Article

A Bibliometric Analysis of Social Entrepreneurship and Entrepreneurial Ecosystems

Iuliia Trabskaia [1,*], Aleksei Gorgadze [1], Mervi Raudsaar [1] and Heidi Myyryläinen [2]

1   School of Economics and Business Administration, University of Tartu, 51009 Tartu, Estonia
2   Lappeenranta Campus, LAB University of Applied Sciences, 15210 Lahti, Finland
*   Correspondence: iuliia.trabskaia@ut.ee

Abstract: Social entrepreneurship plays an important role in the maintenance of economic prosperity and brings benefits to society. The role of social entrepreneurship is growing in the light of challenges of the global economy, increasing uncertainty of the environment, the growth of social problems, and the emergence of crises in the 2020s. These derive an increase in economic and psychological challenges. Social entrepreneurship is known as the driver for solving global problems of society. The entrepreneurial ecosystem serves as a source of entrepreneurial opportunity, as a breeding ground for entrepreneurship. Therefore, exploring the topic of social entrepreneurship in the context of the entrepreneurial ecosystem becomes relevant. Social entrepreneurship, with respect to the entrepreneurial ecosystem, has been extensively explored. However, despite a growing body of publications, to the best of our knowledge, no bibliometric analysis is available on the topic. This analysis is important to understand what trends in the development of social entrepreneurship and the ecosystem exist, what further research directions can be recommended, and how the relationship between social entrepreneurship and the entrepreneurial ecosystem has been studied. This study aims to close the gap, consolidate research, and identify the state of the art in the field. In total, 357 publications from the Scopus database were selected for the period of 2009–2022. The study used social network analysis (bibliographic coupling network, co-citation network, citation network, and co-authorship network) and semantic analysis (semantic network) through VOSviewer version 1.6.19 and Gephi version 0.10.1 software. The results showed a growth of publications during this period, allowing us to observe influential journals, the most productive and cited authors, leading countries and universities, impactful papers, networks of collaborations, and co-citations of scholars. The paper with the highest degree of centrality is "Ecosystems in Support of Social Entrepreneurs: A Literature Review" while *Sustainability* is the most influential journal in the field. The analysis identified six thematic clusters within the research topic. The study contributes to the literature by presenting the research agenda, structure, characteristics of social entrepreneurship, and entrepreneurial ecosystem research.

Keywords: social entrepreneurship; entrepreneurial ecosystem; co-citation network; social network analysis; semantic analysis; VOSviewer

1. Introduction

Social entrepreneurship has received considerable research attention. Over the past decade, the body of knowledge in this domain significantly grew (Dionisio 2019; Hockerts 2017; Chell 2007; Corner and Ho 2010). The essential place of social entrepreneurship has been recognized by both researchers and policymakers. The issue has grown in importance in the light of recent crises, such as COVID-19 and political polarization. Social entrepreneurship plays a high role in developing the economy, solving major challenges that exist in society, increasing stability and prosperity, and reducing poverty.

In recent years, we have seen increasingly rapid advances in the research of the entrepreneurial ecosystem. The construct is understood as a set of conditions and stake-

holders that create an entrepreneurial environment (Stam 2015; Spigel 2017). The concept of ecosystem is widely applied to explain how a system of economic, socio-cultural factors influences entrepreneurial activity (Isenberg 2010).

The interrelationship of social entrepreneurship and the entrepreneurial ecosystem is a relatively new area of research. Although the first publications appeared only in the late 2000s, since then, a significant number of studies have been published (Biggs et al. 2010; Thompson et al. 2018; Surie 2017). The research domain has had an increasing number of publications; however, there is no mapping through bibliometric analysis on the topic. The role of social entrepreneurship is increasing, especially in view of the waves of crises, which cause economic, psychological, and social problems in society. Social entrepreneurship is an important tool for solving problems and reducing social and psychological tensions. To stimulate social entrepreneurship, it is important to develop an entrepreneurial ecosystem and assess what effects the ecosystem has on social entrepreneurship. The study of this domain will identify key trends in the interaction between the ecosystem and the social enterprise, identifying critical gaps and outlining further avenues for study. Given the large body of literature on the subject, it is essential to analyze the field, understand the development of the research agenda, and provide mapping.

The purpose of this study is to provide an overview of the research on social entrepreneurship and the entrepreneurial ecosystem through bibliometric analysis. This research seeks to address the following questions: (1) What are the characteristics of publications on social entrepreneurship with respect to the entrepreneurial ecosystem? (What are the most influential authors, journals, universities, and countries?) (2) Which studies have had the greatest impact? (3) How has the number of publications within the research domain changed over time? (4) What is the structure of the research domain of social entrepreneurship with respect to the entrepreneurial ecosystem? We extracted data from the Scopus academic database (n = 357). Social network analysis and semantic analysis were applied.

This paper is organized as follows. It begins with an overview of social entrepreneurship with respect to the entrepreneurial ecosystem. The paper then describes methods, analysis procedures, selection, and details of the database. The next section presents the findings of the research. Finally, the conclusion, discussion, contributions, limitations, and directions for future research are presented.

2. Social Entrepreneurship and the Entrepreneurial Ecosystem

In recent years, there has been an increasing amount of literature published on social entrepreneurship. There is a consensus among researchers and policymakers that social entrepreneurship brings significant benefits to society, producing both social and economic effects (Rey-Martí et al. 2016). Social entrepreneurship contributes to the development of the economy, increases innovation, and creates solutions for social transformation (do Adro and Fernandes 2022).

Social entrepreneurship is a multidimensional and dynamic phenomenon (Bacq and Janssen 2011). Although social entrepreneurship has many definitions, researchers agree that social entrepreneurship combines the general features of entrepreneurship and, at the same time, focuses on the social mission, while aiming to provide a positive impact on society (Dacin et al. 2011; Saebi et al. 2019; Roundy 2014). Smith and McColl (2016) argue that social enterprises are embedded in their social and cultural communities, orientated to create both social and economic value. Social enterprises are built on an understanding of a community's need (Smith and McColl 2016; Colenbrander et al. 2017).

There is a consensus among social scientists that social entrepreneurship is highly contextual, does not exist in a vacuum, and is influenced by external factors (Mair and Martí 2006; Haugh 2007). Rivera-Santos et al. (2015) note that the environment affects both the emergence of social enterprises and the entrepreneurial journey of social entrepreneurs (Rivera-Santos et al. 2015). In this context, the ecosystem approach has received great recognition (Thompson et al. 2018; Shepherd and Patzelt 2011; Neumeyer et al. 2019;

Roundy 2017a, 2017b). The ecosystem approach to entrepreneurship was proposed by Isenberg (2010) in his foundational work. Isenberg argues that ecosystems have common features and "consist of a set of individual elements" (Isenberg 2010, p. 43). Isenberg's research was developed by Foster et al. (2013) and Stam (2015), clarifying and trans-dividing the elements/pillars of the entrepreneurial ecosystem (Stam 2015; Foster et al. 2013). The ecosystem is understood not only as a set of factors but also as a system of stakeholders' interactions (Stam 2015). Entrepreneurial ecosystem research has received considerable attention, including internal linkages, co-dependencies of pillars/components of the ecosystem (Roundy 2017a, 2019), the transformation of the entrepreneurial ecosystem over time (Mack and Mayer 2016; Trabskaja and Mets 2019; Stam and Spigel 2022), and the approach to measuring the ecosystem (Bell-Masterson and Stangler 2015).

Social entrepreneurship is well researched and systematized, with a significant number of bibliometric analyses of social entrepreneurship studies in general (e.g., Phan Tan (2022)) and on separate domains of social entrepreneurship (e.g., Ahmad and Bajwa (2022) conducted a bibliometric analysis of social entrepreneurship and economic development (Ahmad and Bajwa 2022); do Adro and Fernandes (2022) conducted an analysis of social entrepreneurship in relation to social innovation (do Adro and Fernandes 2022); and Iskandar et al. (2022) analyzed social entrepreneurship in special journals (Iskandar et al. 2022)). There also are mapping studies on the entrepreneurial ecosystem (Malecki 2018; Velt et al. 2020) and on separate domains of the ecosystem (e.g., Purbasari et al. (2019) conducted a systematic mapping study on the entrepreneurial ecosystem in the context of network-rich systems (Purbasari et al. 2019)).

Streams of research on social entrepreneurship from an ecosystem perspective have increased in the past 13 years. The increased attention over time has created the necessity to systematize the research field and identify the most significant areas. However, according to our knowledge, there is no systematic approach to the state of research on social entrepreneurship and the entrepreneurial ecosystem.

3. Results

3.1. Descriptive Analysis

In descriptive analysis, we examined the position of research on social entrepreneurship and the entrepreneurial ecosystem in the context of Scopus database publications. The approach provided an opportunity to understand how popular this topic is in the broader research field. In the analysis, we covered the entire period since the emergence of publications on social entrepreneurship and the entrepreneurial ecosystem, from 2009 to 2022. We included publications from 2009 in our study, since to the best of our knowledge, it was the year when the first article on social entrepreneurship and ecosystems was published.

In the first period (2009–2015), the topic did not attract many researchers, one paper was published in 2009, and the number increased to seven papers in 2013. From 2016, the topic received greater recognition, 13 papers were published in 2016, 31 papers in 2017, and 71 papers in 2022. The possible explanation here can be the publication of one foundational paper in the entrepreneurial-focused field in 2015 by Stam: "Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique" (Stam 2015). We suggest that this paper attracted attention to the ecosystem topic, serves as a driver for this research domain development, and explains the strong increase in the number of publications on the topic in 2016. Moreover, several influential articles were published in 2016 and 2017 (Rahdari et al. 2016 (124 citations); two articles in 2017 (Sussan and Acs 2017 (271 citations); and Surie 2017 (81 citations)), which also explains the growing interest and increasing number of publications on the topic of social entrepreneurship and the entrepreneurial ecosystem (see the analysis of the most influential papers in Table 1). The growth in publications may also have been stimulated by external events, since crises create new social problems and draw attention to social entrepreneurship as a tool for solving these problems. Such crisis stimuli could be crises in 2016 with long-term consequences (Brexit and OPEC production

cuts). In the years to come, the growing interest in the topic could also be stimulated by crises, including COVID-19.

Table 1. The most influential papers on social entrepreneurship and the entrepreneurial ecosystem. Source: own elaboration.

Title	Authors	Year	Journal	N Citations
The Digital Entrepreneurial Ecosystem	Sussan, F., Acs, Z.J.	2017	*Small Business Economics*	271
Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management	Biggs, R., Westley, F.R., Carpenter, S.R.	2010	*Ecology and Society*	203
Digital Entrepreneurship: A Research Agenda on New Business Models for the Twenty-First Century	Kraus, S., Palmer, C., Kailer, N., Kallinger, F.L., Spitzer, J.	2019	*International Journal of Entrepreneurial Behaviour and Research*	186
Harnessing Innovation for Change: Sustainability and Poverty in Developing Countries	Khavul, S., Bruton, G.D.	2013	*Journal of Management Studies*	126
Achieving Sustainability through Schumpeterian Social Entrepreneurship: The Role of Social Enterprises	Rahdari, A., Sepasi, S., Moradi, M.	2016	*Journal of Cleaner Production*	124
How Entrepreneurial Ecosystems Take Form: Evidence from Social Impact Initiatives in Seattle	Thompson, T.A., Purdy, J.M., Ventresca, M.J.	2018	*Strategic Entrepreneurship Journal*	116
Entrepreneurship Ecosystems and Women Entrepreneurs: A Social Capital and Network Approach	Neumeyer, X., Santos, S.C., Caetano, A., Kalbfleisch, P.	2019	*Small Business Economics*	91
Creating the Innovation Ecosystem for Renewable Energy via Social Entrepreneurship: Insights from India	Surie, G.	2017	*Technological Forecasting and Social Change*	81
Antecedents to Forest Owner Innovativeness: An Investigation of the Non-timber Forest Products and Services Sector (Nybakk et al. 2009)	Nybakk, E., Crespell, P., Hansen, E., Lunnan, A.	2009	*Forest Ecology and Management*	61

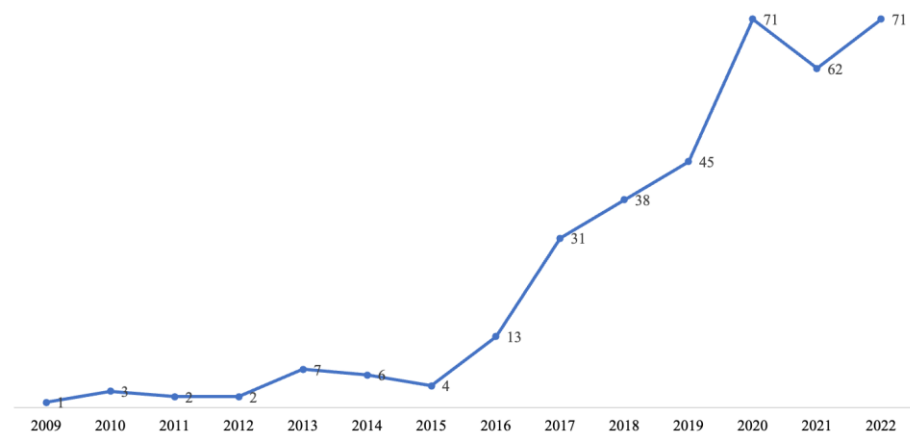Figure 1 shows the number of publications for each year.

Figure 1. Dynamics of publications. Source: own elaboration.

However, the studies of these authors are not among the most cited papers. Table 1 shows the top 10 most influential papers from the total number of publications on the topic. The most cited article is "The Digital Entrepreneurial Ecosystem" (Sussan and Acs 2017), with 271 citations, published by the journal *Small Business Economics*. In the first glance, the focus of this article is not exactly in line with the area under investigation and

social entrepreneurship is hardly given any attention. We suggest that there are several explanations: First, the focus is on social behavior; second, sustainability is seen as the main performance of the digital ecosystem, which is akin to the approach and mission of social entrepreneurship; third, the authors point to the important role of co-creation engagement and participation, which also confounds the approach to digital entrepreneurship with the approach to social entrepreneurship.

Next there is "Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management" (Biggs et al. 2010), with 203 citations, published in the journal *Ecology and Society*. The authors explored ecosystem management transformations, arguing that the attractiveness of the ecosystem stimulates development and the capacity for social entrepreneurship.

The third paper with the highest number of citations is "Digital Entrepreneurship: A Research Agenda on New Business Models for the Twenty-First Century" (Kraus et al. 2018), with 186 citations, published by the *International Journal of Entrepreneurial Behaviour and Research*. In this article, the authors conducted a conceptual literature review, including the digital ecosystem and social digital entrepreneurship as the focus of their research.

The most productive country with the highest number of publications on social entrepreneurship and the entrepreneurial ecosystem is the United States (64 papers), followed by the United Kingdom (31 papers) and India (30 papers). Figure 2 shows the number of publications by the top 11 countries.
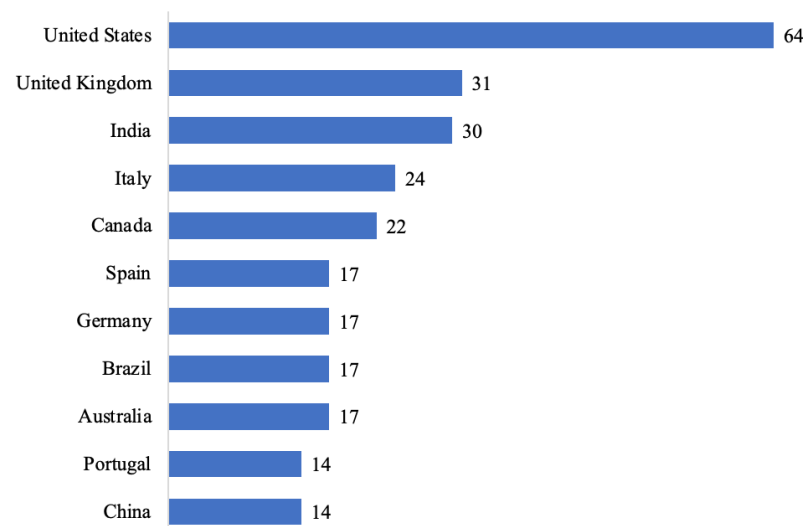

Figure 2. The top 11 countries with the highest number of publications on social entrepreneurship and the entrepreneurial ecosystem. Source: own elaboration.

By analyzing the Scopus database, we identified that there is not a strong concentration of publications on the topic in any university. The maximum number of papers was published by scholars from the Tecnologico de Monterrey, Mexico (7 papers), followed by the Universidad del Desarrollo, Chile (6 papers); the University of Tennessee at Chattanooga, USA; and Wageningen University & Research, the Netherlands (5 papers); see Table 2.

Table 2. Top influential institutions for social entrepreneurship and the entrepreneurial ecosystem. Source: own elaboration.

Organization	Number of Papers
Tecnologico de Monterrey (Mexico)	7
Universidad del Desarrollo (Chile)	6
University of Tennessee at Chattanooga (USA), Wageningen University & Research (the Netherlands)	5
Pennsylvania State University (USA), Harvard University (USA), Universidade de Aveiro (Portugal), Newcastle Business School (UK)	4

The analysis showed that Phillip Roundy is the most productive author, followed by R. During, K. Mehta, and M.S. Ramírez-Montoya. Table 3 shows the authors with the highest number of publications.

Table 3. Top authors in social entrepreneurship and entrepreneurial ecosystem. Source: own elaboration.

Authors	Number of Papers
Roundy, P.T.	5
During, R.; Mehta, K.; Ramírez-Montoya, M.S.	4
Bellucci, M.; Biggeri, M.; Costa, J.; Dentchev, N.A.; Guerrero, M.; Jia, X.; Mariano, S.R.H.; Montes-Martínez, R.; Moraes, J.; Moreira, A.C.; Muñoz, P.; Neumeyer, X.; Persson, H.T.R.; Pita, M.; Santos, S.C.; Siqueira, A.C.O.; Testi, E	3
49 authors	2
90 authors	1

The most influential journal with the greatest number of papers on the topic of social entrepreneurship and ecosystems is *Sustainability* (17 articles); the journal is indexed by Scopus Q2. This is followed by the *International Journal of Entrepreneurial Behaviour and Research* (9 articles), indexed by Scopus Q1, and the *Journal of Business Venturing Insights* (8 articles), indexed by Scopus Q1 (Figure 3).

Figure 3. Top influential journals on social entrepreneurship and the entrepreneurial ecosystem. Source: own elaboration.

3.2. Network Analysis

The semantic network analysis identified several thematic clusters (Figure 4). The first cluster brought together research related to innovation. In this cluster, the role of technology and digital innovation was actively explored. Social entrepreneurship, in the context of the entrepreneurial ecosystem, is linked to innovation activity. Social entrepreneurship

itself often includes social innovations applied to solve social problems in society. The ecosystem contains an innovation component as a crucial part of the external environment of entrepreneurship. The intersection of these two themes is also of interest to researchers in terms of technology, and digital innovations (the cluster is marked in orange in the figure).
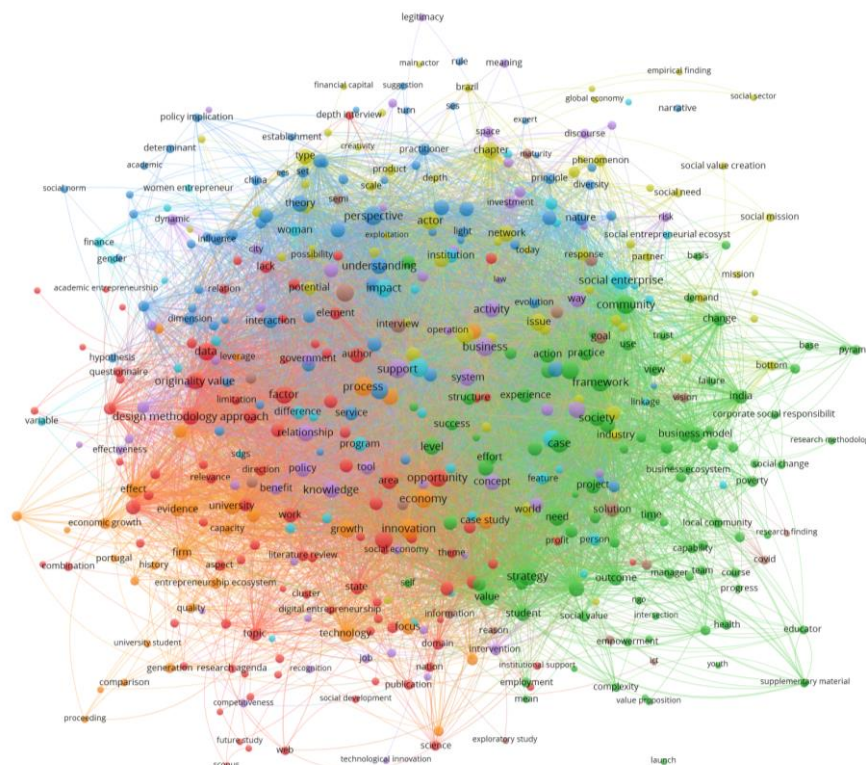

Figure 4. Semantic network. Source: authors based on VOSviewer software.

A second cluster of research referred to gender and women's entrepreneurship topics, which is also highly relevant in terms of social entrepreneurship (marked in blue in the figure). The gender dimension has long been relevant in the field of entrepreneurship and has not lost its relevance.

The analysis highlighted a third cluster with the driving theme of business models. The key areas of this cluster were business models, start-up strategy, industrial cut, and company capacities (the cluster is marked in green).

The fourth thematic cluster was formed around policy dimensions. Traditionally, the policy aspect is a key pillar in the entrepreneurial ecosystem concept. The analysis showed that in the field of social entrepreneurship, this ecosystem aspect attracts considerable research attention. In this cluster, the topics of government support, investments, and risks of social entrepreneurship were raised (the cluster is marked in purple in the figure).

For the fifth cluster, the network was considered as a driving theme. "Network" refers to the entrepreneurial ecosystem pillar. In this research domain, the key topics were community, social value creation, social need, and social mission (the cluster is marked in yellow in the figure).

The sixth cluster in our intervention focused on the topic of education, with the key areas of entrepreneurship education, human capital, and entrepreneurial skill. Education is one of the key topics in the entrepreneurship-focused literature. Entrepreneurial education fosters the development of entrepreneurial skills, entrepreneurial intentions, and entrepreneurial activity.

The state of research within the clusters can be described as the initial stage. So far, there is a lack of consensus on the definitions of key phenomena (e.g., there is no widely accepted view of the definition of the social entrepreneurship ecosystem, innovation in the context of social entrepreneurship, and the place of innovation in the ecosystem;

the business model innovation for social entrepreneurship is not operationalized; etc.) and approaches to measuring the phenomena (e.g., measuring social entrepreneurship innovation, the influence of strategic orientations of social companies on innovation activity, business model innovation, and the influence of ecosystem factors on business model innovation). There is also an open question of how networking in the context of social entrepreneurship differs from networking in other types of entrepreneurships, and there is no consensus on the definition and approaches to the study of networking as an important pillar of the ecosystem.

3.3. Co-Citation Network

Co-citation network analysis allows to identify the frequency with which two articles are cited together in other articles (Small 1973). Nodes illustrate the papers, and the links are citations (van Eck and Waltman 2010, 2017). Colors correspond to the clusters with the most closely related documents. The co-citation network illustrates the structure of research directions, similar ideas of authors, and research leaders. This type of analysis was used since it is an effective way to understand which authors are cited together, continue each other's ideas, or, conversely, debate each other.

The co-citation network on the topic of social entrepreneurship and entrepreneurial ecosystem is presented in Figure 5. Four clusters of authors' citations emerged from the analysis. A cluster presents a group of authors working in the same research field.
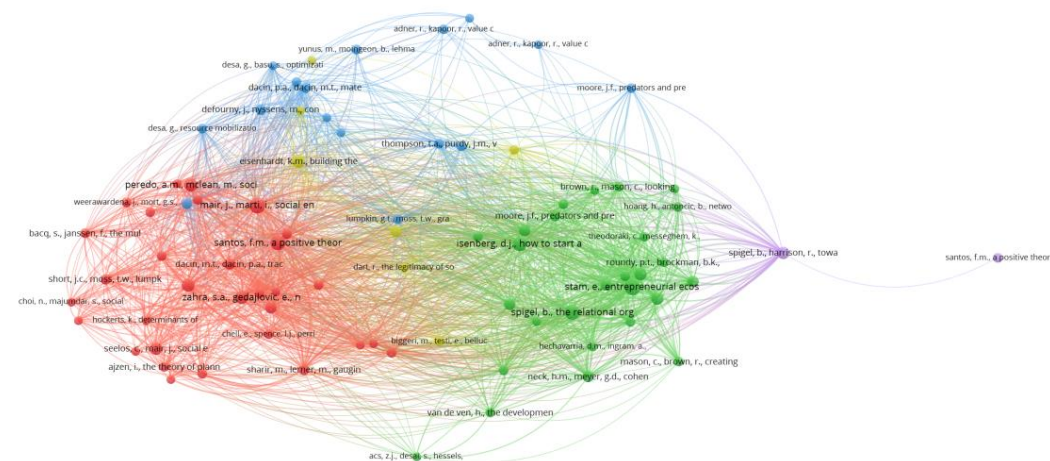

Figure 5. Co-citation network. Source: authors based on VOSviewer software.

Co-citation network analysis also allowed to identify the authors (authors' publications) with the highest degree of centrality. The degree of centrality shows the number of links in the network, the amount of co-citation within our subject area.

- Social entrepreneurship research: A source of explanation, prediction, and delight. *Journal of World Business* 41: 36–44 (Mair and Martí 2006).
- A positive theory of social entrepreneurship. *Journal of Business Ethics* 111: 335–51 (Santos 2012).
- A typology of social entrepreneurs: Motives, search processes and ethical challenges. *Journal of Business Venturing* 24: 519–32 (Zahra et al. 2009).

3.4. Bibliographic Coupling

Bibliographic coupling networks identify papers that have an intersection of the list of references (Figure 6). The link between two papers occurs when they reference a common third work in their bibliographies. It was considered that bibliographic coupling would usefully supplement and extend our understanding of the research domain. The papers with the highest degree of centrality (DC) are:

- Ecosystems in support of social entrepreneurs: a literature review. *Social Enterprise Journal* 17: 329–60. (Diaz Gonzalez and Dentchev 2021). (DC = 212)
- Emerging needs of social innovators and social innovation ecosystems. *International Entrepreneurship and Management Journal* 18: 217–54. (Audretsch et al. 2022). (DC = 174)
- An ecosystem view of social entrepreneurship through the perspective of systems thinking. *Systems Research and Behavioral Science*, 1–16. (Bhardwaj et al. 2022). (DC = 171)
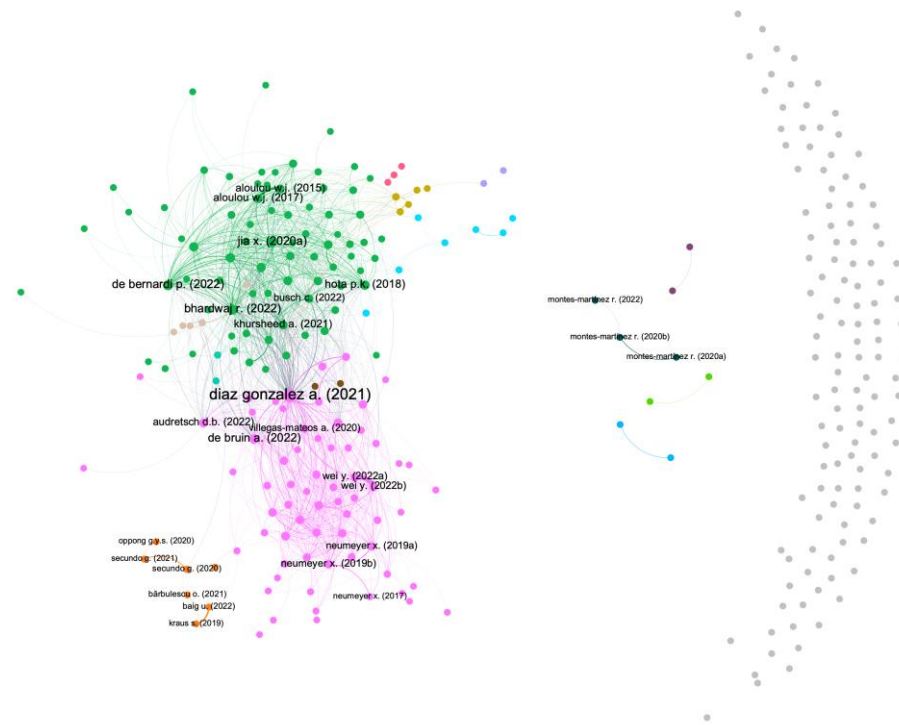

Figure 6. Bibliographic coupling network. Nodes represent articles and the size of the node the degree centrality. Links indicate the number of shared references. All links weighing less than 4 articles were cut off. Source: authors based on VOSviewer version 1.6.19 and Gephi version 0.10.1 software.

The analysis revealed the papers with the highest overlaps in the reference lists. This means that the authors relied on the closest possible theoretical basis and range of sources. The most overlapping papers (36 in common papers) are "Digital Entrepreneurship: A Research Agenda on New Business Models for the Twenty-First Century" (Kraus et al. 2018) and "Digital Entrepreneurship: Future Research Directions and Opportunities for New Business Model" (Baig et al. 2022).

3.5. Co-Authorship Network (Organization Level)

The co-authorship network (Figure 7) illustrates ties between two organizations if their representatives have prepared scientific articles in collaboration with each other. However, the scientific field under study has scant academic connections in co-authoring articles. The analysis revealed unexpected results. The findings showed the formation of national schools. The largest (blue) cluster was formed by international organizations (the United Kingdom, the United States, the Netherlands, Chili, Canada, Germany); see Figure 7b. The orange cluster contains organizations from the United States, India, and Canada. The green cluster is formed by Italian, UK, French, US, and Russian organizations. The yellow cluster represents mainly North American organizations (Canadian, US), with only one exception, a Chinese organization. The brown cluster is composed exclusively of Colombian institutions. It can be assumed that this result is due to the increased attention and debate in these countries on social entrepreneurship and ecosystem factors.
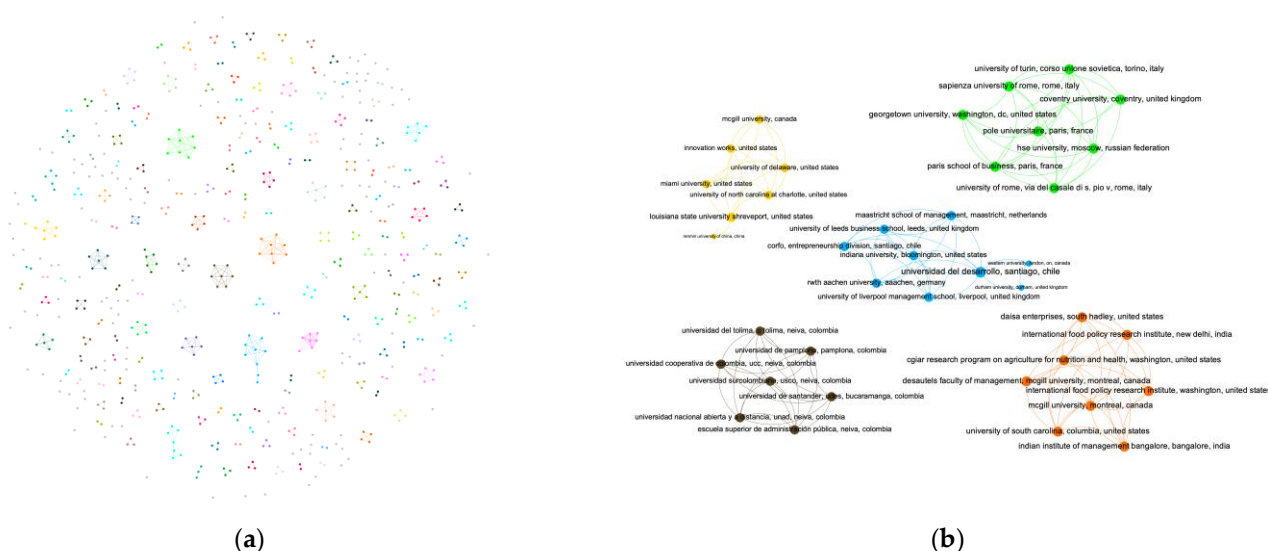
(**a**)   (**b**)

Figure 7. Co-authorship network: (**a**) the full network and (**b**) the top 5 largest clusters. Source: authors based on VOSviewer software.

3.6. Citation

The citation network shows how the selected articles link to each other. Nodes illustrate the papers, and the links are citations (Figure 8). Colors correspond to the clusters with the most closely related documents.
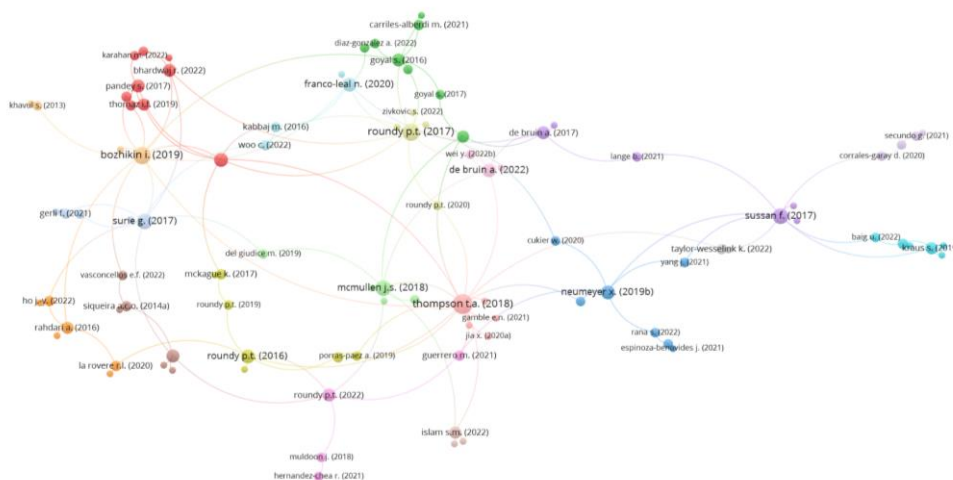

Figure 8. Citation network. Source: authors based on VOSviewer software.

The studies with the highest degree of centrality (indices of citation) are:

- How entrepreneurial ecosystems take form: Evidence from social impact initiatives in Seattle. *Strategic Entrepreneurship Journal* 12: 96–116. (Thompson et al. 2018).
- Social entrepreneurship and entrepreneurial ecosystems: Complementary or disjoint phenomena? *International Journal of Social Economics*, 44(9), 1252–1267. (Roundy 2017a).
- The role of government and key non-state actors in social entrepreneurship: A systematic literature review. *Journal of cleaner production* 226: 730–47. (Bozhikin et al. 2019).

4. Methods

4.1. Bibliometric Analysis

Bibliometric research is an approach to studying science and scientific publications, which includes both classical statistical methods and various methods of text mining and network analysis (Gaviria-Marin et al. 2019; Castillo-Vergara et al. 2018; Phan Tan 2022;

Rey-Martí et al. 2016). Databases of scientific literature abstracts and citations, such as Scopus or Web of Science, allow us to collect and analyze systematized information about scientific research over a long period. This approach provides an opportunity to identify the most central publications, leading authors, and scientific schools in certain fields.

The empirical strategy contains several stages: (1) preparatory stage selection of the research area and keywords for the selection of publications, (2) collection of publications and compilation of a database, (3) data cleaning, (4) data analysis, and (5) interpretation of the results.

4.2. Choice of Database

The source of the database is Scopus—a scientific citation database created by the Elsevier academic publishing house. Scopus includes more than 1.8 billion cited references, 84 million records, 17.6 million author profiles, 948,000 affiliation profiles, and 7000 publishers[1]. The search query of Scopus advanced search consisted of "TITLE-ABS-KEY(Social PRE/5 Entrepreneur*) AND TITLE-ABS-KEY(ecosystem*)". This search algorithm selects articles that contain in the title, abstract, and/or keywords (1) the word "social" before the word "entrepreneur*" at a distance of a maximum of 5 words and (2) the word "ecosystem*". In addition, the "*" operator allows us to find words with different endings. In the case of "entrepreneur*", for example, besides the word "entrepreneur" itself, there will be the words "entrepreneurship," "entrepreneurial," "entrepreneurs," etc. The search was conducted during the last week of November 2022. The resulting database consisted of 357 publications.

4.3. Methods of Analysis

We used four types of networks of bibliographic data (bibliographic coupling, co-citation, citation, and co-authorship) and one type of semantic data. The bibliographic coupling network (Figure 9a) is a network of papers that are linked if they cite the same documents (Phan Tan 2022; van Eck and Waltman 2010, 2014). In other words, two documents could have a strong link if their references overlap. From a methodological point of view, the bibliographic coupling network was a unimodal network of collected papers, which was converted from a bimodal one (in which the 1st level collected papers and the 2nd level was papers from the bibliographic list). The bibliographic coupling network could help us identify the most coherent papers with similar research basis (represented by a reference list). The co-citation network (Figure 9b) is a network of papers that are linked if they are cited by the same document. The citation network (Figure 9c) is a network of papers where one item cites the other. The co-authorship network (Figure 9d) is a network of authors who write papers together. Moreover, the co-authorship network could be aggregated on different levels: authors, organizations, and countries. This network allows us to identify scientific cooperation and schools. The semantic network (Figure 9e) is a network of terms that are used together in the same documents (title, abstract, and/or keywords). Methodologically, the semantic network was a unimodal network of terms, which was converted from a bimodal one (in which the 1st level collected papers and the 2nd level was terms that were used in the papers). The semantic network shows the major topics of the studied field. The degree of centrality was used as a measure of popularity and power and was calculated as the number of node links. Networks allow us to identify relationships within specific areas—in our case, social entrepreneurship and an ecosystem approach. Unlike classical scientometric indicators, we can understand the role of leaders in the focused area. In addition, networks allow us to watch social interactions, which are useful information in behavioral research of the academic world.
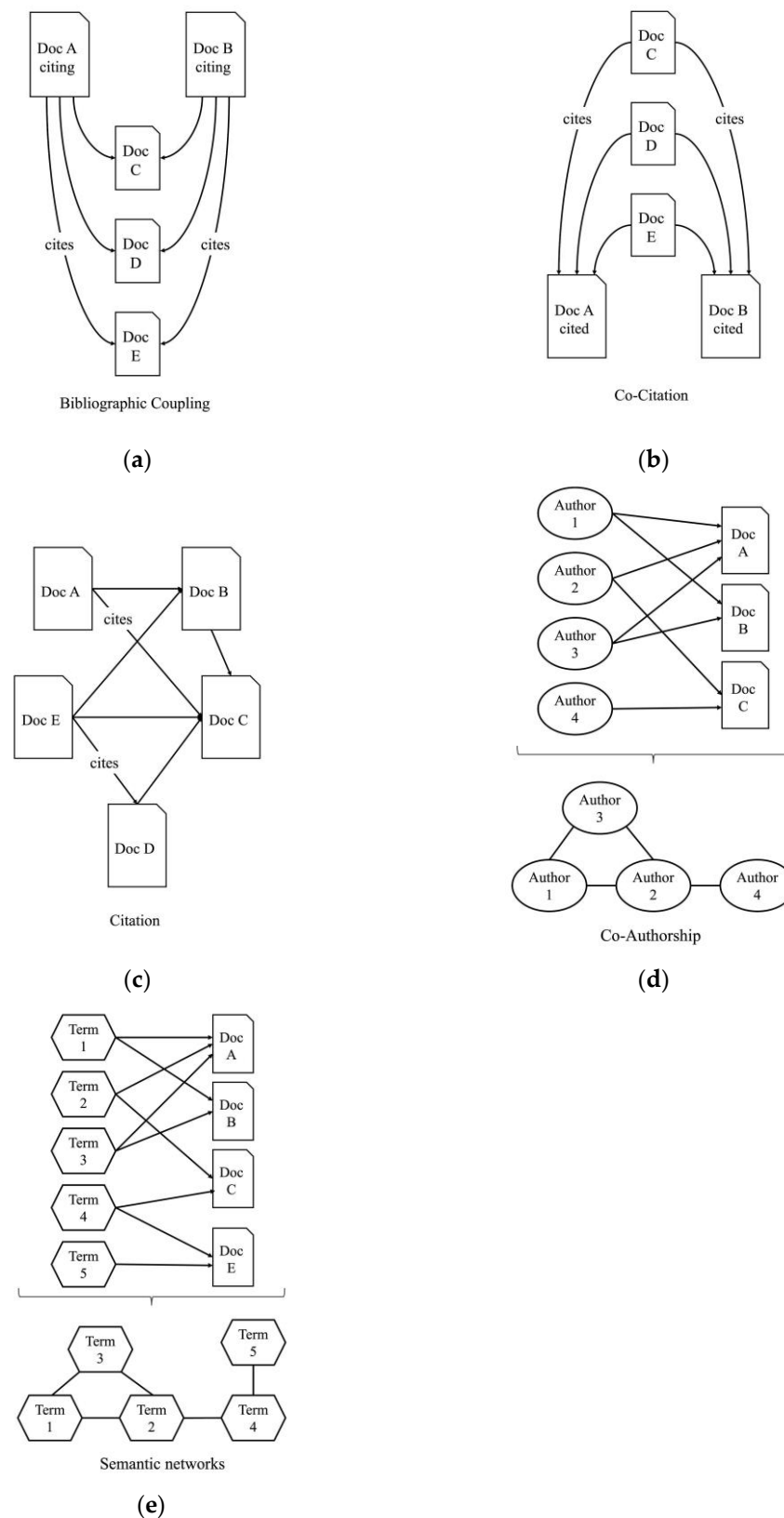
Figure 9. Examples of (**a**) bibliographic coupling, (**b**) co-citation, (**c**) citation, (**d**) co-authorship, and (**e**) semantic networks. Sources: (Phan Tan 2022), *VOSviewer Manual*, and authors.

The descriptive analysis was based on the general indicators taken during data collecting from the Scopus webpage. For example, the number of citations in this block indicated

the total number of citations of a paper in all journals indexed by Scopus. The network analysis was based on calculated indicators exclusively within the collected papers. For example, in the citation network, the number of citations was calculated as the number of links to an article among the selected 357 articles.

5. Conclusions and Discussion

This study was designed to determine the state of the art in the research on social entrepreneurship with respect to the entrepreneurial ecosystem. The analysis showed that social entrepreneurship and the entrepreneurial ecosystem are a hot and relevant topic, attracting the attention of many researchers. We downloaded papers from the Scopus database to focus on high-quality research. In this study, we analyzed papers for the period from 2009 to 2022. Although the field is recent, 357 articles have already been published. The analysis showed the transformation of this direction of research and allowed us to answer the research questions.

First, the main characteristics were identified in the research domain. The leading journal that published the largest number of publications on this topic is the journal *Sustainability* (17 articles). Phillip Roundy is most productive author. The United States leads in the number of published papers on social entrepreneurship and the entrepreneurial ecosystem. Scholars from the University Tecnologico de Monterrey (Mexico) published the highest number of papers on the topic. Second, the most influential paper, "The Digital Entrepreneurial Ecosystem" (Sussan and Acs 2017), was published by the journal *Small Business Economics*, with 271 citations. Third, a significant increase in the number of publications was detected during the analyzed period (2009–2022).

Applying co-citation network analysis, we identified the paper with the highest degree of centrality: "Social Entrepreneurship Research: A Source of Explanation, Prediction, and Delight" (Mair and Martí 2006). The analysis showed which articles are cited the most together in the studies of other researchers. For future research, it would be useful to understand publications with similar ideas.

Bibliographic coupling analysis allowed us to detect papers that have an intersection of the list of references. This is one more approach to identifying the most relevant and influential publications. Appling bibliographic coupling, we identified the most cited article, "Ecosystems in Support of Social Entrepreneurs: A Literature Review" (Diaz Gonzalez and Dentchev 2021).

The citation network shows how the selected articles link to each other and allows us to identify the most central publications. "How Entrepreneurial Ecosystems Take Form: Evidence from Social Impact Initiatives in Seattle" (Thompson et al. 2018), "Social Entrepreneurship and Entrepreneurial Ecosystems: Complementary or Disjoint Phenomena?" (Roundy 2017a), and "The Role of Government and Key Non-state Actors in Social Entrepreneurship: A Systematic Literature Review" (Bozhikin et al. 2019) are the papers with highest degree of centrality.

Thus, the application of different methods allowed us to identify the most influential publications, helpful for future researchers.

The major finding is mapping of the structure of the research domain. Applying network analysis, we distinguished six thematic clusters: "innovations," "gender and women's entrepreneurship," "business models," "policy," "network," and "education."

However, the findings of this study do not support the previous research. Phan Tan (2022) in his analysis highlights key areas in social entrepreneurship, such as management, social entrepreneurs and potential social entrepreneurs, and social innovation. So far, only the theme of "innovation" coincides with the thematic cluster we identified. This discrepancy in the results may be explained by the fact that Tan analyzed social entrepreneurship broadly, without focus on the ecosystem. Significantly, one of the themes highlighted in this bibliographic coupling themes analysis was "institutions and environment," which is close to the "ecosystem" theme and confirms the relevance of researching this aspect of social enterprise. The results obtained in our research are only partly in line with the study of do

Adro and Fernandes (2022). As in our study, the authors pointed out important areas, such as "innovation and value creation," partly related to the topic of "business models" in our analysis. Additionally, the results of this study partially confirm the results of Iskandar et al. (2022). Among the key themes, he identified, as we did, "innovation" and "policymakers and support."

Overall, in contrast to previous publications, we identified themes of "gender and women's entrepreneurship," "networking," and "education." These differences can be explained in part by the relatively narrow focus of our analysis as well as by differences in the methods used and the publication bases analyzed.

The results of the analysis revealed several gaps. First, there is no unified approach to defining and understanding the social enterprise ecosystem, the main actors of the ecosystem, and interconnections of the actors. Gaps are also approaches to identifying the effects and interconnections of the ecosystem and social enterprise. Important gaps are the impact of innovations on social enterprise performances, the impact of business model innovations on consumers, and the role of state and non-state ecosystem actors on the performance of social entrepreneurs and on the behavior of consumers.

Overall, the field of social entrepreneurship and the entrepreneurial ecosystem is a relatively new and fast-developing field. This young research area has many gaps and needs further development, and many key concepts are not operationalized.

This study makes several noteworthy contributions. This study provides insight into the research framework and research agenda on social entrepreneurship and the entrepreneurial ecosystem. These results will be useful in identifying further research directions.

These findings suggest several practical proposals and courses of action for policymakers. The results show that the importance of social entrepreneurship in society is growing, as well as the role of state support (as an important element of the entrepreneurial ecosystem). So far, new mechanisms and models for stimulating social entrepreneurship and the creation of new institutions interacting with social entrepreneurship are become relevant. The role of the state in the development of the social entrepreneurship ecosystem is also to stimulate entrepreneurial networking (e.g., by creating new interaction platforms, holding competitions, creating new networking models) and to develop education specifically in the field of social entrepreneurship. The results have direct implications for business practice. First, social entrepreneurs need to innovate as an effective response to environmental uncertainty, new market demands, and changed consumer expectations. Second, social entrepreneurs need to innovate their business models to achieve better performance. Third, it is important to focus on the digital ecosystem and take steps to be part of it when developing a social enterprise strategy. This brings us back to the recommendations for policymakers, in terms of the need to create educational programs aimed at innovation, including business model innovation and digital innovation for social entrepreneurs.

A number of important limitations need to be considered. This study only analyzed the Scopus database. The scope of this study was limited in terms of bibliometric analysis. The investigation was limited by the methodological approach; in our analysis, we included database publications containing the keywords "social entrepreneurship" and "entrepreneurial ecosystem." However, these phenomena can be used by researchers based on different terminology.

This research has thrown up many issues in need of further investigation. The first set of recommendations relates to approaches to research on the topic. First, further work needs to be done to analyze other databases, such as Google Scholar. Second, a further study could apply different approaches and methods of data analysis, using topic modelling and n-gram networks to identify main trends and changes in the scientific field. Third, another possible avenue of future research is a systematic literature review.

The second group of recommendations is related to theoretical issues. First, there is no generally accepted approach to defining the ecosystem of social entrepreneurship. This needs to be developed, since the actors and interrelationships in the social entrepreneurship

ecosystem represent a separate phenomenon and are substantially different from the ecosystem of another types of entrepreneurships. Second, it is important to develop a systematic approach to measuring the entrepreneurial ecosystem of social entrepreneurship, the degree of development of the entrepreneurial ecosystem, and the effects of the ecosystem on social entrepreneurship. Third, the analysis revealed that the role of state and non-state actors in developing and supporting social entrepreneurship is an extremely important area of research. Fourth, the analysis identified several thematic clusters ("innovations," "gender and women's entrepreneurship," "business models," "policy," "network," and "education"); in each cluster, many open questions and gaps remain, such as approaches to measuring phenomena. Thus, each of the six clusters is a promising area for further research. For instance, innovation in the context of social entrepreneurship is a topic for further research, including the creation of an innovation ecosystem for social entrepreneurship, the impact of social company strategies on the development of innovation activity, and the impact of innovation on the performance of social companies. Additionally, business models of social entrepreneurship represent a promising area for further research, since new business models of social entrepreneurship have been emerging rapidly and it is important to assess their effectiveness. Another topic for future research is education in the context of social entrepreneurship and the entrepreneurial ecosystem, possibly targeting policymakers for the development of the social entrepreneurship support system and social entrepreneurs for their more effective integration into the entrepreneurial ecosystem.

Notes

1   https://www.elsevier.com/solutions/scopus—Downloaded on 15 December 2022.

References

Ahmad, Shabir, and Ishtiaq Bajwa. 2022. Social Entrepreneurship and Economic Development: A Bibliometric Analysis. In *Developments in Corporate Governance and Responsibility*. Edited by David Crowther and Farzana Quoquab. Bradford: Emerald Publishing Limited, pp. 55–75. [CrossRef]

Audretsch, David B., Georg M. Eichler, and Erich J. Schwarz. 2022. Emerging Needs of Social Innovators and Social Innovation Ecosystems. *International Entrepreneurship and Management Journal* 18: 217–54. [CrossRef]

Bacq, Sophie, and Frank Janssen. 2011. The Multiple Faces of Social Entrepreneurship: A Review of Definitional Issues Based on Geographical and Thematic Criteria. *Entrepreneurship & Regional Development* 23: 373–403. [CrossRef]

Baig, Umair, Batool Muhammad Hussain, Ieva Meidute-Kavaliauskiene, and Sigitas Davidavicius. 2022. Digital Entrepreneurship: Future Research Directions and Opportunities for New Business Model. *Sustainability* 14: 5004. [CrossRef]

Bell-Masterson, Jordan, and Dane Stangler. 2015. Measuring an Entrepreneurial Ecosystem. *SSRN Electronic Journal*, 1–12. [CrossRef]

Bhardwaj, Rohit, Saurabh Srivastava, Sunali Bindra, and Sumit Sangwan. 2022. An Ecosystem View of Social Entrepreneurship through the Perspective of Systems Thinking. *Systems Research and Behavioral Science* 40: 250–65. [CrossRef]

Biggs, Reinette, Frances R. Westley, and Stephen R. Carpenter. 2010. Navigating the Back Loop: Fostering Social Innovation and Transformation in Ecosystem Management. *Ecology and Society* 15: art9. [CrossRef]

Bozhikin, Ivan, Janaina Macke, and Luana Folchini da Costa. 2019. The Role of Government and Key Non-State Actors in Social Entrepreneurship: A Systematic Literature Review. *Journal of Cleaner Production* 226: 730–47. [CrossRef]

Castillo-Vergara, Mauricio, Alejandro Alvarez-Marin, and Dario Placencio-Hidalgo. 2018. A Bibliometric Analysis of Creativity in the Field of Business Economics. *Journal of Business Research* 85: 1–9. [CrossRef]

Chell, Elizabeth. 2007. Social Enterprise and Entrepreneurship: Towards a Convergent Theory of the Entrepreneurial Process. *International Small Business Journal: Researching Entrepreneurship* 25: 5–26. [CrossRef]

Colenbrander, Aalt, Aikaterini Argyrou, Tineke Lambooy, and Robert J. Blomme. 2017. Inclusive Governance in Social Enterprises in the Netherlands—A Case Study. *Annals of Public and Cooperative Economics* 88: 543–66. [CrossRef]

Corner, Patricia Doyle, and Marcus Ho. 2010. How Opportunities Develop in Social Entrepreneurship. *Entrepreneurship Theory and Practice* 34: 635–59. [CrossRef]

Dacin, M. Tina, Peter A. Dacin, and Paul Tracey. 2011. Social Entrepreneurship: A Critique and Future Directions. *Organization Science* 22: 1203–13. [CrossRef]

Diaz Gonzalez, Abel, and Nikolay A. Dentchev. 2021. Ecosystems in Support of Social Entrepreneurs: A Literature Review. *Social Enterprise Journal* 17: 329–60. [CrossRef]

Dionisio, Marcelo. 2019. The Evolution of Social Entrepreneurship Research: A Bibliometric Analysis. *Social Enterprise Journal* 15: 22–45. [CrossRef]

do Adro, Francisco, and Cristina Fernandes. 2022. Social Entrepreneurship and Social Innovation: Looking inside the Box and Moving out of It. *Innovation: The European Journal of Social Science Research* 35: 704–30. [CrossRef]

Foster, George, Carlos Shimizu, Steve Ciesinski, Antonio Davila, S. Hassan, Ning Jia, and R. Morris. 2013. Entrepreneurial Ecosystems around the Globe and Company Growth Dynamics. *World Economic Forum* 11: 1–36.

Gaviria-Marin, Magaly, José M. Merigó, and Hugo Baier-Fuentes. 2019. Knowledge Management: A Global Examination Based on Bibliometric Analysis. *Technological Forecasting and Social Change* 140: 194–220. [CrossRef]

Haugh, Michael. 2007. The Discursive Challenge to Politeness Research: An Interactional Alternative. *Journal of Politeness Research. Language, Behaviour, Culture* 3: 295–317. [CrossRef]

Hockerts, Kai. 2017. Determinants of Social Entrepreneurial Intentions. *Entrepreneurship Theory and Practice* 41: 105–30. [CrossRef]

Isenberg, Daniel J. 2010. How to Start an Entrepreneurial Revolution. *Harvard Business Review* 88: 40–50.

Iskandar, Yusuf, Joeliaty Joeliaty, Umi Kaltum, and Hilmiana Hilmiana. 2022. Systematic Review of the Barriers to Social Enterprise Performance Using an Institutional Framework. *Cogent Business & Management* 9: 2124592. [CrossRef]

Kraus, Sascha, Carolin Palmer, Norbert Kailer, Friedrich Lukas Kallinger, and Jonathan Spitzer. 2018. Digital Entrepreneurship: A Research Agenda on New Business Models for the Twenty-First Century. *International Journal of Entrepreneurial Behavior & Research*. ahead-of-print. [CrossRef]

Mack, Elizabeth, and Heike Mayer. 2016. The Evolutionary Dynamics of Entrepreneurial Ecosystems. *Urban Studies* 53: 2118–33. [CrossRef]

Mair, Johanna, and Ignasi Martí. 2006. Social Entrepreneurship Research: A Source of Explanation, Prediction, and Delight. *Journal of World Business* 41: 36–44. [CrossRef]

Malecki, Edward J. 2018. Entrepreneurship and Entrepreneurial Ecosystems. *Geography Compass* 12: e12359. [CrossRef]

Neumeyer, Xaver, Susana C. Santos, António Caetano, and Pamela Kalbfleisch. 2019. Entrepreneurship Ecosystems and Women Entrepreneurs: A Social Capital and Network Approach. *Small Business Economics* 53: 475–89. [CrossRef]

Nybakk, Erlend, Pablo Crespell, Eric Hansen, and Anders Lunnan. 2009. Antecedents to forest owner innovativeness: An investigation of the non-timber forest products and services sector. *Forest Ecology and Management* 257: 608–18. [CrossRef]

Phan Tan, Luc. 2022. Bibliometrics of Social Entrepreneurship Research: Cocitation and Bibliographic Coupling Analyses. *Cogent Business & Management* 9: 2124594. [CrossRef]

Purbasari, Ratih, Chandra Wijaya, and Ning Rahayu. 2019. Interaction of Actors and Factors in Entrepreneurial Ecosystem: Indonesian Creatives Industries. *International Journal of Entrepreneurship*. peer-review.

Rahdari, Amir, Sahar Sepasi, and Mohammad Moradi. 2016. Achieving sustainability through Schumpeterian social entrepreneurship: The role of social enterprises. *Journal of Cleaner Production* 137: 347–60. [CrossRef]

Rey-Martí, Andrea, Domingo Ribeiro-Soriano, and Daniel Palacios-Marqués. 2016. A Bibliometric Analysis of Social Entrepreneurship. *Journal of Business Research* 69: 1651–55. [CrossRef]

Rivera-Santos, Miguel, Diane Holt, David Littlewood, and Ans Kolk. 2015. Social Entrepreneurship in Sub-Saharan Africa. *Academy of Management Perspectives* 29: 72–91. [CrossRef]

Roundy, Philip T. 2017a. Social Entrepreneurship and Entrepreneurial Ecosystems: Complementary or Disjoint Phenomena? *International Journal of Social Economics* 44: 1252–67. [CrossRef]

Roundy, Philip T. 2017b. Hybrid Organizations and the Logics of Entrepreneurial Ecosystems. *International Entrepreneurship and Management Journal* 13: 1221–37. [CrossRef]

Roundy, Philip T. 2019. Rust Belt or Revitalization: Competing Narratives in Entrepreneurial Ecosystems. *Management Research Review* 42: 102–21. [CrossRef]

Roundy, Philip. 2014. The Stories of Social Entrepreneurs: Narrative Discourse and Social Venture Resource Acquisition. *Journal of Research in Marketing and Entrepreneurship* 16: 200–18. [CrossRef]

Saebi, Tina, Nicolai J. Foss, and Stefan Linder. 2019. Social Entrepreneurship Research: Past Achievements and Future Promises. *Journal of Management* 45: 70–95. [CrossRef]

Santos, Filipe M. 2012. A Positive Theory of Social Entrepreneurship. *Journal of Business Ethics* 111: 335–51. [CrossRef]

Shepherd, Dean A., and Holger Patzelt. 2011. The New Field of Sustainable Entrepreneurship: Studying Entrepreneurial Action Linking "What Is to Be Sustained" with "What Is to Be Developed". *Entrepreneurship Theory and Practice* 35: 137–63. [CrossRef]

Small, Henry. 1973. Co-Citation in the Scientific Literature: A New Measure of the Relationship between Two Documents. *Journal of the American Society for Information Science* 24: 265–69. [CrossRef]

Smith, Anne MJ, and Julie McColl. 2016. Contextual Influences on Social Enterprise Management in Rural and Urban Communities. *Local Economy: The Journal of the Local Economy Policy Unit* 31: 572–88. [CrossRef]

Spigel, Ben. 2017. The Relational Organization of Entrepreneurial Ecosystems. *Entrepreneurship Theory and Practice* 41: 49–72. [CrossRef]

Stam, Erik, and Ben Spigel. 2022. Entrepreneurial Ecosystems. In *The SAGE Handbook of Small Business and Entrepreneurship*. London: SAGE Publications Ltd., pp. 407–21. [CrossRef]

Stam, Erik. 2015. Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique. *European Planning Studies* 23: 1759–69. [CrossRef]

Surie, Gita. 2017. Creating the Innovation Ecosystem for Renewable Energy via Social Entrepreneurship: Insights from India. *Technological Forecasting and Social Change* 121: 184–95. [CrossRef]

Sussan, Fiona, and Zoltan J. Acs. 2017. The Digital Entrepreneurial Ecosystem. *Small Business Economics* 49: 55–73. [CrossRef]

Thompson, Tracy A., Jill M. Purdy, and Marc J. Ventresca. 2018. How Entrepreneurial Ecosystems Take Form: Evidence from Social Impact Initiatives in Seattle. *Strategic Entrepreneurship Journal* 12: 96–116. [CrossRef]

Trabskaja, Julia, and Tõnis Mets. 2019. Ecosystem as the Source of Entrepreneurial Opportunities. *Foresight and STI Governance* 13: 10–22. [CrossRef]

van Eck, Nees Jan, and Ludo Waltman. 2010. Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping. *Scientometrics* 84: 523–38. [CrossRef]

van Eck, Nees Jan, and Ludo Waltman. 2014. CitNetExplorer: A New Software Tool for Analyzing and Visualizing Citation Networks. *Journal of Informetrics* 8: 802–23. [CrossRef]

van Eck, Nees Jan, and Ludo Waltman. 2017. Citation-Based Clustering of Publications Using CitNetExplorer and VOSviewer. *Scientometrics* 111: 1053–70. [CrossRef]

Velt, Hannes, Lasse Torkkeli, and Igor Laine. 2020. Entrepreneurial Ecosystem Research: Bibliometric Mapping of the Domain. *Journal of Business Ecosystems* 1: 43–83. [CrossRef]

Zahra, Shaker A., Eric Gedajlovic, Donald O. Neubaum, and Joel M. Shulman. 2009. A Typology of Social Entrepreneurs: Motives, Search Processes and Ethical Challenges. *Journal of Business Venturing* 24: 519–32. [CrossRef]