables that entrepreneurs can use to minimize the few risks under their control (Russell and Russell, 1992; Hart, 2003; Mayer-Schönberger, 2007). Besides, as Burgelman (1983) defends, “structure follows strategy” and “strategy follows structure”. For this reason, the balanced scorecard (Kaplan and David, 1992) was used to structure the subdimensions since it is one of the strategic tools most frequently used (Frigo, 2002) by all types of companies, including entrepreneurial ones (Malagueño et al., 2018). It relies on a set of metrics based on different perspectives (Malagueño et al., 2018), each looking at specific aspects: i) *economic performance* includes how shareholders look at a company’s performance; ii) *customer* reflects on how clients should view it; iii) *internal business processes* consider the processes that are functioning and those that need to be changed to meet internal and external customer demands and operational efficiency; and, finally, iv) *learning and growth* analyzes the type of human resources, innovation policies and organizational culture to be promoted to achieve the company’s vision (Dudic et al., 2020). Consequently, the six subdimensions used to organize literature results regarding the organizational context of STE, TE and SE are (1) *organizational structure*, (2) *legal structure*, (3) *economic performance*, (4) *customer*, (5) *internal business processes*, and (6) *learning and growth*, as detailed below.

**Organizational structure:** STE companies take different organizational forms (Gidron et al., 2021). The definition of the organizational structure has particular relevance during the innovation process (Scillitoe et al., 2018). Besides, creating a balanced organizational structure can be difficult, given STE’s social and market mission (Scillitoe et al.,

2018). Regarding SE ventures, these need to adopt an organizational structure that enables them to maximize social impact (S. Bacq and Janssen, 2011).

**Legal structure:** The definition of the legal structure is considered a critical structural decision of STE companies (Arena et al., 2018; Scillitoe et al., 2018) since they need to adopt one of the following forms: for-profit, nonprofit, or hybrid form (Desa, 2012; Desa and Basu, 2013; Scillitoe et al., 2018a), each having implications in terms of financing, target audience, and organizational culture (Scillitoe et al., 2018). Also, SE companies take various legal structures (for-profit, government, NGOs, co-operatives, associations or hybrid) (e.g., Bacq and Janssen, 2011; Persaud and Bayon, 2019), and each is directly connected to the option about profit distribution (Lumpkin et al., 2018).

**Economic performance:** To achieve economic performance growth, preserving companies' distinctiveness is vital for STE's unique attributes (those that make them attractive and valuable) (Grassi and Toschi, 2021), which are fragile and easy to disrupt or destroy (Austin and Leonard, 2008). Regarding SE, how companies meet their goals and overcome challenges depends on the system of governance defined since it determines for what and to whom an organization is accountable (Sparviero, 2019).

**Customer:** The customer subdimension of STE and SE is very important because both need to define whether they are the beneficiaries of social value or if that value is created with them (Scillitoe et al., 2018a; Saebi et al., 2019; Sancho et al., 2021).

**Internal business processes:** When developing a business model, STE ventures must consider their main components: value proposition; technology system that creates value and distributes it to customers; customer segmentation for concrete consumers of business models; potential consuming idea step, where systems that will concretely solve social problems are developed; costs and revenues; and connection with customers (Yun et al., 2016). Besides, having versatile, dynamic, and adaptable processes for creating value sets STE apart from other forms of initiatives (Yáñez-Valdés et al., 2023). Regarding TE, its organizational context should be assessed considering several factors, namely having a managerial emphasis on either operations or technology development; the complexity of the technology; the type of technological innovation; and knowledge-based services, knowledge-embedded services, or knowledge-extracted services (Walsh and Linton, 2011).

**Learning and growth:** Technology enablers hold the key to growth both of the social value and the emancipatory potential of STE since even if a technology is available, there may be few entities with the knowledge or capability to leverage it towards the attainment of the desired outcome (Leong et al., 2022). Regarding SE, sometimes, even before growth is considered, social ventures are often pulled into rapid growth either by funders or demand for their products/services and even pushed by their social missions to meet those needs (Austin and Wei-Skillern, 2006). As to TE, academia needs to understand what influences the survival and growth of new high-technology ventures considering this type of company's importance in developing countries' innovation (Gimmon and Levie, 2010).

### 3.2.5. Resources

RBV Theory argues that resource access is a key predictor of opportunity-based entrepreneurship and venture growth. Thus, resources are crucial in matching a concept to a potential opportunity (Shepherd et al., 2019; Morris et al., 2001). A diversity of resources shapes the accomplishment of a business idea and were used as the five subdimensions to categorize data from the literature review: (1) *physical* (e.g., buildings, equipment), (2) *financial* (e.g., funding, bank loan), (3) *human* (e.g., R&D, sales skills), (4) *relational* (e.g., customers, networks), and (5) *technological resources* (e.g., patents, licenses) (Morris et al., 2001; Nacu and Avasilcăi, 2014). It is, therefore, vital for an entrepreneur to determine the required resources and find "creative ways" of obtaining adequate ones (e.g., purchase, outsource, partnering) (Foss et al., 2008; Morris et al., 2001; Villanueva et al., 2012), and convert

them from inputs into outputs (Alvarez and Busenitz, 2001).

**Physical resources:** STE resorts to "hidden assets" (those that may not have been recognized or used before), such as vacant land, energy and waste resources, which are particularly useful when entrepreneurs turn them into productive resources (Linna, 2013).

**Financial resources:** STE, like TE, requires high capital investments for initial development and to gain scale (Scillitoe et al., 2018a; Gidron et al., 2021; Grassi and Toschi, 2021). However, STE, given its advantage of allowing cheaper and faster replication across regions or projects, enables higher social impact, scale, cost-efficiency, profitability and sustainability (Ismail et al., 2012; Leong et al., 2022; Holzmann and Gregori, 2023) and, for this reason, STE increasingly attracts alternative funding sources (Arena et al., 2018; Gidron et al., 2021; Holzmann and Gregori, 2023). When large companies acquire small STE ventures, one advantage of this acquisition is the opportunity for STE companies and their investors to have a financial exit (Austin and Wei-Skillern, 2006). As to TE, venture capital is vital in high-technology entrepreneurship (Florida and Kenney, 1988). For SE, financial resources are a significant challenge since it often heavily relies on a vast range of funding sources (e.g., Groot and Dankbaar, 2014; Gupta Chauhan et al., 2020), without which, companies cannot achieve their goals, which are frequently ambitious (Austin and Wei-Skillern, 2006; Iyengar, 2014).

**Human resources:** STE, TE and SE firms have more chances of survival if a balanced team creates them, avoiding the Lazearian imperative of being a "jack of all trades" (Gimmon and Levie, 2010; Aliaga-Isla and Huybrechts, 2018). STE counts on "collective resource" generated by relations among people who allow STE to access other resources, such as knowledge (Linna, 2013; Ajah et al., 2022). Also, by resorting to "hidden assets", STE accesses more practical knowledge about everyday life or relevant only in a local context, like skills, knowledge and experience of individuals, as well as community capacities (Linna, 2013). High-technology entrepreneurship depends on investing and attracting high-quality, experienced personnel who can tap into established entrepreneurial networks and secure co-investors (Florida and Kenney, 1988). SE needs to count on a varied range of inside and outside actors, institutions, stakeholders and networks to overcome barriers to success (Yerbury and Burrige, 2011; Montgomery et al., 2012) and promote social development (Ferreira et al., 2017).

**Relational resources:** As with human resources, relational resources are crucial to STE, TE and SE. STE and TE need access to specialized knowledge and resources that the entrepreneur usually cannot own or control. STE resorts to relational resources because it is easier for companies that match the technological strengths of their operating location to acquire basic materials and hire certified employees (Desa, 2012). Besides, establishing partnerships or alliances is also important for STE to overcome difficulties faced (Grassi and Toschi, 2021). TE often depends on innovations and activities of different people who may be located anywhere since TE operates in an interconnected global market (Muegge, 2013; Isabelle, 2013; Klingler-Vidra et al., 2021). Besides, STE and SE need a strong network of supporters (e.g., Dacin et al., 2010; Scillitoe et al., 2018a; Nascimento and Salazar, 2020). Also, STE frequently depends on strong and weak ties, which bring value to STE in technology adoption through an integrated network (while strong ties provide valuable and deep knowledge on how to implement the technology and overcome challenges, weak ties offer more information on how other companies use the technology) (Scillitoe et al., 2018).

**Technological resources:** For STE, like TE, technological resources are a cornerstone. In fact, as the regulatory environment becomes more supportive, several stakeholders, like universities, corporations and governments, look for legitimate technologies to fund (Desa, 2012). Regarding TE, an effective strategy to accelerate its startup is to acquire the physical and intellectual assets of older technologies (Smith, 2013). In what concerns SE, companies leverage their social networks when facing resource or technology constraints (Gupta Chauhan et al., 2020) while also benefiting from social mediating technologies (Chou and Lin, 2023).

### 3.3. Comparative perspective of the findings and STE framework

Having performed the previous analyses, it is now possible to answer the paper’s second research question and to establish STE’s boundaries and understand what it has in common with – and how it differs from – TE and SE.

The systematic literature review provided an objective assessment of a set of dimensions and subdimensions of STE, TE and SE that have been scientifically addressed from 1988 to 31 December 2023 (Appendix E). These results enabled the development of an integrated framework (Fig. 6), which synthesizes those dimensions and subdimensions, as well as the key adjacencies between STE, TE and SE.

The framework depicted in Fig. 6 frames the 62 main findings that emerged from the literature within the five major dimensions of analysis and it highlights three categories of research topics drawn from the literature: (A) those that are specific to STE; (B) those common to STE and TE/SE; and (C) topics that are specific to TE/SE but have not been addressed for STE. Conceptually, it is important to focus primarily on (A) as it clearly provides evidence that STE exhibits a number of particularities which make it different from a simple mix between TE and SE. For this reason, in Fig. 6 only STE is detailed in what concerns the dimensions, subdimensions and specific features within subdimensions. The findings regarding all dimensions and subdimensions for each type of entrepreneurial venture analyzed – STE, TE and SE – are detailed in Appendix E.

Therefore, the present framework provides support to Scillitoe

et al.’s (2018b) concern that “care should be taken not to consider socio-tech ventures as simply either social ventures using some technology or technology ventures with a social twist. Socio-tech ventures can exhibit characteristics and make decisions that may mimic or be unique from either social or tech ventures”. The clear identification of characteristics that are specific to STE, legitimates it as a conceptually relevant group of companies and as an autonomous research topic within the business sciences field.

Following Fig. 6 and starting with the *business concept*, one can say that Socio-Tech Entrepreneurship evidences key subdimensions regarding: (1) *Mission*: STE has a distinct mission from other ventures, namely: to satisfy a social need or societal problem through technological innovation in a financially sustainable manner, with a strong market orientation (e.g., Ismail et al., 2012; Desa and Basu, 2013; Gidron et al., 2021); (2) *Market segments*: STE ventures define early well in advance which market segments to focus on and whether they will work for paying customers or non-paying beneficiaries (Scillitoe et al., 2018), which has natural consequences on the entire STE building; (3) *Technology-push disruptive innovations with social impact*: To pursue their strategy, STE companies can opt for different vehicles, but technology-push disruptive innovations with social impact, although more challenging, are thought to provide solutions with a higher impact on society (Chavez et al., 2017); (4) *Social technology*: STE companies are particularly attractive to multinational corporations, which gain access to social assets, while providing STE ventures with new market segments, qualified managerial skills, and access to capital (Austin and

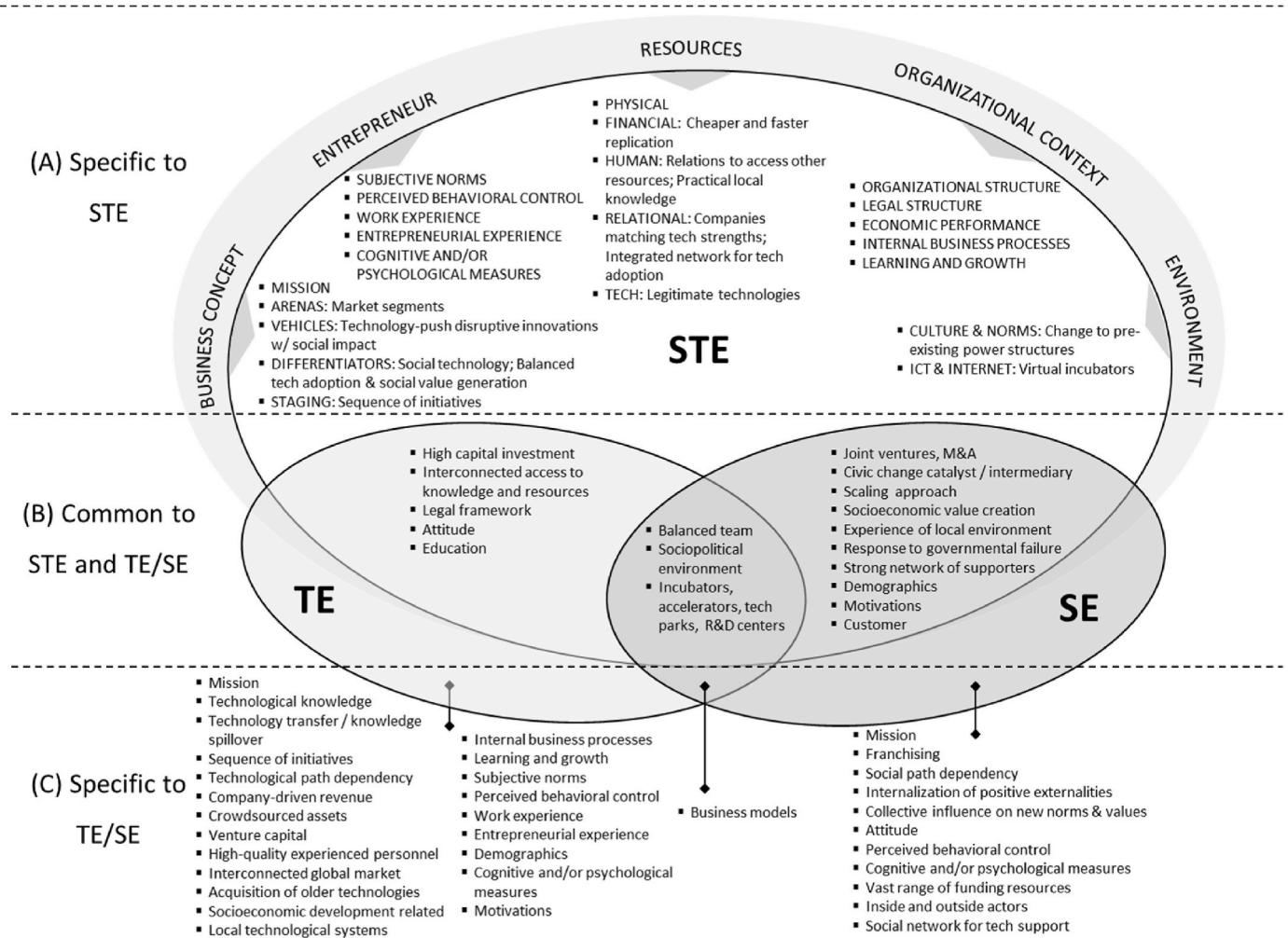


Fig. 6. Framework on the similarities and differences between STE, TE and SE and STE research opportunities.

Leonard, 2008); (5) *Balanced tech adoption and social value generation*: STE ventures continuously balance technology adoption and social value generation (Scillitoe et al., 2018) to maintain their uniqueness, which is reflected in production processes, product characteristics, organizational culture and relationship with stakeholders (Austin and Leonard, 2008; Katz and Page, 2010; Scillitoe et al., 2018a); and (6) *Sequence of initiatives*: The first step that STE ventures take is to decide on the technological degree of solutions to be implemented according to the specific target country and then develop subsequent initiatives accordingly, such as low-cost technical solutions addressing the problem to be solved through sustainable product design in developing countries (Linna, 2013) or intensive use of new technologies in developed ones (Ariza-Montes and Muniz, 2013).

The STE *entrepreneur* defines the mission and the business concept; therefore, it is central to understand if the literature highlights individual characteristics or behaviors that are specific to STE entrepreneurs. Overall, TPB, HCT and AT theories demonstrate that STE venture creators are characterized by the following subdimensions: (1) *Subjective norms*: STE entrepreneurs direct their visions collaboratively, gaining the commitment of various stakeholders (Ariza-Montes and Muniz, 2013); (2) *Perceived behavioral control*: STE entrepreneurs refuse to be constrained by limitations and creatively find solutions to overcome obstacles (Linna, 2013); (3) *Work experience*: Experienced managers have greater awareness and capability to manage potential critical contingencies (Scillitoe et al., 2018a; Gidron et al., 2021); (4) *Entrepreneurial experience*: When STE companies are acquired by large firms, one of the most valued assets is the founding entrepreneur's specialized knowledge (Austin and Leonard, 2008); and (5) *Cognitive and/or psychological measures*: STE entrepreneurs are able to build confidence and support from organizational members (Scillitoe et al., 2018) and their self-confidence encourages them to believe in their skills and work towards their mission (Linna, 2013).

Another important dimension of analysis is the existence of *resources* that can convert inputs into outputs (Alvarez and Busenitz, 2001). In this respect, STE presents unique requirements in terms of resources to match its business concept to potential opportunities (Shepherd et al., 2019; Morris et al., 2001): (1) *Physical Resources*: These resources are significant, mainly when STE entrepreneurs have knowledge of local assets that may not have been recognized or used before and turn them into productive resources (Linna, 2013); (2) *Cheaper and faster replication*: Although, due to technological requirements, STE entails high capital investments (Harms and Walsh, 2015; Gidron et al., 2021), on the reverse side of the coin, the same technology allows cheaper and faster replication, enabling higher social impact (Ismail et al., 2012; Leong et al., 2022); (3) *Relations to access other resources*: Relations of STE ventures' human resources are crucial to implement technology, overcome challenges and gain inside information (Scillitoe et al., 2018); (4) *Practical local knowledge*: STE entrepreneurs have resourceful practical knowledge about everyday life or local relevant facts, such as skills, knowledge and experience of individuals, as well as community capacities (Linna, 2013); (5) *Companies matching tech strengths*: Relational resources make it easier for STE companies to match the technological strengths of their operating location, either to acquire basic materials or hire certified employees (Desa, 2012); (6) *Integrated network for technology adoption*: Relational resources, like strong and weak ties, bring value to STE through an integrated network to enable technology adoption (Scillitoe et al., 2018); and (7) *Legitimate technologies*: Solid technological resources are a cornerstone able to attract universities, corporations and governments, looking for legitimated technologies to fund (Desa, 2012).

The *organizational context* is determinant in implementing the business concept and in the resources' acquisition process by the entrepreneur. Accordingly, the following subdimensions are considered relevant for STE to fulfill its mission: (1) *Organizational structure*: STE companies take different organizational forms (Gidron et al., 2021) in trying to maintain a balanced organizational structure, which is not easy given

their social and market mission (Scillitoe et al., 2018); (2) *Legal structure*: The definition of the legal structure is a critical structural decision of STE companies (Scillitoe et al., 2018) since they need to adopt a for-profit, a nonprofit, or a hybrid form and corresponding organizational and financing consequences (Desa, 2012; Desa and Basu, 2013; Scillitoe et al., 2018a); (3) *Economic performance*: While striving to grow economically, STE companies need to preserve their distinctiveness in order to maintain their unique but fragile attributes (Austin and Leonard, 2008); (4) *Internal business processes*: STE companies need to develop a business model that concretely solves social problems through the selected value creation technology (Yun et al., 2016); and (5) *Learning and growth*: Technology is critical to the growth of both the social value and the STE venture (Leong et al., 2022).

Lastly, given that entrepreneurship is embedded in environmental conditions (Shepherd et al., 2019), STE is both influenced by and influences the *environment* in what concerns: (1) *Change to pre-existing power structures*: STE can overcome environmental constraints generated by societal norms and restrictive practices through creative solutions that transform pre-existing structures of power which traditionally limit opportunities (Leong et al., 2022); and (2) *Virtual incubators*: according with the literature, these are extremely useful to STE since it allows e-empowerment through unlimited resources and global scope for a significantly lower infrastructure cost (Ariza-Montes and Muniz, 2013).

The framework defines a different category (B), comprehending a set of topics which are common to STE and TE/SE. In fact, STE presents five similarities with TE on three dimensions: two on *resources*, two regarding the *entrepreneur*, and one concerning the *environment*. Regarding *resources*, STE and TE share the importance of (1) financial resources since both require a *high capital investment* for initial development (Harms and Walsh, 2015; Scillitoe et al., 2018a; Gidron et al., 2021); and (2) relational resources, given that these resources provide them with *interconnected access to knowledge and further resources* (Desa, 2012; Muegge, 2013; Isabelle, 2013). As to the *entrepreneur*, (1) STE and TE entrepreneurs share an *attitude* of having a high level of passion, perseverance and determination (Ariza-Montes and Muniz, 2013; Nacu and Avasilcăi, 2014); and (2) their formal technology *education* is vital (Colombo and Grilli, 2005; Scillitoe et al., 2018). As to the *environment* dimension, in what concerns the culture and norms subdimension, the *legal framework* in which companies operate is decisive for their success since it can foster or hinder economic and political success (Nacu and Avasilcăi, 2014).

The framework also shows that STE presents ten similarities with SE on four dimensions: four on the *business concept*, two on the *environment*, two on the *entrepreneur*, one on the *resources* and one on the *organizational context*. In what concerns the *business concept*, STE and SE display common aspects regarding: (1) the vehicles used to implement the strategy defined, namely those generated by *joint ventures, mergers & acquisitions*, which allow STE and SE ventures to access new market segments, qualified managerial skills, and capital able to increase their scale and social impact (Austin and Leonard, 2008; Chen, 2012; Asemota and Chahine, 2017); (2) a differentiator of STE and SE is that both act as *civic change catalysts or intermediaries* by influencing the way community members view social problems and by turning critical societal problems into opportunities while mobilizing community members to work towards collective well-being (Douglas, 2008; Lisetchi and Brancu, 2014; Znagui and Rahmouni, 2019); and (3) regarding staging, the *scaling approach* of STE and SE varies according to the development of the country in which they operate (Linna, 2013; Ariza-Montes and Muniz, 2013); and (4) the economic logic followed by STE and SE uphold *socioeconomic value creation* (Linna, 2013). Regarding the *environment*, STE and SE ventures can benefit from environmental advantages and also turn constraints into favorable aspects, mainly in what concerns: (1) infrastructures and amenities, given entrepreneurs' personal *experience of local environments*, which enables them to use those factors as local strengths (Linna, 2013; Nascimento and Salazar, 2020); and (2) formal

institutions, since STE and SE provide value in a reactive *response to governmental failures* (Austin and Wei-Skillern, 2006; Desa and Koch, 2014; Leong et al., 2022). With respect to *resources*, relational resources are important to STE and SE, mainly the possibility of being able to count on a *strong network of supporters* (Dacin et al., 2010; Nascimento and Salazar, 2020). Concerning the *entrepreneur*, STE and SE share the importance of: (1) *demographics* because the social, cultural and economic background of entrepreneurs encourages them to believe in their skills and work towards their mission (Linna, 2013; Sengupta et al., 2018); and (2) motivations since STE and SE entrepreneurs share a sense of commitment and ethical responsibility to help others (Betts et al., 2018; Gupta Chauhan et al., 2020). As to the *organizational context*, for STE and SE, the *customer* subdimension is very important because both need to define whether customers are the beneficiaries of social value or if that value is created with them (Scillitoe et al., 2018a; Saebi et al., 2019).

As clearly shown in the framework, STE also present three *similarities* with both TE and SE: two regarding the *environment*, and one regarding *resources*. As regards the environment, all three types of entrepreneurship studied are influenced by: (1) culture and norms, specifically the *sociopolitical environment*, because it becomes easier to get resources from granting organizations when ventures are aligned with local government policies and political and legal environments (Desa, 2012; Linna, 2013; Znagui and Rahmouni, 2019); and (2) formal institutions, more precisely local *incubators, accelerators, technology parks and research centers*, which help them scale, connect, access funding networks and activate demand (Garud and Karnøe, 2003; Ariza-Montes and Muniz, 2013). STE, TE and SE share the same need regarding *human resources*, having more chances to be successful when counting on a *balanced team* (Gimmon and Levie, 2010; Aliaga-Isla and Huybrechts, 2018).

After describing the *research profile of existing studies on Technology, Social, and Socio-Tech Entrepreneurship (RQ1)* through the systematic review and analysis of the literature, in the previous Section; the present Section has answered RQ2 and shed new light on *what Socio-Tech Entrepreneurship has in common with, and how it differs from Technology Entrepreneurship with no explicit social aims and Social Entrepreneurship with no technological base*. This provides a robust basis to address RQ3 in the next Section and to discuss *the research gaps, potential research questions and avenues for future research on Socio-Tech Entrepreneurship*.

#### 4. Avenues for future research on STE

The analysis of findings enables a general representation of Socio-Tech Entrepreneurship and the interconnection between its five dimensions, as illustrated in the framework in Fig. 6.

Furthermore, by clearly identifying existing knowledge regarding STE's commonalities and differences with TE and SE and knowledge gaps in the literature concerning STE (as presented in Appendix E), it is possible to answer the third research question and unveil a research agenda covering all five dimensions.

Potential future research avenues were identified regarding the three research topics presented in Fig. 6: (A) STE aspects that are mentioned by the literature but different from either TE or SE, (B) those that are mentioned by the literature and common to either TE, SE or both, and (C) when not mentioned by the literature, research questions that can provide further clarity to Socio-Tech Entrepreneurship. Possible research questions along these axes are presented for each dimension.

Regarding the *business concept*, it is essential to investigate: (i) What are the common characteristics of different social technologies?; (ii) What strategies do STE companies use to become civic change catalysts?; and (iii) What are the business models used by STE companies to accomplish their mission? On the *entrepreneur*, it would be advantageous to answer questions on: (i) How do subjective norms contribute to the commitment of various stakeholders on STE companies?; (ii) What are the most common motivations of STE entrepreneurs that lead them to

solve social problems through an entrepreneurial technological solution? Considering *resources*, there is a lack of investigation on: (i) How do STE companies transform adverse local physical resources into productive resources?; (ii) What is the adequate balance between entrepreneurial team members to ensure the equilibrium between technology development, social value generation and financial sustainability?; and (iii) What are the most critical funding resources for STE companies? As to the *organizational context*, researchers could analyze: (i) What is the organizational structure that ensures that STE is successfully developed and balances social and market mission?; and (ii) How do activity sectors influence STE decisions regarding customer focus? Finally, in that concerning the *environment*, STE research would benefit from addressing the following research gaps: (i) How do pre-existing power structures influence STE?; (ii) How does the lack of institutional support or governmental failure impact the creation of STE companies?; (iii) What is the influence of local technological systems and local workforce on STE companies?

Besides these research questions, further research should be developed regarding the theories that can be used to analyze the Business Concept and the Organizational Context of STE. Also, additional research that integrates all dimensions would provide further information to maximize STE potential. Moreover, a more integrated perspective of both theory and practice would enable a deeper perception of STE, namely regarding the main regulatory incentives and institutional encouragement, the main stakeholders involved and their interconnection, as well as the main drivers of uncertainty and risk. Since this field of research is new, there are still countless research opportunities.

The original framework presented in Fig. 6 provides all STE ecosystem participants with an integrated perception of STE's main dimensions and subdimensions of analysis, and it discusses relevant findings and questions within each of those subdimensions. This framework is particularly useful to academics, entrepreneurs, investors, business incubators/accelerators, decision-makers and community members already involved– or willing to become involved – with Socio-Tech Entrepreneurship. Moreover, the SLR unveiled several future research lines, as well as theoretical and practical implications.

#### 5. Conclusions

Conceptualizing Socio-Tech Entrepreneurship is fundamental to expanding the potential provided by an increasing number of companies that create social value and help build a more sustainable, inclusive world (van der Have and Rubalcaba, 2016; Scillitoe et al., 2018a; Johnson and Schaltegger, 2020). Socio-Tech Entrepreneurship is a growing observable phenomenon, often referred to as tech4good, and highly valued for the significant benefits of meeting the UN's Sustainable Development Goals. However, conceptual academic research dedicated explicitly to socio-tech ventures is still incipient. To address this gap, this paper develops a systematic literature review and offers the first conceptualization of Socio-Tech Entrepreneurship as an autonomous topic within the entrepreneurship research domain, reconciling the social and technology entrepreneurship streams of literature.

##### 5.1. Main findings and contribution to theory

This paper builds on and extends previous conceptual research and frameworks, mainly those provided in four peer-reviewed papers on "Technology Social Ventures" (Ismail et al., 2012; Grassi and Toschi, 2021), "Socio-tech Ventures" (Scillitoe et al., 2018) and "Impact Tech Startups" (Gidron et al., 2021) as well as on two foundational book chapters (Desa & Kotha, 2006a, 2006b), a book (Poonamallee et al., 2020), a report on Technology Social Ventures, analyzing 345 ventures (Meggio and Spadoni, 2019), a working paper (Calderini et al., 2021) and two conference papers (Meggio, 2022; Meggio and Radziwon, 2022) (that were not used for the present systematic literature review since they are not peer-reviewed), which represent a first building block on

## Socio-Tech Entrepreneurship.

This paper provides an answer to the first RQ – *What is the research profile of existing studies on Technology, Social, and Socio-Tech Entrepreneurship?* – through descriptive and content analysis methods. The second question RQ of this study – *What does Socio-Tech Entrepreneurship have in common with, and how does it differ from (a) Technology Entrepreneurship with no explicit social aims and (b) Social Entrepreneurship with no technological base?* – is also answered. Through an SLR and an in-depth analysis of 238 peer-reviewed studies, the commonalities and differences of STE with TE and SE, as well as the characteristics that define STE, are identified. Based on the results, a framework conceptualizing Socio-Tech Entrepreneurship is presented. The identification of STE specific characteristics legitimates Socio-Tech Entrepreneurship as a conceptually relevant group of companies and an autonomous research topic within the business sciences field.

By integrating existing knowledge and under-researched areas, the third RQ (*What are the research gaps and potential research questions on Socio-Tech Entrepreneurship providing avenues for future research?*) is answered and avenues for future research are proposed. This study also presents important implications both for theory and practice.

## 5.2. Theoretical implications

This study contributes seven key theoretical implications. First, this study provides an original comparative analysis of 238 studies on Technology, Social and Socio-Tech Entrepreneurship along five main entrepreneurship dimensions and 30 subdimensions, guided by various theoretical contributions. Each dimension (Business Concept, Environment, Entrepreneur, Organizational Context and Resources) (Morris et al., 2001) was divided into subdimensions proposed by the authors based on relevant theory. These dimensions and subdimensions better define the concept of STE and clearly differentiate the definition of each subdimension in STE, TE, and SE, adding new definitions and clear concepts to the theory. Moreover, these clear definitions and this new structure of the concepts are an advance in the theory, opening new research areas and allowing organizations to better engage in STE. The detailed and original analysis provided in this study was possible through a Systematic Literature Review, which, to the best of our knowledge, is the first to analyze only peer-reviewed conceptual literature on TE, SE and STE and to compare STE with TE and SE, to understand what characteristics define STE vis-à-vis TE and SE.

Second, by analyzing and synthesizing the 47 results on TE, 166 on SE and 25 on STE, under descriptive, content analysis and comparative perspectives, this study expands Ismail et al.'s (2012) research to the comparison between STE and TE while Ismail et al.'s (2012) research only distinguished between STE and SE. Furthermore, the analyses provided and the 62 main findings presented enabled the creation of a conceptual framework that clearly indicates distinctive features of STE and the characteristics it shares with TE and SE, which addresses the gap identified by Poonamallee et al. (2020) on the fact that conceptual literature on STE is still incipient. Therefore, this advance in theory addresses a clear void and sheds new light on the topic, improving further research and implementation of the concepts.

Third, by reconceptualizing Socio-Tech Entrepreneurship and studying an existing exponentially growing phenomenon (Wright, 2018), this study opens the door to an emerging academic area (Poonamallee et al., 2020) while simultaneously contributing to the entrepreneurship literature by identifying STE-specific characteristics for each dimension that differentiate it from TE and SE and, consequently, supporting the idea of a “new entrepreneurial genre” (Calderini et al., 2021). The main specific features of STE regarding the business concept are its distinct mission to satisfy a social need or societal problem through technological innovation in a financially sustainable manner, with a strong market orientation; (e.g., Ismail et al., 2012; Desa and Basu, 2013; Gidron et al., 2021); the need to define from the beginning of the venture which market segments to focus on and the technological

degree of solutions to be implemented according to the specific target country; technology-push disruptive innovations with social impact, although more challenging, are thought to provide solutions with a higher impact on society (Chavez et al., 2017); STE's valuable social technology: that particularly attract multinational corporations; balanced tech adoption and social value generation (Scillitoe et al., 2018) to maintain their uniqueness. Concerning the entrepreneur, TPB, HCT and AT theories demonstrate that the following attributes distinguish STE venture creators: by directing their visions collaboratively, STE entrepreneurs gain the commitment of various stakeholders (Ariza-Montes and Muniz, 2013); by refusing to be constrained by limitations, they creatively find solutions to overcome obstacles (Linna, 2013); their previous managerial experience grants them the capability to manage potential critical contingencies (Scillitoe et al., 2018a; Gidron et al., 2021); and STE entrepreneurs can build confidence and support from organizational members (Scillitoe et al., 2018) while their self-confidence encourages them to believe in their skills and work towards their mission (Linna, 2013). As to resources, STE presents the following characteristics: physical resources are significant, mainly when STE entrepreneurs know local assets (Linna, 2013); STE enables cheaper and faster replication, enabling higher social impact (Ismail et al., 2012; Leong et al., 2022); relations of STE ventures' human resources are crucial to implement technology, overcome challenges and gain inside information (Scillitoe et al., 2018); and solid technological resources are a cornerstone able to attract universities, corporations and governments, looking for legitimated technologies to fund (Desa, 2012). Regarding the organizational context, STE companies: take different organizational forms (Gidron et al., 2021) and legal structures (Scillitoe et al., 2018) in trying to balance their social and market mission (Desa, 2012; Desa and Basu, 2013; Scillitoe et al., 2018a); while striving to grow economically, STE companies need to preserve their distinctiveness in order to maintain their unique but fragile attributes (Austin and Leonard, 2008); and these ventures need to develop a business model that concretely solves social problems through the selected value creation technology (Yun et al., 2016). In what concerns the environment: STE can overcome environmental constraints generated by societal norms and restrictive practices through creative solutions that transform pre-existing structures of power which traditionally limit opportunities (Leong et al., 2022); and virtual incubators are extremely useful to STE since they allow e-empowerment through unlimited resources and global scope for a significantly lower infrastructure cost (Ariza-Montes and Muniz, 2013).

Fourth, the research profile analysis presented enables researchers to understand the compared evolution of STE, TE, and SE research and provides the basis for future research. By providing information on (a) the journals where knowledge on these research streams was mainly published, (b) the distribution of publications over the years, (c) the principal authors per type of scholarship, (d) the main theories used per type of entrepreneurship and also, specifically, the main theories used to study STE and their correspondence with the five main entrepreneurship dimensions followed, and (e) the research methodologies and techniques used to study TE, SE and STE, this study enables required future research.

Fifth, this paper supports the claim that although STE is at the intertwining of TE and SE, Socio-Tech entrepreneurship is neither SE using technology nor TE with a social twist (Scillitoe and Joy, 2018b) by presenting a fine-grained assessment of each type of entrepreneurship through a thematic analysis that consolidates results around five main entrepreneurship dimensions (Morris et al., 2001) (Business Concept, Environment, Entrepreneur, Organizational Context, and Resources), also combining various theoretical positions (organizational strategy; entrepreneurial ecosystem; Planned Behavior, Human Capital and Agency Theories; organizational identity and balanced scorecard; and Resource-Based View Theory) that structured the subdimensions for the analysis.

Sixth, through the comparative analysis of results (detailed in

Appendix E) that led to 62 main findings, which enabled the development of a framework on the main characterizing features of STE (already detailed), this study contributes to reducing the lack of theoretical frameworks on this new type of entrepreneurial company (Scillitoe et al., 2018a). Our framework allows for an overall snapshot of Socio-Tech Entrepreneurship and legitimates STE as a conceptually relevant group of companies and as an autonomous research topic within the business sciences field.

Seventh, this study contributes to future research on Socio-Tech Entrepreneurship as an independent research field by presenting a detailed research agenda with helpful research questions for all the five dimensions and their respective subdimensions, according to the three research topics presented in Fig. 6: (A) STE aspects that are mentioned by the literature but different from either TE or SE, (B) those that are mentioned by the literature and common to either TE, SE or both, and (C) when not mentioned by the literature, research questions that can provide further clarity to Socio-Tech Entrepreneurship. The several research gaps in STE (as displayed in Appendix E) identified in this study and the research questions provided will hopefully guide future research to shed light on a recent and growing entrepreneurial stream, which, although sharing similarities with both TE and SE, has a specific conceptual base and scope, and needs further clarification to support practitioners and decisionmakers as detailed subsequently.

### 5.3. Practical implications

This study also unveils five main practical implications. An increasing number of ventures are resorting to technology to address critical challenges facing society (Poonamallee et al., 2020), mainly those affecting more vulnerable and critical social groups (Scillitoe and Joy, 2018b; Thesing, 2023; Tan, 2023). Consequently, the theory developed in this study has practical consequences.

First, entrepreneurs willing to establish STE ventures may use the theoretical framework developed to select the appropriate theoretical foundations to ground their practical work, being attentive to the key definitional areas to observe.

Second, established entrepreneurs can resort to the framework presented in this study to gain awareness of the fundamental areas to consider scaling both their ventures and the social impact that their vision aims at while maintaining their financial sustainability.

Third, the attention that STE ventures receive from international companies suggests that STE entrepreneurs can gain an advantage by partnering with interested companies, who can provide additional funding, marketing channels and professional management while delivering on their challenging mission of providing technology solutions with social impact, achieving sustainable profit.

Fourth, this research can be of value to different stakeholders, such as venture capital investors or business incubators, in their efforts to guide, finance, and promote technology start-ups with high social potential.

Fifth, this study can be used by policymakers to understand this new social and economic phenomenon, responsible for excellent social and economic results (Aït-Si-Selmi et al., 2020). Thus, a policy and practice system of incentives is essential to develop further STE, a type of entrepreneurship that is defining sociotechnical innovation through the resolution of new needs and new problems, increasingly complex and interdisciplinary (EU, 2021), focusing on the resolution of societal problems, mainly those affecting more vulnerable and critical social groups.

### 5.4. Future research

To provide further clarity to Socio-Tech Entrepreneurship, potential future research avenues are identified and possible research questions

are presented for each dimension. Among other important questions, it is essential to investigate: (1) regarding the *business concept*, the business models used by STE companies to accomplish their mission; (2) on the *organizational context*, the organizational structure that ensures that STE balances its social and market mission; (3) as to *resources*, the adequate balance between entrepreneurial team members to ensure the equilibrium between technology development, social value generation and financial sustainability; (4) considering the *entrepreneur*, the most common motivations of STE entrepreneurs to solve social problems through an entrepreneurial technological solution; and (5) on the *environment*, the influence of institutional support or lack of it on the creation. Additionally, a more integrated perspective of both theory and practice would enable a deeper perception of STE.

This study is not without limitations. On the one hand, the SLR used two databases, while the use of other sources may broaden and enrich the scope of analysis. On the other hand, this research focuses only on review papers, while other empirical studies (and books) – which are out of the scope of this research – may provide additional knowledge. Finally, adjacent areas of knowledge, such as social innovation and social impact, could bring new perspectives to this subject.

Socio-Tech Entrepreneurship is a type of entrepreneurship (Sargent and Ahmed, 2017) developed by an increasing number (Poonamallee et al., 2020) of ventures that use technology to address society's critical challenges. Given the fact that conceptual literature on this subject is still incipient, this paper draws on the TE and SE fields to (1) establish the differences and commonalities with these two types of entrepreneurship, (2) propose a conceptual framework for Socio-Tech Entrepreneurship, and (3) suggest future research avenues. Hopefully, this article will stimulate and enable further scholarly exploration of Socio-Tech Entrepreneurship.

### Declaration of competing interest

None.

### Disclosure

The authors of this study have no conflicts of interest to disclose and received no financial benefits. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### CRediT authorship contribution statement

**Maria Eugénia Leitão:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **Miguel Amaral:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft. **Ana Carvalho:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

### Data availability

Data will be made available on request.

### Acknowledgements

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Abu-Saifan, 2012)		SE	Theoretical and conceptual	Concept review	2012	X		X		
(Acs Boardman and McNeely, 2013)		SE	Qualitative	Case study	2013	X	X			
(Ahearn and Mai, 2023)		SE	Qualitative	Systematic review of systematic reviews	2023				X	
Ahuja et al. (2019)	Theory of planned behavior	SE	Theoretical and conceptual	Theoretical model development	2019	X		X		
Ajah et al. (2022)		STE	Qualitative	Systematic literature review	2022		X	X		X
Aliaga-Isla and Huybrechts (2018)		SE	Qualitative	Systematic literature review, content analysis	2018	X	X			
Alka et al. (2023)		SE	Mixed methodology	Qualitative: Literature review, Quantitative: Bibliometric analysis	2023	X				
Allen and Taylor (2005)	Social capital theory, Theory of communities of practice	TE	Theoretical and conceptual	Examples	2005				X	
Alonso et al. (2020)		SE	Qualitative	Case study, Interviews	2020	X		X		
Arasti et al. (2015)		SE	Qualitative	Interview/survey	2015		X			
Ardichvili et al. (2003)		TE	Theoretical and conceptual	Theoretical model development	2003	X		X		
Arena et al. (2018)		STE	Theoretical and conceptual	Theory development	2018	X				X
Ariza-Montes and Muniz (2013)		STE	Qualitative	Case study	2013	X	X	X	X	X
Asemota and Chahine (2017)	Resource scarcity theory, Agency theory, Theory of change	SE	Qualitative	Literature review	2017	X				
Austin and Leonard (2008)		STE	Qualitative	Case study, Interview/survey, Secondary data analysis	2008	X		X	X	X
Austin and Wei-Skillern (2006)	Theory of change, Entrepreneurship theory	SE	Theoretical and conceptual	Framework development	2006	X	X		X	X
Bacq and Janssen (2011)	Processual theories of entrepreneurship	SE	Theoretical and conceptual	Framework development	2011	X	X	X	X	
Bacq et al. (2019)		SE	Qualitative	Case study, Interview/survey, Field observation, Grounded theory	2019	X			X	
Bailetti et al. (2012)		TE	Theoretical and conceptual	Concept review	2012	X				
Bailetti (2012)	Theory of sustainable competitive advantage, Theory of the firm, Entrepreneurship theory, Management theory, Resource-based view	TE	Theoretical and conceptual	Concept review	2012	X				
Bansal et al. (2019)		SE	Qualitative	Systematic literature review	2019	X	X			
Battisti (2019)		STE	Qualitative	Multiple case studies, Clinical inquiry	2019	X		X		
Battisti et al. (2022)		TE	Qualitative	Case study	2022	X				
Beckman et al. (2012a)	Network theory, Entrepreneurial agency	TE	Theoretical and conceptual	Concept review	2012	X		X		

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
Beckman et al. (2012b)	Network theory, Resource-based view, Behavioral theory of the firm	TE	Theoretical and Conceptual	Concept review	2012	X		X		
Betts et al. (2018)		SE	Theoretical and Conceptual	Theoretical model development	2018	X	X	X	X	
Blaga (2018)		SE	Theoretical and Conceptual	Framework development	2018	X	X	X		X
Bloom and Chatterji (2009)		SE	Theoretical and Conceptual	Theoretical model development	2009	X				
Borza et al. (2009)		SE	Qualitative	Case study	2009	X				
Brown and Mason (2014)		TE	Mixed methodology	Quantitative: Descriptive statistics Qualitative: Interview/Survey	2014		X			
Cameron (2010)		SE	Qualitative	Case study	2010		X		X	X
Chavez et al. (2017)	Competency theory	STE	Qualitative	Case study	2017	X				
Chen (2012)	Social exchange theory, International new venture (INV) theory	SE	Theoretical and Conceptual	Framework development	2012	X				
Chmelik et al. (2016)		SE	Qualitative	Case study	2016	X				
Choi et al. (2020)	Publicness (government-dominated) theory	SE	Qualitative	Case study	2020	X				
Chou and Lin (2023)	Innovation diffusion theory, Theory of planned behavior, Competitive advantage theory	SE	Quantitative	Meta-analysis	2023	X	X	X	X	X
Christensen et al. (2006)		SE	Theoretical and conceptual	Concept review	2006	X	X			
Christmann (2014)		SE	Theoretical and conceptual	Examples	2014	X		X		
Cieslik (2018)	Critical analysis theory	SE	Theoretical and conceptual	Concept review	2018	X	X	X		
Colombo and Grilli (2005)	Competence-based view	TE	Mixed methodology	Quantitative: Descriptive statistics, Econometric model; Qualitative: Observations	2005			X		
Corman et al. (1988)		TE	Qualitative	Interview/survey	1988			X		
(Cukier et al., 2011)		SE	Qualitative	Systematic literature review, Content analysis, Case study	2011	X				
(Ćwiklicki, 2019)	Resource-based view	SE	Qualitative	Case study, Systematic literature review	2019		X		X	X
Dacin et al. (2010)	Resource-based view	SE	Theoretical and conceptual	Concept review	2010	X	X			X
(Conway Dato-on and Kalakay, 2016)		SE	Qualitative	Systematic literature review	2016	X				
(Day and Jean-Denis, 2016)	Resource-based view	SE	Theoretical and conceptual	Theoretical model development	2016	X		X		X
(de Melo et al., 2020)		SE	Qualitative	Systematic literature review, Content analysis	2020					X
Dees (1998)		SE	Theoretical and conceptual	Concept review	1998		X	X		

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Defourny and Nyssens, 2010)		SE	Theoretical and conceptual	Concept review	2010	X				
(del Carmen Álvarez-Castañón et al., 2023)		SE	Qualitative	Systematic literature review, Case study	2023	X	X			
Desa and Basu (2013)	Resource-based view, Resource dependence theory	STE	Mixed methodology	Quantitative: Descriptive statistics, Qualitative: Hypothesis	2013	X				X
Desa and Koch (2014)	Theory of change	SE	Qualitative	Case study	2014	X	X			
Desa (2012)	institutional theory, resource mobilization	STE	Mixed methodology	Quantitative: Descriptive statistics, Qualitative: Hypothesis	2012	X	X			X
(Desa and Koch, 2014)		SE	Qualitative	Case study	2014	X				
Diaz Gonzalez and Dentchev (2021)		SE	Qualitative	Literature review	2021	X	X	X	X	X
Doganova and Eyquem-Renault (2009)		TE	Qualitative	Case study, Interview/survey, Secondary data analysis	2009	X	X			X
(Dorado, 2006)		SE	Theoretical and conceptual	Examples	2006	X				
Douglas (2008)		SE	Qualitative	Literature review	2008	X				X
(Dufays and Huybrechts, 2014)	Sociology of social networks	SE	Theoretical and conceptual	Concept review	2014	X	X			
(Eichler and Schwarz, 2019)		SE	Qualitative	Systematic literature review, Content analysis, Meta-analysis	2019	X				
(Farinha et al., 2020)	Innovation theory, Transformative agency theory, Institutional and structuration theories, Evolutionary theory, Actor-Network Theory, Social Movement Theory	SE	Qualitative	Bibliometric analysis	2020	X				
(Farooq, 2017)	Theory of social capital, Resource-Based View	SE	Theoretical and conceptual	Theoretical Model Development	2017	X				X
(Fauchart and Gruber, 2011)	Theory of social identity	SE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Interview, Secondary data analysis	2011			X		
Ferreira et al. (2016)		TE	Qualitative	Bibliometric analysis, Systematic literature review	2016					X
Ferreira et al. (2017)		SE	Qualitative	Bibliometric analysis	2017	X		X		X
Florida and Kenney (1988)		TE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Archival research	1988		X			X
(Forouharfar et al., 2019)	Resource-based view	SE	Theoretical and conceptual	Framework development	2019	X	X			X
Fyke et al. (2016)	Conflict-based communication theory	SE	Qualitative	Discourse analysis	2016	X	X	X		
(García-Jurado et al., 2021)		SE	Qualitative	Systematic literature review, Latent semantic analysis (LSA)	2021	X				
Garud and Karnøe (2003)	Agency theory, Social construction of technological systems	TE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Comparative analysis	2003					X
Ghatak et al. (2023)	Entrepreneurial intention theory, Theory of planned behavior, Expectancy theory	STE	Theoretical and conceptual	Theory development	2023			X		
Ghauri et al. (2022)		STE	Qualitative	Systematic literature review	2022		X	X		
Gidron et al. (2021)	organizational ecology theory, social origins theory	STE	Qualitative	Natural language processing content analysis	2021	X	X	X	X	X

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
Gimmon and Levie (2010)	Human capital theory, Signalling theory	TE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Literature review, Hypotheses Examples	2010			X	X	X
(Giones and Brem, 2017)		TE	Theoretical and conceptual		2017	X				
Giones et al. (2013)	Constructivist view, Discovery view	TE	Qualitative	Field case study	2013	X	X	X	X	X
Glodowska et al. (2023)		TE	Qualitative	Literature review, Indirect observation, Cause-and-effect analysis, Theoretical model development	2023	X		X		
Grassi and Toschi (2021)		STE	Qualitative	Systematic literature review	2021	X	X	X	X	X
(Grilo and Moreira, 2022)		SE	Qualitative	Systematic literature review	2022	X				
(Grimes et al., 2013)	Embedded agency	SE	Theoretical and conceptual	Concept review	2013	X				
Groot and Dankbaar (2014)		SE	Qualitative	Hypotheses, Secondary data analysis	2014	X				X
Gupta and Srivastava (2021)		SE	Qualitative	Systematic literature review	2021	X	X	X		
(Gupta Chauhan et al., 2020)	Servant leadership theory, Social learning and self-efficacy theory, Resource dependency theory, Institutional complexities theory, Social movement theory, Paradox theory	SE	Qualitative	Systematic literature review	2020	X	X	X		X
Haessler et al. (2023)		TE	Qualitative	Systematic literature review	2023		X		X	X
(Haigh et al., 2015)		SE	Qualitative	Case study	2015				X	
(Hanna, 2010)		SE	Theoretical and conceptual	Concept review	2010	X	X			
Harms and Walsh (2015)		TE	Theoretical and conceptual	Concept review	2015	X		X	X	X
(Harris et al., 2009)	Stakeholder theory	SE	Theoretical and conceptual	Concept review	2009	X		X		
(Hernandez and Cormican, 2016)		SE	Qualitative	Literature review	2016	X				
(Hidalgo et al., 2024)		SE	Qualitative	Systematic literature review	2024	X		X		
Hietschold et al. (2023)		SE	Qualitative	Systematic literature review	2023	X				
(Hill et al., 2010)	Theories of governance, Entrepreneurship theory, Agency theory, Resource scarcity theory	SE	Quantitative	Centering Resonance Analysis (CRA), Network analysis, Factor analysis	2010	X				
(Hockerts, 2015)	Resource-based view	SE	Qualitative	Case study, Secondary data analysis, Interviews	2015	X				
(Holt and Littlewood, 2015)	Stakeholder theory	SE	Qualitative	Case study	2015	X				
Holzmann and Gregori (2023)		STE	Qualitative	Systematic literature review	2023	X	X	X	X	X
(Hossain and Shamsuddoha, 2019)		SE	Qualitative	Archival research	2019	X	X			

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
Isabelle (2013)		TE	Qualitative	Interview/survey, Thematic analysis	2013			X	X	X
(Islam, 2020)		SE	Qualitative	Systematic literature review	2020	X				
(Islam, 2022)		SE	Qualitative	Systematic literature review	2022	X			X	X
Ismail et al. (2012)		STE	Qualitative	Archival research	2012	X				X
Iyengar (2014)		SE	Qualitative	Literature review	2014	X	X	X		X
(Jafari-Sadeghi et al., 2021)		TE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Hypothesis, Secondary data analysis	2021					X
(Janssen et al., 2018)		SE	Qualitative	Systematic literature review	2018	X	X			X
Javed et al. (2021)		STE	Qualitative	Interview/survey	2021	X	X			
Johnson and Schaltegger (2020)	Analytical sociology	SE	Qualitative	Systematic literature review	2020	X		X		
(Kamaludin et al., 2024)	Theory of change	SE	Qualitative	Literature review	2024	X		X		X
Katz and Page (2010)		STE	Theoretical and conceptual	Concept review	2010	X				
(Kaushik et al., 2023)		SE	Quantitative	Bibliometric analysis, Latent Dirichlet Allocation (LDA)	2023	X				
Khefacha and Belkacem (2016)	Creative destruction theory	STE	Mixed methodology	Quantitative: Descriptive statistics, Regression analysis, Cointegration analysis, Causality test, Error correction model (ECM); Qualitative: Hypothesis, Secondary data analysis	2016	X				
(Kling, 2000)		TE	Theoretical and conceptual	Concept review	2000		X			
(Klingler-Vidra et al., 2021)		TE	Quantitative	Regression analysis	2021			X		X
(Korosec and Berman, 2006)		SE	Qualitative	Interview/survey	2006		X			X
(Kovanen, 2021)		SE	Qualitative	Systematic literature review, Content analysis	2021	X	X			X
(Kraus et al., 2014)		SE	Qualitative	Bibliometric survey, Citation analysis	2014	X				
(Krlev et al., 2014)		SE	Qualitative	Grounded theory	2014	X				
(Kroeger and Weber, 2014)	Organizational effectiveness theory	SE	Qualitative	Literature review	2014	X				
(Kruse et al., 2021)		SE	Mixed methodology	Qualitative: Literature review, Quantitative: Meta-analysis	2021	X	X	X		
(Kusa, 2016)		SE	Qualitative	Literature review	2016	X				
(Lane and Casile, 2011)		SE	Theoretical and conceptual	Framework development	2011	X				
(Larsen and Hannibal, 2021)		SE	Qualitative	Systematic literature review	2021	X				
(Lehner and Kansikas, 2013)		SE	Qualitative	Literature review	2013	X				
Leong et al., 2022		STE	Qualitative	Field case study	2020	X	X		X	X
Linna (2013)	Bricolage	STE	Qualitative	Case study	2013	X	X	X		X
Lisetchi and Brancu (2014)		SE	Theoretical and conceptual	Concept review	2014	X				

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Littlewood and Khan, 2018)	Actor-Network Theory, Social network, Institutional theory	SE	Qualitative	Systematic literature review	2018		X			
Löfsten et al. (2022)	Resource-based view, Network theory	TE	Quantitative	Questionnaire, Interview/survey, Econometric analysis	2022			X		X
Lorenzo-Afable et al. (2023)		SE	Qualitative	Systematic literature review	2023	X				
(Lortie and Cox, 2018)		SE	Theoretical and conceptual	Concept review	2018	X		X		
Lumpkin et al. (2018)	Social identity theory	SE	Qualitative	Literature review, Case study	2018	X			X	
(Macke et al., 2018)		SE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Systematic literature review, Content analysis	2018	X				
(Mair and Marti, 2006)	Structuration theory, Sociology, Organizational theory, Institutional theory	SE	Theoretical and conceptual	Concept review	2006	X				
(Mair et al., 2007)		SE	Theoretical and conceptual	Concept review	2007		X			
Mair et al. (2012)		SE	Mixed methodology	Quantitative: Cluster analysis, Discriminant analysis, ANOVA; Qualitative: Content analysis, Secondary data analysis	2012	X		X		X
(Majdouline et al., 2022)(Majdouline et al., 2022)		TE	Qualitative	Systematic literature review, Bibliometric analysis	2022	X				
Marvel and Lumpkin (2007)	Human capital theory	TE	Qualitative	Literature review, Hypotheses	2007			X		
(Mason, 2015)	Theory of Social-Enterprise Systems-Engineering	SE	Theoretical and conceptual	Concept review	2015	X				
(Masseti, 2012)		SE	Theoretical and conceptual	Framework development	2012	X				
(Maurer, 2012)	Institutional theory, Game theory	SE	Theoretical and conceptual	Concept review	2012		X			X
(McMullen and Shepherd, 2006)	Entrepreneurship theories, Subjectivism, Behavioralism, Schumpeter's theory, Kirzner's Alert Arbitrageur, Knight's theory, Economic theory	TE	Theoretical and conceptual	Conceptual model development	2006			X		
(McPhee, 2012)		TE	Theoretical and conceptual	Framework development	2012				X	
Miller et al. (2012)		SE	Theoretical and conceptual	Theoretical Model Development	2012	X		X		
(Miloseska et al., 2021)		SE	Qualitative	Analysis of secondary data	2021	X				
(Mitra et al., 2011)		SE	Quantitative	Questionnaire, Descriptive statistics, Univariable analysis of variables, Bi-variable analysis, ANOVA	2011			X		
(Mohiuddin and Yasin, 2023)		SE	Qualitative	Systematic literature review	2023			X		X

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Mair et al., 2012)		SE	Theoretical and conceptual	Framework development	2012	X				
(Molina and Perez-Garrido, 2022)		SE	Qualitative	Literature review	2022	X				
Montgomery et al. (2012)	Social movement theory	SE	Qualitative	Case study	2012		X	X		X
Mor Barak (2020)	Social capital theory	STE	Theoretical and conceptual	Framework development	2020	X				
(Morris et al., 2021)		SE	Theoretical and conceptual	Theory development	2021	X				
(Moussetis and Cavenagh, 2021)		SE	Qualitative	Literature review	2021				X	
Muegge (2012)		TE	Theoretical and conceptual	Framework development	2012			X		
Muegge (2013)	Design rule theory, Game theory	TE	Theoretical and conceptual	Concept review	2013					X
(Muskat and Sylvester, 2012)		SE	Theoretical and conceptual	Examples	2012					X
Nacu and Avasilcăi (2014)		TE	Quantitative	Questionnaire, Nonprobabilistic sampling, Descriptive statistics	2014		X	X		X
Nair (2022)		SE	Theoretical and conceptual	Theory development	2022				X	
(Nambisan, 2017)	Technology affordances and constraints theory, Entrepreneurial agency	TE	Theoretical and conceptual	Concept review	2016	X				
Nascimento and Salazar (2020)		SE	Qualitative	Descriptive research, Interview/ survey, Case study, Content analysis	2020	X	X	X		X
Nashchekina et al. (2019)		SE	Theoretical and conceptual	Concept review	2019	X	X	X		X
(Olsen and Boxenbaum, 2009)		SE	Qualitative	Case study	2009	X				
(Pablo-Lerchundi et al., 2015)	Theory of planned behavior	TE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Hypothesis, Interview/ survey	2015	X		X		X
Palil et al. (2023)		SE	Qualitative	Literature review	2023	X				
(Pan et al., 2019)	Social cognitive theory, Social identity theory	SE	Theoretical and conceptual	Concept review	2019	X		X		
(Pathak and Muralidharan, 2020)	Stage-based perspective, Knowledge spillover theory	TE	Theoretical and conceptual	Theoretical model development	2020		X			
(Pathak and Laplume, 2013)	Employment choice theory	TE	Quantitative	Descriptive statistics, Regressions, Correlations	2013	X	X			

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Paulsen and McDonald, 2010)		SE	Theoretical and conceptual	Examples	2010	X	X			
(Peredo and McLean, 2006)		SE	Theoretical and conceptual	Concept review	2006	X				
(Pereira et al., 2023)		SE	Qualitative	Literature review	2018	X				
(Persaud and Bayon (2019)		SE	Qualitative	Systematic literature review, Text Mining Analysis	2019	X	X	X	X	X
(Peterson, 2015)		SE	Qualitative	Case study	2015	X				
(Phillips et al., 2015)		SE	Qualitative	Systematic literature review	2015	X	X			
(Prahalad and Hart (2002)		STE	Theoretical and conceptual	Theoretical model development	2002	X		X	X	
(Ran and Weller (2021)		SE	Qualitative	Systematic literature review	2021	X				
(Rana et al., 2014)	Experimental social innovation and dissemination (ESID) Model, Actor-network theory, Cluster Theory, Four-stage grounded model, Social innovation framework, Genre Theory, City development life cycle (CDLC) Model, Partnership Model, Institutional Theory, Organization and management theory, Static market-equilibrium Theory of structural change, Institutional Approach, Three-level analytical model, Sociological Theory, Three-sectoral model, Implementation and network theory, System Theory, Hierarchy Theory, Innovation theory, Resilience Theory, Network theory, Territorial innovation model, Strategic niche management theory, Living systems theory, Evolutionary game theory	SE	Qualitative	Literature review	2014	X				
(Rangan and Gregg, 2019)	Theory of change	SE	Qualitative	Case study	2019	X		X		
(Ratinho et al., 2015)		TE	Qualitative	Bibliometric analysis	2015	X				
(Ratinho et al., 2020)		TE	Qualitative	Systematic literature review	2020	X				
(Reiser and Dean, 2013)	Game theory	SE	Theoretical and conceptual	Concept review	2013					X
(Reiser, 2010)		SE	Theoretical and conceptual	Concept review	2010	X				
(Reiser, 2011)		SE	Theoretical and conceptual	Concept review	2011	X				
(Roundy, 2014)	organizational narrative theory	SE	Qualitative	Interviews, Ethnography, Observations, Literature review	2014	X				X
(Sadiq et al., 2022)		SE	Qualitative	Systematic literature review	2022	X				
(Saebi et al. (2019)	Organizational identity theory	SE	Qualitative	Systematic literature review	2019	X		X	X	X
(Sancho et al. (2021)		SE	Qualitative	Literature review, Case study	2021	X			X	
(Sandvik et al., 2014)		TE	Theoretical and conceptual	Concept review	2014		X			

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
Santos (2012)	Positive theory of social entrepreneurship, Structuration theory, Theory of the firm, Transaction cost economics, Resource dependence theory, Agency theory	SE	Theoretical and conceptual	Theoretical model development	2012	X		X		X
(Schaefer et al., 2015)	Structuration theory	SE	Qualitative	Literature review	2015	X				
(Schneider, 2017)	Labor theory of value	SE	Theoretical and conceptual	Concept review	2017	X			X	
(Scillitoe et al., 2018a)		STE	Theoretical and conceptual	Concept review, Conceptual model development, Examples	2018	X	X	X	X	X
(Sekliuckiene and Kisielius, 2015)		SE	Qualitative	Literature review	2015	X	X	X		
Sengupta et al. (2018)		SE	Qualitative	Integrative review	2018	X	X	X		X
Shane and Venkataraman (2003)		TE	Theoretical and conceptual	Concept review	2003	X	X			X
(Short et al., 2009)		SE	Qualitative	Literature review	2009	X				
(Si et al., 2023)		TE	Theoretical and conceptual	Concept review	2023	X				
(Smith et al., 2013)	Institutional theory, Organizational identity theory, Stakeholder theory, Paradox theory	SE	Qualitative	Literature review	2013	X				
Smith (2013)		TE	Qualitative	Case study	2013					X
Sobel and Clark (2018)	Knowledge theory, Market process theory	TE	Theoretical and conceptual	Theory development, Examples	2018	X		X		X
(Somerville and McElwee, 2011)		SE	Theoretical and conceptual	Theory development, Examples	2011	X		X		
Sparviero (2019)		SE	Qualitative	Literature review, Grounded theory, Case study	2019	X			X	
(Spicer et al., 2019)	Theory of social change, Field theory	SE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Secondary data analysis, Content analysis	2019	X				
Spiegel and Marxt (2011)		TE	Theoretical and conceptual	Framework development	2011	X				
(Spiess-Knafl et al., 2015)		SE	Mixed methodology	Quantitative: Descriptive statistics; Qualitative: Secondary data analysis	2015				X	
(Starnawska, 2016)		SE	Qualitative	Literature review, Grounded theory	2016	X				
(Stoyanov and Zhelyazkov, 2019)		SE	Qualitative	Literature review, Case study	2019	X			X	
(Stratan, 2017)		SE	Qualitative	Literature review, Interview/survey	2017	X			X	
(Suseno and Rowley, 2018)		SE	Theoretical and conceptual	Concept review	2018					X
(Swanson and Zhang, 2011)	Complexity theory	SE	Theoretical and conceptual	Concept review	2011	X	X			
Tan et al. (2020)	Social Cognitive Career Theory	SE	Qualitative	Systematic literature review	2020	X		X		
(Tan Lin, 2021)		SE	Qualitative	Systematic literature review	2021			X		

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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Tarko, 2015)	Austrian Theory of Social-Political Change	SE	Theoretical and conceptual	Concept review	2015	X				
Teasdale et al. (2023)		SE	Qualitative	Literature review	2023	X				
(Thananusak, 2019)		SE	Qualitative	Systematic literature review, Science mapping, Bibliometric analysis	2019	X				
(Tripathi and Brahma, 2018)		TE	Qualitative	Interview/survey, Content analysis	2018	X				
Upadhyay (2022)		SE	Theoretical and conceptual	Theory development	2022			X		
(Urban, 2013)	Social cognitive theory	SE	Mixed methodology	Quantitative: Factor analysis, Descriptive statistics; Qualitative: Hypotheses, Interview/survey	2013		X	X		
(Uygur and Marcoux, 2013)	Theory of the firm, Knowledge-based theory of the firm	SE	Theoretical and conceptual	Concept review	2013	X				
Van der Have and Rubalcaba (2016)		SE	Qualitative	Systematic literature review, Integrative review, Bibliometric analysis	2016	X				
(van Lunenburg et al., 2020)		SE	Qualitative	Systematic literature review	2020			X	X	
(Vial and Richomme-Huet, 2021)		SE	Qualitative	Content analysis	2021			X		
(Voudouris et al., 2011)	Behavioral learning, Cognitive learning	TE	Qualitative	Case study	2011		X		X	
Walsh and Linton (2011)		TE	Theoretical and conceptual	Framework development	2011				X	
(Warnecke and Balzac-Arroyo, 2023)	Capabilities approach	SE	Theoretical and conceptual	Theory development	2023		X			
(Weerawardena and Mort, 2006)		SE	Qualitative	Grounded theory, Case study	2006		X			
(Weller and Ran, 2020)		SE	Qualitative	Systematic literature review	2020	X				
(Wronka-Pospiech, 2016)	Contingency theories	SE	Quantitative	Questionnaire, Descriptive statistics	2016	X		X		
(Wry and York, 2017)	Identity theory	SE	Theoretical and conceptual	Theoretical model development	2017			X		
(Wu et al., 2020)	Institutional theory, Stakeholder theory, Theory of change, Prosocial motivation theory, Social identity theory, Self-efficacy approach	SE	Qualitative	Content analysis	2020	X	X	X	X	X
Yáñez-Valdés et al. (2023)		STE	Qualitative	Integrative literature review, Interview/survey, Case study	2023	X	X	X	X	X
Yerbury and Burridge (2011)	Social identity theory	SE	Qualitative	Case study	2011			X		

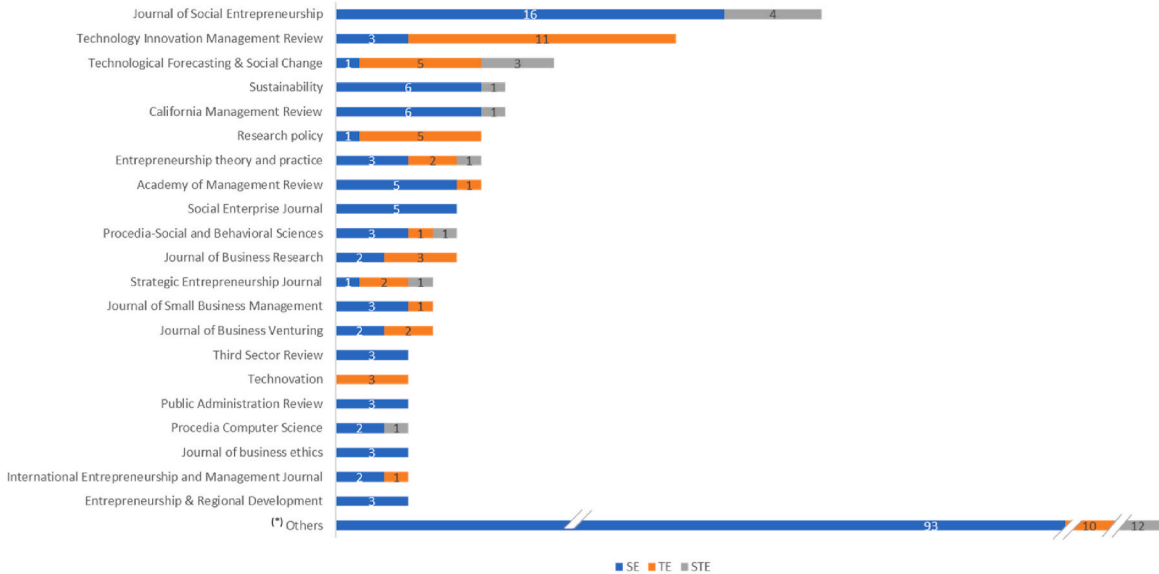
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Short Reference (alphabetical order)	Theories used/mentioned	Domain	Research methodology	Techniques used	Publication date	Business Concept	Environment	Entrepreneur	Organizational Context	Resources
(Young and Grinsfelder, 2011)		SE	Qualitative	Literature review, Case Study	2011			X		
(Yujuico, 2008)		SE	Theoretical and conceptual	Framework development	2008	X				X
Yun et al. (2016)		STE	Qualitative	Literature review	2016	X			X	X
(Yun et al., 2017)		SE	Qualitative	Literature review, Content analysis, Case study, Interview/survey	2017				X	
(Yusuf and Sloan, 2015)	Theory of effectuation	SE	Qualitative	Case study	2015			X		
Zahra et al. (2009)		SE	Theoretical and conceptual	Theoretical model development	2009	X	X	X		
(Zaremozhzabieh et al., 2019)	Theory of planned behavior	SE	Quantitative	Meta-analysis, Meta-analytic structural equation modeling (MASEM), Correlations	2019			X		
(Zhang and Swanson, 2014)	Network theory	SE	Theoretical and conceptual	Theoretical model development	2014	X	X			
Znagui and Rahmouni (2019)		STE	Theoretical and conceptual	Theoretical model development	2019	X				
(Žur, 2015)	Opportunity-based view	SE	Theoretical and conceptual	Framework development	2015	X		X		

Appendix A. Complete list of articles reviewed and their general analysis

Appendix B. Number of papers published per journal on TE, SE and TSE (complete)

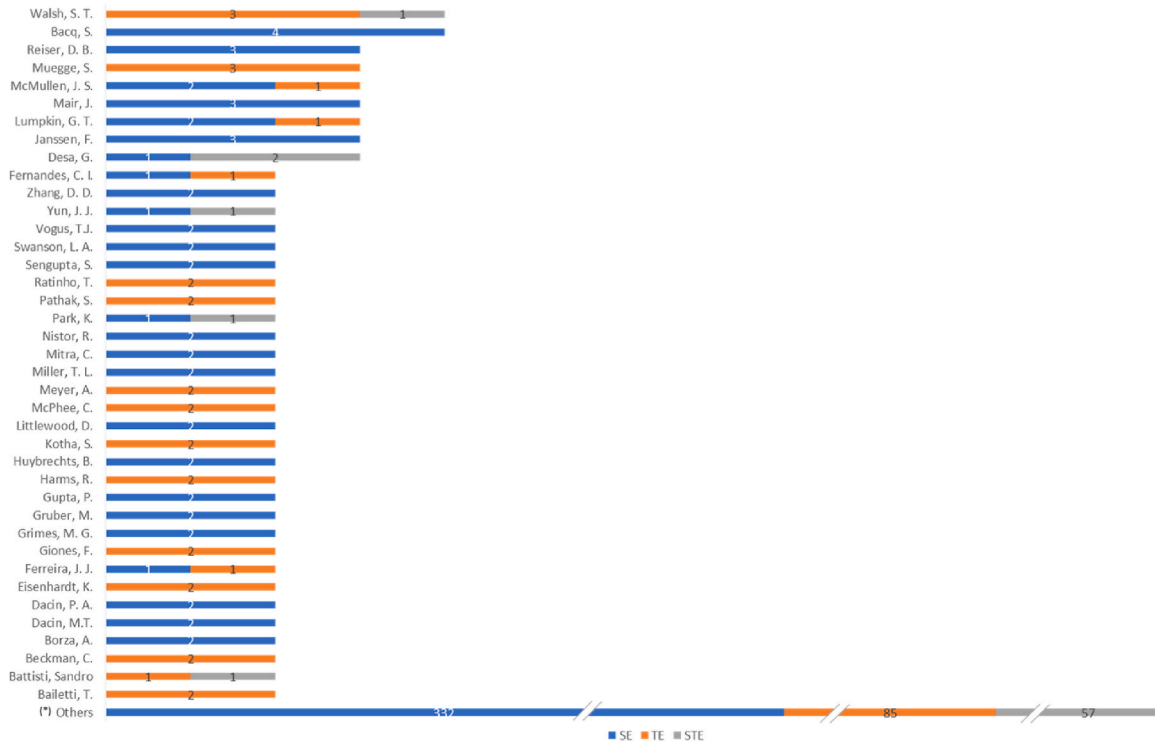


(\*) **SE**  
 Business Ethics Quarterly (2); Entrepreneurial Business and Economics Review (2); Information Systems Management (2); International Journal of Voluntary and Nonprofit (2); International review on public and nonprofit marketing (2); Journal of cleaner production (2); Journal of Strategic Innovation & Sustainability (2); Journal of world business (2); Small Business Economics (2); Socio-economic review (2); Conference proceedings (1); International Review of Entrepreneurship (1); Journal of Developmental Entrepreneurship (1); Science, Technology and Society (1); The Review of Austrian Economics (1); Vermont Law Review (1); Academy of management perspectives (1); Asia Pacific Business Review (1); Australian Journal of Management (Sage Publications Ltd.) (1); Australian Journal of Public Administration (1); BAR-Brazilian Administration Review (1); BCL Rev (1); Business and Society Review (1); Business Inform (1); cademy of management journal (1); Cogent Business & Management (1); Community Development (1); Complexity and Organization (1); Discern (1); DisP-The Planning Review (1); e-BANGI Journal (1); Economic Development / Ekonomiski Razvoj (1); Environmental Development (1); European Business Forum (1); European Management Review (1); Frontiers in Psychology (1); Global Journal of Entrepreneurship (1); Group & Organization Management (1); Harvard business review (1); Harvard Business School Working Knowledge (1); Ho Chi Minh City Open University Journal of Science - Economics and Business Administration (1); International Journal of Business & Society (1); International Journal of Innovation Studies (1); International Journal of Management Reviews (1); Journal of Business & Economic Analysis (1); Journal of Business & Management (1); Journal of Business Strategy (1); Journal of Business Venturing Insights (1); Journal of Computer Information Systems (1); Journal of Entrepreneurship Development (1); Journal of Entrepreneurship, Management and Innovation (1); Journal of Ethics & Entrepreneurship (1); Journal of Global Entrepreneurship Research (1); Journal of International Entrepreneurship (1); Journal of Management (1); Journal of Nonprofit & Public Sector Marketing (1); Journal of Public Affairs Education (1); Journal of Sciences (1); Journal of Small Business Strategy (1); Kauffman Center for Entrepreneurial Leadership (1); Management (1); Management Decision (1); Managing Global Transitions (1); Nonprofit & Voluntary Sector Quarterly (1); Organization & environment (1); Polish Sociological Review (1); Problemy Zarządzania (1); Procedia Economics and Finance (1); Public Organization Review (1); Review of Business (1); Review of Managerial Science (1); Review of Social Economy (1); Revista Telos (1); Scientific Bulletin-Economic Sciences (1); Social Business (1); Social enterprise and competitiveness. Management & Marketing (1); Society & Sustainability (1); Sustainability (1); The American Review of Public Administration (1); Thunderbird International Business Review (1); Trends and Strategies (1); Visegrad Journal on Bioeconomy and Sustainable Development (1); Wake Forest L. Rev (1);

**TE**  
 Conference proceedings (1); International Review of Entrepreneurship (1); The Review of Austrian Economics (1); Creativity and innovation management (1); Engineering Management Journal (1); International Entrepreneurship Review (1); International Review of the Red Cross (1); International Small Business Journal (1); Technology in Society (1); The information society (1);

**STE**  
 Journal of Developmental Entrepreneurship (1); Science, Technology and Society (1); Vermont Law Review (1); Information & Management (1); International Journal of Information Management (1); Journal of Electronic Commerce in Organizations (1); Journal of Entrepreneurship in Emerging Economies (1); Journal of International Management (1); Research on Social Work Practice (1); Strategy+ Business (1); The Journal of International Trade & Economic Development (1); World Journal of Entrepreneurship, Management and Sustainable Development (1);

Appendix C. Number of papers published per author

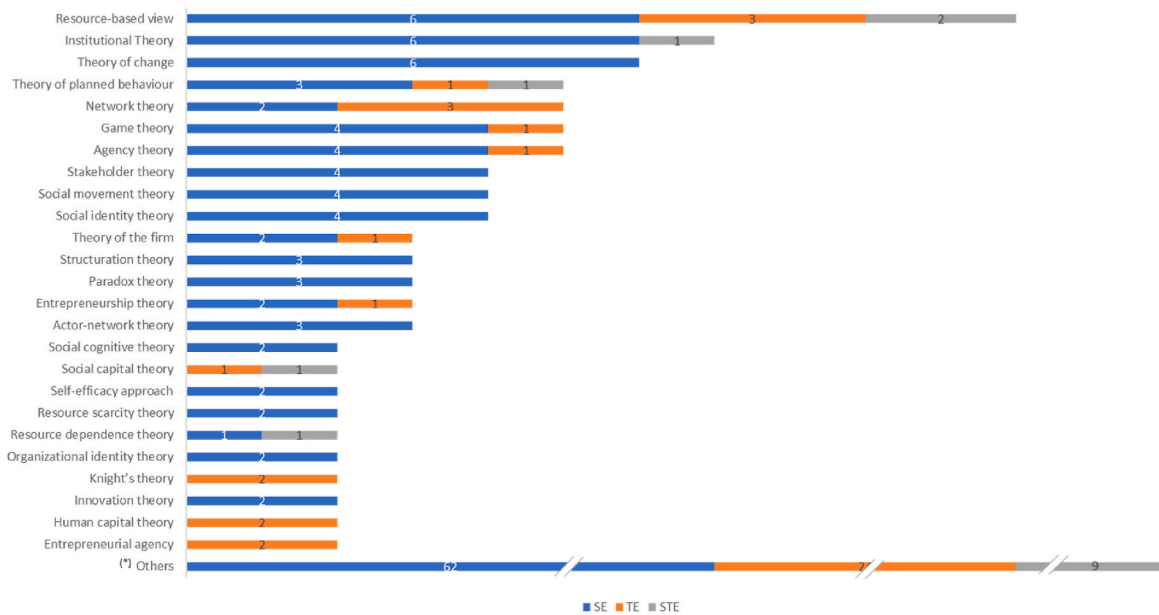


(\*) SE  
 Abu-Saifan, S.; Acs, Z. J.; Ahearn, Elizabeth-Rose; Ahrari, S.; Ahsan, M.; Ahuja, V.; Akhtar, A.; Allaga-Isla, R.; Alka, T. A.; Alonso, Duarte; Alves, H.; Amin, Muslim; Arasti, Z.; Ariffin, Z.; Asemota, J.; Austin, J.; Balzac-Arroyo, Josephine; Bansal, S.; Battilana, J.; Baumann, H.; Bayon, M.C.; Bellazzecca, Enrico; Berman, E.M.; Berry, F.S.; Besharov, M.L.; Betts, S. C.; Binder, J.; Blaga, S.; Bloom, P. N.; Boardman, M.C.; Bordean, O.; Bowie, N.E.; Boxenbaum, E.; Brancu, L.; Bund, E.; Burrige, N.; Cameron, J.; Campos-Silva, W.L.; Cardenas, J.; Carl, D.; Casle, M.; Cavazos-Arroyo, Judith; Cavenagh, Thomas; Chahine, T.; Chatterji, A.K.; Chauhan, S.; Chen, S.; Chmelik, E.; Choi, D.; Chou, David C.; Christensen, C. M.; Christmann, G. B.; Cieslik, K.; Cormican, K.; Corner, P.D.; Cox, K.C.; Croce, F.; Cukier, W.; Cwiklicki, M.; Dankbaar, B.; daSilva, K.A.; Dato-on, M. C.; David, A.; Day, S. W.; de Bruin, Anne; de Melo, M. F. D. S.; Dean, S.A.; Dees, J. G.; Defourny, J.; del Carmen Álvarez-Castañón, Lorena; Dentchev, Nikolay A.; Desai, H. P.; Diaz Gonzalez, Abel; Didehvar, F.; Djambaska, Elizabeta; Domeneghini, J.; Dorado, S.; Douglas, H.; Dufays, F.; Dwivedi, Y.K.; Eichler, G. M.; EnriqueVargas-Sáenz, Mario; Farinha, L.; Farooq, R.; Fauchart, E.; Fayolle, Alain; Feldner, Sarah Bonewits; Filser, M.; Forouharfar, A.; Foss, N.J.; Fyke, Jeremy P.; Ganz, M.; Garcia-Jurado, Alejandro; Garg, I.; Gedajlovic, E.; Gehman, Joel; Gekas, G.; Geuijen, K.; Ghadimi, A.; Ghobadian, A.; Gomes, Rute; Gonin, M.; PradeepKumar; Im, C.; Islam, S. M.; Islam, Syrus M.; Ismail, IdaSuriya; Iyengar, V.; Jaiswal, M.P.; Jamaluddin, NurAainaAqilah; James, P.; Jansen, S.A.; Jean-Denis, H.; Johnson, M. P.; Kalakay, J.; Kamaludin, Mohammed Faiz; Kansikas, J.; Kaushik, Vineet; Kay, T.; Kearins, K.; Khan, Z.; Kickul, J.; Kisielius, E.; Koch, J.L.; Korosec, R. L.; Kothari, T.H.; Kovanen, Sunna; Krauss, S.; Krauss, S.E.; Kretinin, A.; Krlev, G.; Kroeger, A.; Kruse, Philipp; Kuratko, Donald F.; Kusa, R.; Lane, M. D.; Larsen, Nathalie N.; Laud, R.; Le, A.N.H.; Lee, H.; Lehner, O. M.; Lin, Binshan; Linder, S.; Lips-Wiersma, Marjolein; Lisetchi, M.; Lopes, J.; Maas, Karen; Macke, J.; Mai, Catherine; Marcoux, A.M.; Marti, I.; Marti, I.andGanly, K.; Mason, J.; Massetti, B.; Mast, C.; Matear, M.; Maurer, A.; McDonald, A.; McElwee, G.; McLean, M.; McNeely, C.L.; Meijer, A.; Meng, L.K.; Mildenerberger, G.; Miloseska, Snezana Kostadinovska; Mohiuddin, Md. Fazla; Mohr, J. J.; Molina, M. Carmen; Montgomery, A. W.; Monticelli, JeffersonMarlon; Moreira, António Carrizo; Morris, Michael H.; Mort, G.S.; Moss, T. W.; Moussetis, Robert; Muskat, E.; Musteen, M.; Nair, Praveen Balakrishnan; Nascimento, Leandro da Silva; Nashchekina, O. M.; Neubaum, D.O.; Noël, C.; Nova, Rodrigo; Nwafor, F.N.; Nyssens, M.; O'Brien, Seamus; O'Dwyer, M.; O'Regan, N.; Olsen, M.; Palli, Mohd Rizal; Pan, N. D.; Paul, J.; Paulsen, N.; Peredo, A. M.; Peres-Ortiz, M.; Pérez-Barea, José Javier; Periac, F.; Permencar, Cláudia; Persaud, A.; Peterson, M.; Phillips, W.; Pidduck, R.J.; Piercy, N.C.; Popovski, Vasil; Ran, B.; Ran, Bing; Rana, N. P.; Rangan, V. K.; Richomme-Huet, Katia; Roberson, O.; Roundy, P.; Rowley, C.; Rowshan, S.A.; Roy, Michael; Rubalcaba, L.; Ruggles, R.; Sadiq, Tasneem; Sadtler, T.M.; Saebi, T.; Sahasranamam, Sreevas; Sahay, A.; SalazarZehi, H.; Salazar, VivianeSantos; Samah, A. A.; Sampaio, C.; Samsuddin, MasErVina; Sancho, Pedro; Santos, F. M.; Santos, Susana C.; Sapienza, H. J.; Sarate, J.A.R.; Schaefer, K.; Schaltegger, S.; Scherer, AndreasGeorg; Schneider, A.; Schwarz, E.J.; Sebastião, J.R.; Sekliuckiene, J.; SengKok, Abel; Shamsuddoha, M.; Sharma, G.D.; Sharpe, J.; Shaw, E.; Shea, M.; Shin, C.; Short, J. C.; Shulman, J.M.; Singh, Smita; Slater, S.F.; Sloan, M.F.; Smith, W. K.; Somerville, P.; Souza, R.C.; Sparviero, S.; Spicer, J.; Spiess-Knaff, W.; Sreenivasan, Aswathy; Srivastava, Ritu; Starnawska, M.; Steven, K. May; Stevenson, H.; Stoyanov, K.; Stratan, D.; Suresh, M.; Suseno, Y.; Sylvester, D.; Tan Luc, Phan; Tan, L. P.; Tarko, V.; Teasdale, Simon; Tewari, Shobha; Thananusak, Trin.; Tírca, A.; Trenholm, S.; Tulder, RobVan; Tymoshenko, I.V.; Upadhyay, Divya; Urban, B.; Uygur, U.; Van der Have, R. P.; van Lunenburg, M.; VargasBortoloso, Ingridi; Vial, Virginia; Voegtlin, Christian; Wach, Dominika; Wali, O.P.; Walker, J.; Warnecke, Tonia; Weber, C.; Weerakkody, V.; Weerawardena, J.; Wegge, Jürgen; Wei-Skillern, J.; Weller, S.; Weller, Scott; Wronka-Pospiech, M.; Wry, T.; Wu, T.; Wu, Y. J.; Wuilaume, Amélie; Xavier, JesrinaAnn; Xuan, L.P.; Yaryd, R.T.; Yasin, IdaMd; Yerbury, H.; York, J.G.; Young, D.R.; Yujuico, E.; Yusuf, J. E.; Zahra, S. A.; Zarei, H.; Zaremohzabieh, Z.; Zhao, X.; Zhelyazkov, G.

TE  
 Allen, K. R.; Amezcua, A.; Ardichvili, A.; Avasilcá, S.; Baz, JamalEl; Bot, S.D.; Brahma, M.; Brem, A.; Brem, Alexander; Brown, R.; Candelò, E.; Cardozo, R.; Clark, J.R.; Colombo, M. G.; Corman, J.; Couturier, J.; Dimitratos, P.; Doganova, L.; Duxbury, T.; Eyquem-Renaud, M.; Ferreira, F.A.; Florida, R.; Garcia-Perez, A.; Garud, R.; Gimmon, E.; Giones, Ferran; Glodowska, Agnieszka; González-Tirados, R.M.; Grilli, L.; Haessler, Philipp; Honig, B.; Hudson, D.; Isabelle, D.; Isaksson, Anders; Jafari-Sadeghi, V.; Jalali, M.S.; Jebli, Fedwa; Jumbert, M.G.; Karlsrud, J.; Karnøe, P.; Katzy, B.; Kaufmann, M.; Kenney, M.; Kling, R.; Klingler-Vidra, Robyn; Laplume, A.O.; Levie, J.; Linton, J.D.; Löfsten, Hans; Maciejewski, Marek; Majdouline, Ilias; Marques, C.S.; Marvel, M. R.; Marx, C.; Mason, C.; Miralles, F.; Morales-Alonso, G.; Muralidharan, E.; Nacu, C. M.; Nambisan, S.; Pablo-Lerchundi, I.; Perles, B.; Rajagopalan, N.; Rajagopalan, N.; Rannikko, Heikki; Raposo, M.L.; Ray, S.; Salavou, H.; Sandvik, K. B.; Shane, S.; Shepherd, D.A.; Si, Steven; Smith, D.; Sobel, R. S.; Spiegel, M.; Taylor, C.C.; Tripathi, S. S.; Venkataraman, S.; Voudouris, I.; Wach, Krzysztof; Westerlund, M.; Xavier-Oliveira, E.; Yancini, P.; Zeng, Z.; Zhou, Z.

STE  
 Ajāh, Emmanuel Okoro; Ali, Muhammad; Arena, M.; Bengo, I.; Calderini, M.; & Chiodo, V.; Ariza-Montes, J. A.; Austin, J. E.; Ayuniza, U.N.; Bar, K.; Barros-Celume, Sebastián; Basu, S.; Belkacem, L.; Bhowmick, Bhaskar; Chatterjee, Swagato; Chavez, V. A.; Faisal, F.; Fu, Xiaolan; Ghatak, Arpita; Ghauri, Pervez; Gldron, B.; Grassi, Eleonora; Gregori, Patrick; Guerrero, Maribel; Hart, S.L.; Holzmann, Patrick; Ibáñez, María; Ismail, K.; Israel-Cohen, Y.; Javed, Asad; Joy, S.; Kandel, D.; Katz, R. A.; Khefacha, I.; Leonard, H.B.D.; Leong, C.; Linna, P.; Lustig, M.; Majid, Abdul; Minayora, Amorettya; Mor Barak, M. E. ; Muniz, N.M.; Nche, Charles; Ononiwu, Chidi; Page, A.; Poonamallee, L.; Prahalad, C. K.; Rahmouni, B.; Scillitoe, J. L.; Silberstein, D.; Sohel, M.H.; Stinnett, R.; Tan, B.; Tan, F.T.C.; Tierney, R.; Toschi, Laura; Yáñez-Valdés, Claudia; Yang, J.; Yasir, Muhammad; Znagui, Z.

Appendix D. Theories used or cited



(\*) **SE**  
 Analytical sociology; Austrian Theory of Social-Political Change; Capabilities approach; City development life cycle (CDLC) Model; Cluster Theory; Competitive advantage theory; Complexity theory; Conflict-based communication theory; Contingency theories; Critical analysis theory; Embedded agency; Evolutionary game theory; Evolutionary theory; Experimental social innovation and dissemination (ESID) Model; Field theory; Four-stage grounded model; Hierarchy Theory; Identity theory; Implementation and network theory; Innovation diffusion theory; Institutional and structuration theories; Institutional complexities theory; Institutional Approach; International new venture (INV) theory; Knowledge-based theory of the firm; Labour theory of value; Living systems theory; Opportunity-based view; Organization and management theory; Organizational effectiveness theory; organizational narrative theory; Organizational theory; Partnership Model; Positive theory of social entrepreneurship; Processual theories of entrepreneurship; Prosocial motivation theory; Publicness (government-dominated) theory; Resilience Theory; Resource dependency theory; Servant leadership theory; Social Cognitive Career Theory; Social exchange theory; Social innovation framework; Social learning and self-efficacy theory; Social network; Sociological Theory; Sociology; Sociology of social networks; Static market-equilibrium Theory of structural change; Strategic niche management theory; System Theory; Territorial innovation model; Theories of governance; Theory of effectuation; Theory of social capital; Theory of social change; Theory of social identity; Theory of Social-Enterprise Systems-Engineering; Three-level analytical model; Three-sectoral model; Transaction cost economics; Transformative agency theory

**TE**  
 Behavioral theory of the firm; Behavioralism; Behavioural learning; Cognitive learning; Competence-based view; Constructivist view; Design rule theory; Discovery view; Economic theory; Employment choice theory; Entrepreneurship theories; Kirzner's Alert Arbitrageur; Knowledge spillover theory; Knowledge theory; Management theory; Market process theory; Schumpeter's theory; Signalling theory; Social construction of technological systems; Stage-based perspective; Subjectivism; Technology affordances and constraints theory; Theory of communities of practice; Theory of sustainable competitive advantage;

**STE**  
 Bricolage; Competency theory; Creative destruction theory; Diffusion of innovation theory (DOI); Entrepreneurial intention theory; Expectancy theory; organizational ecology theory; resource mobilization; social origins theory

**Appendix E. Summary of findings from the Systematic Literature Review on TE, STE and SE**

		TE	STE	SE	
I. Business Concept	(1) Mission	△	△	△	
	(2) Arenas	Business models	△		△
		Market segments		△	
	(3) Vehicles	Technology push disruptive innovations with social impact		△	
		Joint ventures, mergers & acquisitions		■	■
		Franchising			△
		Technology transfer / knowledge spillover	△		
	(4) Differentiators	Social technology		△	
		Balance tech adoption and social value generation		△	
		Civic change catalyst / intermediary		■	■
		Technological knowledge	△		
	(5) Staging	Sequence of initiatives	△	△	
		Technological path dependency	△		
		Social path dependency			△
		Scaling approach		■	■
	(6) Economic logic	Socially-oriented economic value creation		■	■
		Internalization of positive externalities			△
		Company-driven revenue	△		
		Crowdsourced assets	△		

		TE	STE	SE	
II. Environment	(1) Culture and norms	Sociopolitical environment	■	■	■
		Change to pre-existing structures of power		△	
		Collective influence on new norms and values			△
		Legal framework	■	■	
	(2) Physical infrastructures and amenities	Personal experience of local environment		■	■
		Socioeconomic development related	△		
	(3) Formal institutions	Local incubators, accelerators, technology parks and research centers	■	■	■
		Response to governmental failure		■	■
	(4) Information technologies and the internet	Local technological systems	△		
		Virtual incubators		△	

Legend:  
 ■ Mentioned and common  
 △ Mentioned but different  
 □ Not mentioned

		TE	STE	SE
III. Entrepreneur	(1) Attitude	■	■	△
	(2) Subjective norms	△	△	
	(3) Perceived behavioral control	△	△	△
	(4) Work experience	△	△	
	(5) Education	■	■	
	(6) Entrepreneurial experience	△	△	
	(7) Demographics	△	■	■
	(8) Cognitive and/or psychological measures	△	△	△
	(9) Motivations	△	■	■

		TE	STE	SE
IV. Organizational Context	(1) Organizational structure		△	△
	(2) Legal structure		△	△
	(3) Economic performance		△	△
	(4) Customer		■	■
	(5) Internal business processes	△	△	
	(6) Learning and growth	△	△	△

		TE	STE	SE	
V. Resources	(1) Physical		△		
		High capital investment	■	■	
	(2) Financial	Cheaper and faster replication		△	
		Venture capital	△		
		Vast range of funding resources			△
		Balanced team	■	■	■
	(3) Human	Relations allow access to other resources		△	
		Practical local knowledge		△	
		High-quality experienced personnel	△		
		Inside and outside actors			△
		Interconnected access to knowledge and resources	■	■	
	(4) Relational	Companies matching tech strengths		△	
		Interconnected global market	△		
		Strong network of supporters		■	■
		Integrated network for technology adoption		△	
		Legitimated technologies		△	
	(5) Technological	Acquisition of older technologies	△		
		Social networks for tech support			△

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