



Connecting entrepreneurial ecosystem and innovation. Grasping at straws or hitting a home run?

Sanjay Chaudhary^a, Puneet Kaur^{b,c,j}, Alberto Ferraris^{d,e,*}, Stefano Bresciani^{d,f,g},
Amandeep Dhir^{h,i,j}

^a O.P. Jindal Global University, Sonapat, India

^b Department of Psychosocial Science, University of Bergen, Norway

^c Jaipuria Institute of Management, Lucknow, India

^d Department of Management, University of Torino, Italy

^e Laboratory for International and Regional Economics, Graduate School of Economics and Management, Ural Federal University, Russia

^f Department of Industrial Systems Management, Faculty of Materials Science and Technology, VSB-Technical University of Ostrava, Czech Republic

^g University of Nicosia - Nicosia, Cyprus

^h Department of Management, School of Business & Law, University of Agder, Kristiansand, Norway

ⁱ Jaipuria Institute of Management, Noida, India

^j Optentia Research Focus Area, North-West University, Vanderbijlpark, South Africa

ARTICLE INFO

Keywords:

Entrepreneurial ecosystem
Innovation
Entrepreneurs
Entrepreneurial firms
Systematic literature review

ABSTRACT

Why do some regions continuously exhibit productive entrepreneurship while others stagnate? The entrepreneurial ecosystem and innovation are buzzwords within academic research, representing the cultural, economic, social, and political environment supporting productive entrepreneurship. Scholars have examined the linkage between ecosystems and innovation in the past few years, and there is an agreement that the interaction of entrepreneurial actors, institutions, and cultures facilitates new venture development and productive entrepreneurship. However, despite burgeoning research, the entrepreneurial ecosystem still represents a metaphor lacking clarity. There is little agreement on the causal mechanisms driving the entrepreneurial ecosystem and innovation outcomes as the research at the current stage involves diverse views and is currently fragmented. We present a review of ninety-eight articles to synthesize existing research evidence on entrepreneurial ecosystems by identifying the ecosystem aspects maximizing innovative capacity. The content analysis reveals three predominant themes: (1) the role of universities, (2) the role of entrepreneurial actors, and (3) innovation as an outcome of the entrepreneurial ecosystem. The findings highlight scholarly attention on the interactions between elements of the entrepreneurial ecosystem and reveal the crucial role of entrepreneurial actors as drivers of innovation. We contribute to the prior research by offering an overview of predominant themes and proposing a conceptual framework. Shedding light on the intersection between the entrepreneurial ecosystem and innovation is a potential pathway for future ecosystem research.

1. Introduction

Rapid changes in the external environment have led to an unprecedented transformation in economic activities, and innovation is now crucial to the survival of organizations that are at risk of losing their competitive position (Christofi et al., 2015; Ozdemir et al., 2022; Talwar et al., 2021a,b). Organizations must unleash new products and disrupt the current path of knowledge creation by recognizing new

opportunities for sharing knowledge related to new products and markets within their networks (De Brito and Leitão, 2021; Kaur et al., 2020a; Van De Ven, 1993). Researchers have elucidated how factors outside the organization contribute to innovation success, resulting in value creation and appropriation (Cavallo et al., 2019; Chaudhary et al., 2022). There is an agreement in the literature that innovation success is based on shared resources, spillovers, networks, and institutional support in a turbulent environment (Huang-Saad et al., 2018; Khan et al., 2021;

* Corresponding author. Department of Management, University of Torino, Italy.

E-mail addresses: sanjaychaudhary@jgu.edu.in (S. Chaudhary), puneet.kaur@uib.no (P. Kaur), alberto.ferraris@unito.it (A. Ferraris), stefano.bresciani@unito.it (S. Bresciani), amandeep.dhir@uia.no (A. Dhir).

<https://doi.org/10.1016/j.technovation.2023.102942>

Received 28 December 2021; Received in revised form 6 September 2023; Accepted 2 December 2023

Available online 15 December 2023

0166-4972/© 2023 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Ritala and Gustafsson, 2018; Suchek et al., 2021). Interactions between individuals, organizations, institutions, infrastructure, and regional-level initiatives promote innovation-based start-ups (Grimaldi et al., 2011) and technology entrepreneurship (e.g., incubators; Acs et al., 2017). Hence, the need for a supportive ecosystem to access knowledge resources and connect with different actors within a location or geographic area has become pertinent for sustaining innovation and entrepreneurship (Cao and Shi, 2020; Stam, 2015).

Entrepreneurial ecosystem research addresses the crucial linkage between organizational and contextual factors resulting in new knowledge creation and implementation of innovation by entrepreneurs (Wurth et al., 2021). The ecosystem metaphor derives from biology, evoking interactions among organisms within a particular environment (Cavallo et al., 2019). The analogy also highlights the complexity and interdependencies as a feature of the entrepreneurial ecosystem as scholars theorize an entrepreneurial ecosystem as a network of actors interacting formally and informally within the external environment (Brown and Mason, 2014). An ecosystem entails an evolutionary approach in which individual and collective learning occurs over a period, resulting in innovation at a collective level (Acs et al., 2017; Mack and Mayer, 2016). A functioning ecosystem may result in the rise of innovation commercialization at academic institutions via joint ventures with private and public bodies and start-up creation (Huggins and Williams, 2011). The success of the ecosystem exemplifies the invention of new products and services, resulting in successful start-ups being scaled up globally, which in turn creates an impact in the form of regional innovation and productive entrepreneurship (Cavallo et al., 2019; Thompson et al., 2018).

While the growing literature on entrepreneurial ecosystems emphasizes a relationship with productive entrepreneurship, critics have pointed out the varying uses of the term *entrepreneurial ecosystem* and its value beyond the extant scholarly discourse for concepts like clusters, innovation systems, and triple-helices (Brown and Mason, 2017). The conceptualization of an entrepreneurial ecosystem is currently viewed as a metaphor for economic development, where the environment facilitates innovation, and scholars have considered the phenomenon of the entrepreneurial ecosystem as tautological. There is a lack of understanding of how the ecosystem forms (Thompson et al., 2018) and whether it leads to various forms of innovation (Stam, 2015). It is likewise unclear how various actors interact with each other in the evolution of entrepreneurial ventures (Stam, 2015).

Moreover, despite attempts to provide a consolidated view of entrepreneurial ecosystem research, we find no systematic literature review (SLR) articulating the linkages between entrepreneurial ecosystems and innovation (Marshall et al., 2019). Despite a sheer number of studies theorizing drivers and outcomes of the entrepreneurial ecosystem, the field remains thematically fragmented, and we lack a theoretical underpinning on the linkage between the entrepreneurial ecosystem and innovation outcomes (Wurth et al., 2021). Accordingly, conceptualizing the entrepreneurial ecosystem and its linkage with the innovation ecosystem remains a widely debated issue (Ritala and Gustafsson, 2018). Questions remain about whether all entrepreneurs innovate and when and where entrepreneurs innovate (Autio et al., 2014). What role “place” play in facilitating entrepreneurial innovation? What different configurations of the entrepreneurial ecosystem result in innovation success (Wurth et al., 2021)?

In brief, ambiguity remains due to diverse views regarding the topic and its conceptualization and overlap with related areas (Ritala and Gustafsson, 2018). Researchers are still debating conceptualizations and empirical approaches regarding regional drivers of innovation (Ritala and Gustafsson, 2018) and identifying crucial action points supporting an entrepreneurial ecosystem’s genesis and outcomes (Cavallo et al., 2019). The literature fails to explain how the entrepreneurial ecosystem leads to innovation implementation and what are its underlying causal mechanisms (Stam, 2015). A better understanding requires having knowledge of the interactions between various actors and governance

mechanisms in which entrepreneurial firms operate (Marshall et al., 2019). Specifically, we attempt to answer three key research questions (RQs): **RQ1**. What is the profile of extant research on the entrepreneurial ecosystem and innovation? **RQ2**. What are the predominant themes? **RQ3**. Based upon emergent themes, what are research questions for future research?

We attempt to synthesize existing research evidence on the linkage between the entrepreneurial ecosystem and innovation implementation to answer the above gaps. Literature reviews play a crucial role in developing the field by summarizing the existing literature, generating replicable findings (Snyder, 2019), and offering areas for future research (Christofi et al., 2021a, b). We employ an SLR methodology to review the existing literature on the entrepreneurial ecosystem and innovation implementation. As research questions are needed to guide the systematic review (Kraus et al., 2020; Kraus et al., 2022), our SLR is motivated by three broad research objectives. First, we attempt to bring insight to the empirical research investigating the concept of an entrepreneurial ecosystem. Second, we examine the linkages between the entrepreneurship ecosystem and innovation. Third, we examine the drivers and outcomes of the entrepreneurship ecosystem.

To address **RQ1**, we derived descriptive statistics by summarizing the theories and methods adopted. In doing so, we identified and collected literature on the entrepreneurial ecosystem and innovation relevant to our topic of interest. We addressed **RQ2** by performing a thematic analysis, which is increasingly employed in SLRs to delineate key emerging themes in the prior literature and highlight research gaps. Finally, we answered **RQ3** by proposing a conceptual framework based on the identified emerging themes and research gaps.

By systematically analyzing the literature on the entrepreneurial ecosystem and performing a thematic analysis of the prior studies, we attempt to contribute in the following ways. First, we provide a reproducible and consolidated view of entrepreneurial ecosystem and innovation research by identifying emerging trends. The conceptualization of the entrepreneurial ecosystem has often been criticized as under-theorized, with a lack of agreement on how linkages between actors shape innovation. There is a lack of clarity on why all entrepreneurial ventures do not innovate within the ecosystem (Autio et al., 2014). As decision-making within an ecosystem calls for a thorough understanding of dynamic interactions between actors (Brown and Mason, 2017), we contribute to theory and practice by clarifying the mechanisms resulting in the successful leverage of the external environment. The findings pinpoint that interaction between ecosystem elements, such as entrepreneurs, research institutions, universities, and other actors, fosters innovation (Granstrand and Holgersson, 2020). While entrepreneurs are central actors driving innovation within an ecosystem by leveraging resources from other actors like government, incubators, and accelerators (Hernández-Chea et al., 2021; Pustovrh et al., 2020), universities contribute to the ecosystem by conducting research and contributing to skill building (Theodoraki and Meseghem, 2017).

Second, we find how the interaction of numerous actors facilitates or constrains entrepreneurial ventures within a particular geography. The entrepreneurial ecosystem comprises two broader components: institutional arrangement and resource endowment (Stam and van de Ven, 2021). While the institutional arrangement includes the institutional actors, culture, and networks necessary for productive entrepreneurship, the resources endowment includes physical resources, leadership, human capital, and knowledge allow successfully implement innovation, the ecosystem must allow for the interaction of different factors, including structural, organizational, and cultural factors (Audretsch and Belitski, 2017).

Third, although the entrepreneurial ecosystem and innovation concepts often overlap, they seem distinct. In contrast to the innovation literature, the entrepreneurial ecosystem literature views the crucial role of individual entrepreneurs and entrepreneurial teams in identifying and exploiting entrepreneurial opportunities (Audretsch et al., 2019). We describe the causal mechanisms linking the entrepreneurial

ecosystem with innovation implementation and contribute to practice by explaining how innovation's success depends on the holistic understanding of various ecosystem components instead of focusing on individual actors. Situating innovation as the center of entrepreneurial ecosystem research allows for a close examination of organizational attributes and exogenous regional factors that result in innovation. Organizations must realize that they need to adapt and reconfigure their strategies to manage collaborations within the ecosystem and drive innovation (Hakala et al., 2020).

The structure of the study is as follows. Section 2 briefly overviews the entrepreneurial ecosystem and its theorized relationship with innovation. Section 3 explains our study's methodology and outlines the selected studies' descriptive statistics. Section 4 presents the findings of the thematic analysis of the avenues of future research. Sections 5 and 6 illustrate the conceptual framework and provide discussions.

2. Conceptualization and scope of this review

2.1. Entrepreneurial ecosystem

Ecosystem research has gained popularity due to the works of Moore (1993) and Isenberg (2010). Hesiod coined the term ecosystem around 700 BCE (Audretsch et al., 2019). A literature review points out the varied definitions of the ecosystem. Moore (1993) theorized *business ecosystems* as a cluster of interacting actors, such as firms, research parks, universities, and the government, that co-exist and evolve. Porter (1996) provided a theoretical underpinning for entrepreneurial ecosystems by suggesting that the configuration of resources enhances entrepreneurial ecosystem performance beyond factors of production influencing economic performance. Cohen (2006) subsequently coined the term *entrepreneurial ecosystem* and theorized it as interrelated actors in a particular geography committed to sustainable development. Deviating from the dominant view on the role of individual entrepreneurs as the drivers of productive entrepreneurship, entrepreneurial ecosystem research focuses on entrepreneurship as a broader phenomenon focusing on social, institutional, organizational, and market dimensions (Zahra, 2007). The first component, “*entrepreneurial*”, refers to a process resulting in the exploration and exploitation of new opportunities (Shane and Venkataraman, 2000). The second component, *ecosystem*, is related to biology and highlights the interaction between actors (Stam, 2015). Audretsch and Belitski (2017) defined an entrepreneurial ecosystem as a network of institutional and organizational actors that interact to identify and commercialize entrepreneurial opportunities. Spiegel (2017) theorized the entrepreneurial ecosystem as an interaction between cultural perspectives, social networks, institutions, and governance mechanisms, creating an environment for innovation-based ventures.

The interest in entrepreneurial ecosystem closely resembles research in management concepts such as industrial districts (Krugman, 1991), inter-organizational networks (Shipilov and Gawer, 2020), industry clusters (Pitelis, 2012), entrepreneurial environments (Van De Ven, 1993), ecosystems (Adner, 2017), regional innovation systems (Cooke, 2001), triple helixes (Leydesdorff and Etzkowitz, 1998), entrepreneurial regional innovation systems (Cooke et al., 1997), and innovation ecosystems (Adner, 2006). All the above works popularized the idea that the forces outside the firm, which include the external environment, community, and culture, have a significant effect on the entrepreneurial process and innovation over and above the role of the entrepreneur (De Brito and Leitão, 2021; Stam, 2015).

Prior research shows how an entrepreneurial ecosystem based on supportive policies and culture creates a social and economic system supporting value creation and innovation (Autio et al., 2014; Fritsch, 2013; Mack and Mayer, 2016). As an illustration, Van de Ven (1993) theorized four components of the ecosystem: institutional mechanisms, resource endowments for generating scientific knowledge, market demand for the products offered, and proprietary business activities that enable private entrepreneurs to develop innovation. Likewise, Isenberg

(2010) grouped elements of the entrepreneurial ecosystem into six domains: institutional support, culture, leadership, availability of finance, human capital, and markets. The interaction of the above-mentioned elements results in productive entrepreneurship (Stam, 2015). In a similar vein, Cukier et al. (2016) linked the entrepreneurial ecosystem to start-ups located in a given geographical area formed by a network of actors that interact to create new start-ups and develop existing ones. The supporting elements include physical elements, such as organizations supporting business-to-people interaction, financial institutions, and universities, and non-physical elements, such as culture and regulations (Theodoraki and Meseghem, 2017). In brief, the entrepreneurial ecosystem emphasizes the complex relationships among various institutional actors, resulting in value creation (Acs et al., 2014; Auerswald, 2015).

We observed an increasing number of systematic reviews on the entrepreneurial ecosystem that provide pathways for theory building (see Wurth et al., 2021). The contributions of the prior review studies are as follows. To begin with, Brown and Mason (2017) elaborated on the role of actors—professional service providers, banks, and venture capitalists—as resource providers in the entrepreneurial ecosystem. Kansheba and Wald (2020) discussed the antecedents and outcomes of the entrepreneurial ecosystem. The authors pointed out the role of culture, institutions, and infrastructure as precursors of the entrepreneurial ecosystem and the diffusion of technology as a potential entrepreneurial ecosystem outcome. Cao and Shi (2020) contextualized the entrepreneurial ecosystem in emerging economies by proposing a model based on the interaction of resources, institutions, and structure. Cho et al. (2021) pointed out that scant attention has been paid to the entrepreneurial ecosystem's evolutionary aspect and processes underlying its dynamics. The authors theorized that the entrepreneurial ecosystem is not technology and industry-specific; it allows regions to evade the *specialization trap* and adapt to global changes. Recently, Wurth et al. (2021) identified variables that exhibit the causal relationship linking the entrepreneurial ecosystem with firm-level outcomes. The authors suggested emerging trends, namely dynamics of innovation and entrepreneurship.

Despite numerous reviews explicating varied definitions, drivers, and outcomes of entrepreneurial ecosystems as well as the role of various actors, we noted a lack of reviews linking entrepreneurial ecosystems with innovation. Moreover, extant reviews fail to clarify what role various actors play in shaping innovation outcomes.

2.2. Entrepreneurial ecosystems and innovation

Entrepreneurship and innovation research has shifted towards a community-based perspective, theorizing interaction among the social and cultural forces shaping the ecosystem (Stam and van de Ven, 2021). Scholars and practitioners increasingly agree on the usefulness of the entrepreneurial ecosystem for explaining innovation implementation (Du Plessis and Boon, 2004; Ritala and Gustafsson, 2018), and have inquired whether the ecosystem analogy can be used to describe innovation as a phenomenon that evolves under the influence of varied interactions in the ecosystem. To start new businesses, the interconnectivity of entrepreneurs, the external environment, institutions, and other community members is crucial for driving creative destruction. Entrepreneurs need to develop interdependent relationships with community members to access knowledge and material resources, human capital, and regulatory approval licenses from various government agencies. The entrepreneurial ecosystem facilitates creating and capturing the value through innovation that a single firm finds difficult to achieve.

Nonetheless, despite the theorized linkage between ecosystems and innovation, the entrepreneurial ecosystem differs from the innovation ecosystem as it theorizes the ability of an entrepreneur to access external resources and innovate (Spiegel and Harrison, 2008).

First, while the national system of innovation literature focuses on a

top-down approach, entrepreneurial ecosystem literature focuses on bottom-up approach initiatives by individual entrepreneurs and entrepreneurial teams. Second, while concepts like innovation systems are regional and territory-specific, the sustainability of the entrepreneurial ecosystem hinges on its heterogeneity (Cho et al., 2021). Third, the entrepreneurial ecosystem points out the entrepreneur's role as the ecosystem's creator and builder (Spigel, 2017; Stam, 2015), and focuses on the knowledge of entrepreneurs regarding the entrepreneurial process, which includes opportunity recognition and exploitation (Spigel and Harrison, 2008). The entrepreneurial ecosystem focuses on productive entrepreneurship, with a strong focus on innovation and growth (Stam, 2015).

Succinctly, the entrepreneurial ecosystem encompasses interdependent actors and a governing mechanism that aggregates and codifies knowledge, enabling innovation and productive entrepreneurship (Stam 2015). Fig. 1 illustrates the conceptualization of the entrepreneurial and innovation system.

3. Method

Systematic literature review (SLR) as a methodology has been elaborated upon in numerous studies (see Tranfield et al., 2003). An SLR has numerous advantages over other forms of reviews. First, it allows for synthesizing a specific research area (Witell et al., 2016). Second, it allows the reduction of errors and biases due to the high quality of the review procedure (Leonidou et al., 2018). The systematic literature review (SLR) in management research allows a comprehensive literature review that is transparent, clear, and replicable (Aman and Seuring, 2021; Calabrò et al., 2019). The process is valid and replicable as it is based on predefined steps employed in the review (Christofi et al., 2017; Khanra et al., 2020). The methodological rigor in an SLR study is similar to any empirical research (Mariani et al., 2021; Pittaway and Cope, 2007). Finally, an SLR enables researchers to integrate extant knowledge on a given topic or field of research (Nofal et al., 2018).

The three different stages of the SLR process are planning, selection, and descriptive analysis. Fig. 2 exhibits the overview of the study methodology.

3.1. Planning the systematic review

Our review is based on peer-reviewed empirical articles covering the entrepreneurial ecosystem published in academic journals up to June 1, 2021. We reviewed peer-reviewed journal articles as these publications are believed to be of higher quality than other articles, such as book chapters and conference proceedings. We focused on studies theorizing the entrepreneurial ecosystem concept, emphasizing entrepreneurship and innovation in territorial boundaries. We identified keywords using a multi-stage process. In the first stage, we searched for keywords on Google Scholar to identify articles available in the literature. Specifically, following prior SLRs, we reviewed the first 100 results to update our keywords list. The keywords selected were “ecosystem,” “entrepreneurship,” and “innovation.” We examined leading journals from the entrepreneurial ecosystem and innovation system areas to confirm whether our list of keywords was exhaustive. In this step, we expanded our initial keywords to include “start-up” and “new ventures.” The final list of search strings employed was (entrep* AND ecosys* AND innov*) OR (start-up* AND ecosys* AND innov*) OR (‘New ventures* AND ecosys* AND innov*).

3.2. Selection criteria: identify, evaluate, and extract articles

Our review began searching through the Scopus and Web of Science (WOS) databases for empirical studies on entrepreneurial ecosystems (Cavallo et al., 2019). Both of these databases extensively cover management and entrepreneurship journals and are widely used in systematic reviews (Kaur et al., 2020a,b). The search covered articles published before June 1, 2021. The combined search (without duplicates) resulted in 1260 articles. We limited our review to peer-reviewed empirical articles published in English discussing the entrepreneurial ecosystem and innovation topics. During the initial screening, we read the articles' titles, abstracts, and keywords. To eliminate irrelevant articles, we required that the terms *entrepreneurial ecosystem* and *innovation* were included in the title, abstract, or keywords. This step allowed articles containing both keywords to pass through the initial readings. The research articles addressing both the entrepreneurial ecosystem and innovation were retained.

Specifically, the studies that addressed the ecosystem without

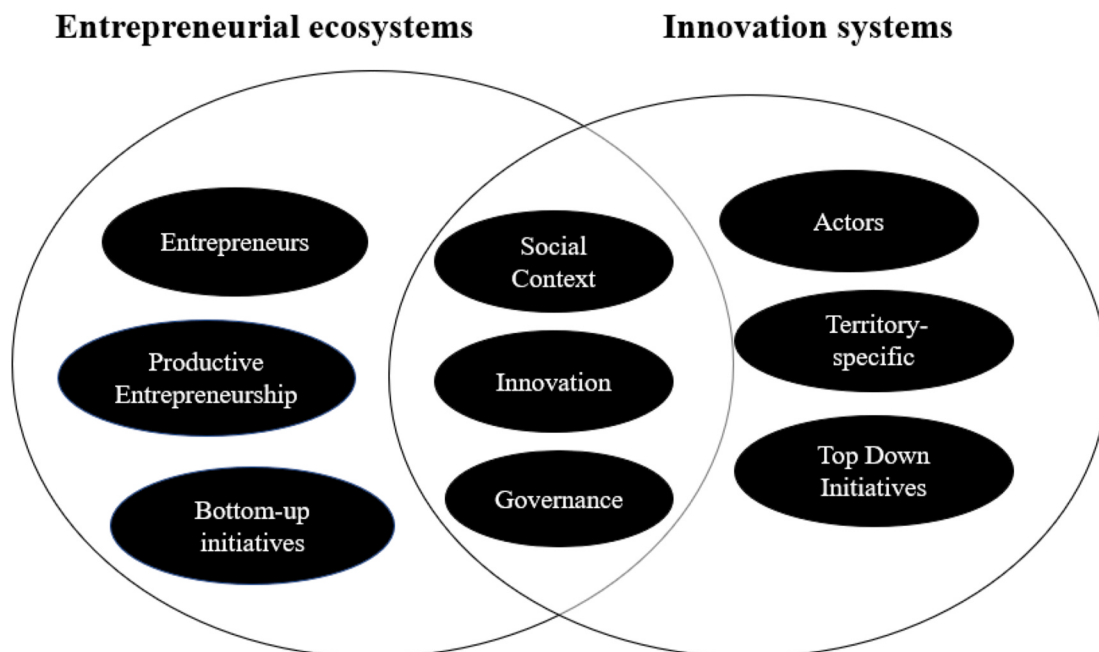


Fig. 1. Conceptualization of entrepreneurial ecosystems and innovation systems.

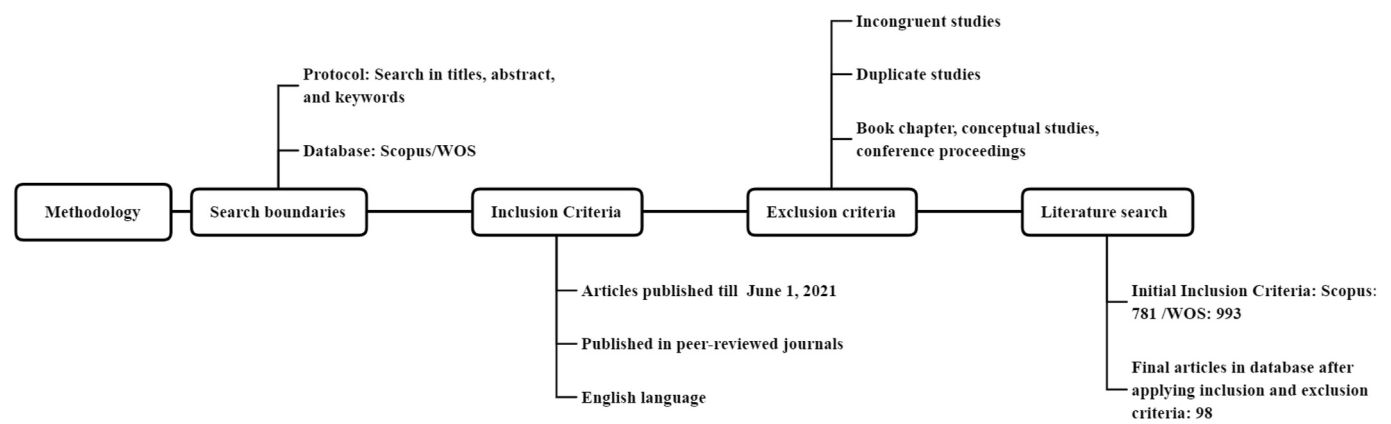


Fig. 2. Inclusion and exclusion criteria.

discussing entrepreneurship and innovation were removed. We excluded calls for papers, editorials, literature reviews, and conceptual papers. Finally, we read all the articles in their entirety to ensure theoretical and empirical relevance. This resulted in a final database of 98 studies. Fig. 2 illustrates the inclusion and exclusion criteria.

3.3. Descriptive analysis

Assessing the quality of extant research is a challenging task with inherent interpretive bias. In the first stage, we read all the selected papers. This process involved data extraction, including publication details, geography, and methodology (quantitative, qualitative, or mixed-method). This step aided us in capturing descriptive statistics, which include the source of study, year of publication, authors' details, theoretical underpinnings, methodology applied, and theoretical lenses. We employed the information generated from descriptive analysis to exhibit the research profile of the study.

The year-wise publication statistics (Fig. 3) reveal that few studies on the entrepreneurial ecosystem and innovation were published until 2015. However, we observed a rapid upward publication trend regarding the number of papers published after 2015. Fig. 3 exhibits the publishing trend. Concerning the source of publication, the prominent journals include *Small Business Economics*, *Journal of Technology Transfer*, *Technology Forecasting and Social Change*, *Journal of Enterprising*

Communities, Sustainability, and *Review of Management Science*. The list of journals with a minimum of three research articles is given in Fig. 4 below. The geography covered by these papers skews toward Europe and North America. We noted comparatively lesser research in South America, Asia, Australia, and Africa. Fig. 5 illustrates the geographical coverage of articles.

Regarding methodology (see Fig. 6), we found employment of qualitative (55%), quantitative (41%), longitudinal (2%), and mixed method (2%) approaches (Fig. 6). While qualitative studies provide rich insights into elements of the entrepreneurial ecosystem (Stam and van de Ven, 2021), the quantitative approach complements the qualitative methods by describing how the entrepreneurial ecosystem's configuration reveals productive entrepreneurship (Spigel, 2017). However, the employment of qualitative methods instead of quantitative research designs makes it difficult to generalize the findings.

Moreover, there seems to be an agreement on its evolutionary nature, calling for a longitudinal perspective to understand its genesis and outcomes (Cho et al., 2021).

Extant research recognizes that the path dependency and the role of the temporal dimension of the entrepreneurial ecosystem as ecosystem drives changes in culture and local institutions over a period of time. The level of productive entrepreneurship and innovation are due to industry growth and decline, changes in governance and ownership, and changes in rules and regulations (Autio et al., 2014). A longitudinal dataset can

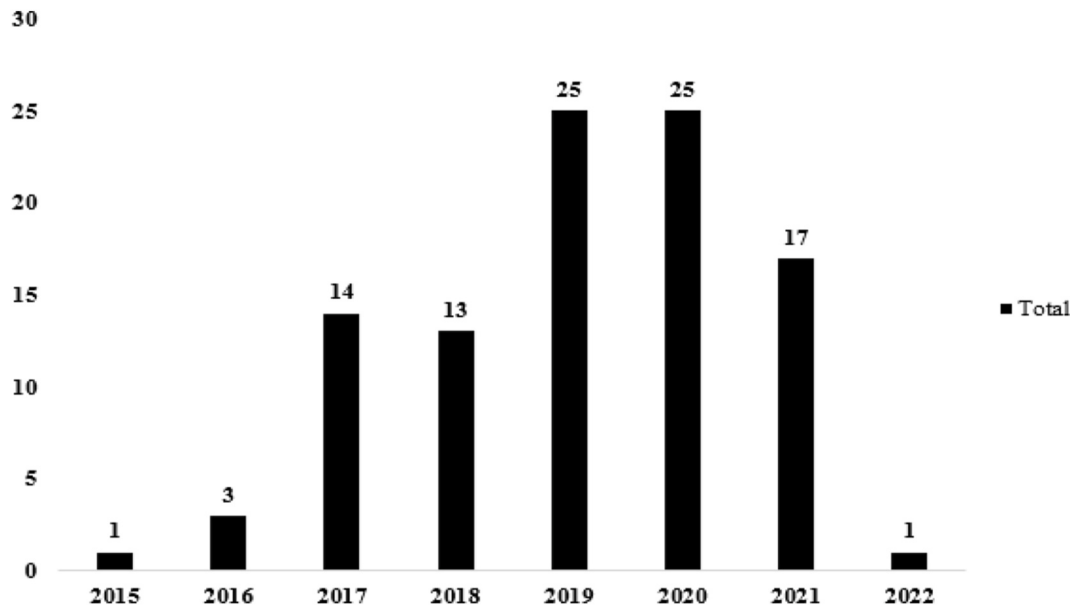


Fig. 3. Overview of the publication trend.

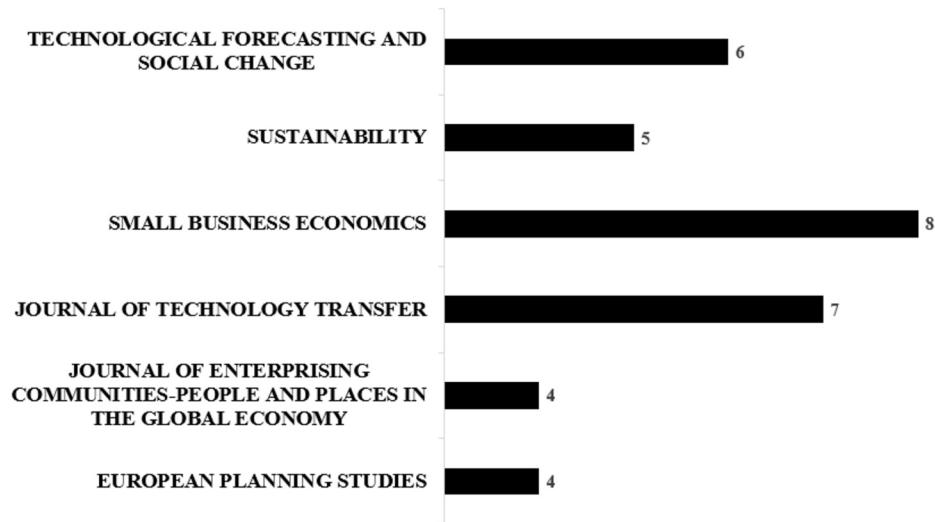


Fig. 4. Source of publication.

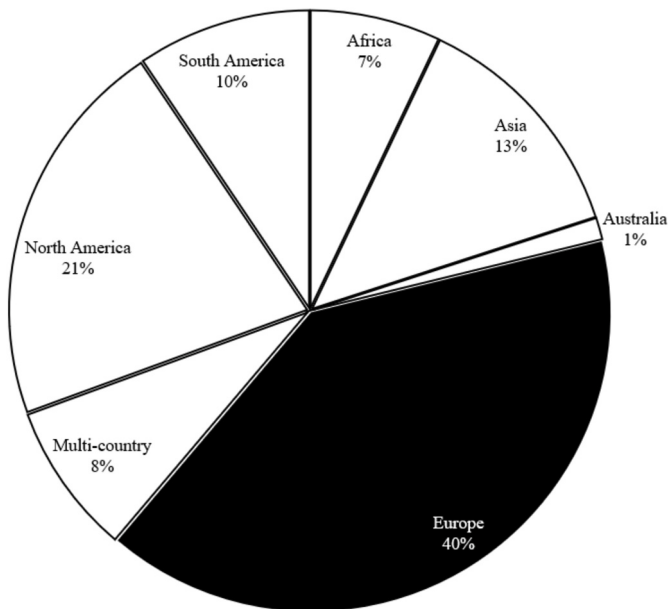


Fig. 5. Geographical coverage of articles.

advance our understanding of the genesis of entrepreneurial ecosystems and their impact on economic development (Schwab and Zhang, 2019). Beyond the quantitative approach, another potential area stems from the need for replication studies to increase our confidence in the literature findings. A fuzzy-set qualitative comparative analysis could identify factors that are associated with a high level of entrepreneurial activity in the region. In addition, experimental research designs can enable theory building by providing knowledge about causal mechanisms leading to the emergence of entrepreneurship (Williams et al., 2019).

Finally, the review of the literature illustrates that the entrepreneurial system concept is used metaphorically, with sparse research linking the entrepreneurial ecosystem to a variety of theoretical lenses, which includes innovation system literature (e.g., Duarte et al., 2021), knowledge spillover theory (e.g., Yi et al., 2021), and network theory (Marshall et al., 2019). Notably, more work is required to apply multiple theories to further distinguish the entrepreneurial ecosystem from other related concepts.

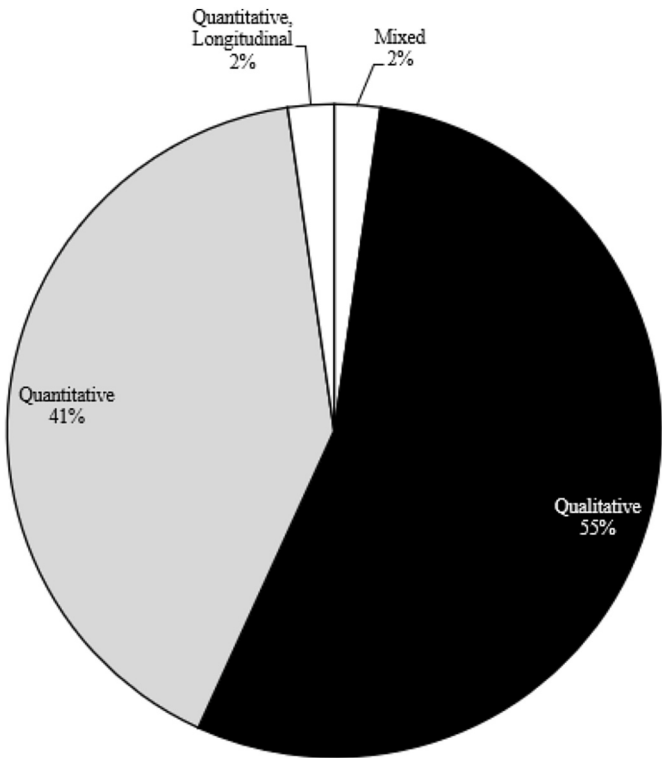


Fig. 6. Research methodology.

Specifically, the concept of the ecosystem is based on the premise that the concentration of entrepreneurial organizations within a geographical region results in innovation and economic growth (De Brito and Leitão, 2021). Innovation literature investigates how actors and institutions generate, diffuse, and exploit innovations without explicitly referencing entrepreneurs and entrepreneurship (Carayannis et al., 2018; Granstrand and Holgersson, 2020; Hu and Hughes, 2020; Qian et al., 2013). We noted that the extant research on the triple helix and quadruple helix models demonstrates that the collaboration between universities and various other actors in the entrepreneurial ecosystem is an essential prerequisite for innovation outcomes (Brem and Radziwon, 2017; Carayannis and Campbell, 2009; Leydesdorff and Etzkowitz, 1998). The triple helix refers to the dynamic relationship

between the university–industry–government, resulting in successful innovation within the ecosystem and illustrating the interactions between actors (Carayannis and Campbell, 2009; Sarpong et al., 2017).

Likewise, the basic premise of knowledge spillover theory is that entrepreneurial behavior is a consequence of opportunities arising from knowledge spillovers (Acs et al., 2013). The knowledge spillover theory explains the role of knowledge as the driver of innovation by converting spillover from under-exploited expertise into a piece of new knowledge. The entrepreneurial ecosystem emerges due to knowledge spillovers and closer interaction between universities, R&D labs, and individual actors (Mason and Brown, 2013; Yi et al., 2021). The knowledge received from spillovers allows entrepreneurial firms to develop knowledge management processes, resulting in innovation (Yi et al., 2021). In case knowledge created by incumbent firms is not fully utilized, it creates an opportunity for entrepreneurs to absorb knowledge spillovers and commercialize external knowledge (Acs et al., 2013).

The literature review further shows that knowledge is widely distributed among heterogeneous actors, and the interactions between actors are crucial for new knowledge creation and innovation (Autio et al., 2014). Network theory enables the analysis of multiple interactions between actors and provides a thorough understanding of the role of multiple actors in creating knowledge spillovers and the entrepreneurial success of entrepreneurial ventures of different sizes and at different stages of the life cycle. Specifically, the ecosystem literature draws from network theory to explicate entrepreneurial ecosystem conceptualizations involving a network of actors (Adner and Kapoor, 2010; Ritala and Gustafsson, 2018), with an emphasis on formal and informal interactions between actors of an ecosystem resulting in entrepreneurial activities (Marshall et al., 2019; Stam, 2015). As an illustration, the strength of local networks for entrepreneurial ventures is more critical as start-ups rely on a network of various stakeholders to address the unique challenges they face (Cohen, 2006).

4. Findings

To systematically synthesize selected studies on the entrepreneurial ecosystem, we attempted to identify the common themes. We followed extant research to conduct thematic analysis and identify emergent themes (Cao and Shi, 2020; Pittaway and Cope, 2007). We conducted thematic coding at two levels. In stage 1, abstracts were reviewed to generate open codes. Then, we reviewed the existing coded data in the second stage to generate axial codes. Specifically, we read each paper in detail and coded the data in Microsoft Excel to extract key themes. After that, themes were synthesized to propose a conceptual framework and research gap. The thematic analysis revealed three predominant themes, (1) the role of universities, (2) the role of entrepreneurial actors, and (3) innovation outcomes of entrepreneurial ecosystems.

The emergence of an ecosystem depends on events involving the interaction of actors transcending organizational boundaries (Van De Ven, 1993). Different actors, including individual entrepreneurs and entrepreneurial firms (Yi et al., 2021), and accelerators (Feldman et al., 2019; Goswami et al., 2018), impact the birth and evolution of the entrepreneurial ecosystem. The findings indicate that the key inputs of successful innovation are technological changes in the external environment, actors in the ecosystem, infrastructure built to support innovation and culture (Hernández-Chea et al., 2021).

4.1. The role of universities

The extant literature exhibits the role of universities as key actors in creating, distributing, and commercializing knowledge (Wagner et al., 2021). As universities have links with commercial ventures, social organizations, individual faculties, and student bodies (Feldman et al., 2019), there has also been some debate in the literature about how universities influence the entrepreneurial ecosystem (Audretsch et al., 2019; Lai and Vonortas, 2019).

Applying the lens of knowledge spillover theory, Secundo et al. (2020) identified how knowledge flows between universities, institutions, and industries result in an entrepreneurial mindset among students. The authors explored how collaboration between actors fosters university-driven innovation. Schaeffer and Matt (2016) analyzed how an academic institution contributes by acting as a boundary spanner linking different stakeholders. Heaton et al. (2019) assessed the influence of universities on innovation. The authors theorize the role of capabilities at the various stages of innovation, in particular, emergence, development, and renewal. Wagner et al. (2021) explored the role of universities in facilitating knowledge spillover and sustainable regional transformation. The findings revealed that universities play an important role in supporting entrepreneurial innovation. Likewise, Civera et al. (2019) theorize that universities play an important role by providing training to entrepreneurs and access to expertise and technologies.

Notably, we know little about the roles and goals of university managers, faculty, students, and local authorities as to the co-creators of innovation and how various institutional contexts related to universities evolve over time (Feldman et al., 2019). It is crucial to understand how universities can provide new knowledge to the ecosystem by promoting innovation (Halbinger, 2020) and developing new scientific fields that corporations are reluctant to explore (Heaton et al., 2019). Therefore, we propose the following potential research questions (PQRs): **PRQ1**. How do the goals of universities impact the development of the ecosystem and vice versa? How does the entrepreneurial ecosystem of a university evolve over a period of time? **PRQ2**. What is the nature of the interaction between universities and other actors in an entrepreneurial ecosystem? **PRQ3**. How do the relationships between individual actors in universities drive the evolution of the ecosystem?

4.2. Role of entrepreneurial actors

Entrepreneurial firms are best positioned to recognize the opportunities in the ecosystem through cooperation with other actors (Stam, 2015). The actors include *innovation communities* (Fichter, 2009), incubators (Hernández-Chea et al., 2021), and accelerators (Pustovrh et al., 2020).

Wang and Ramiller (2009) refers to innovation communities as a network of actors interested in creating and implementing innovation. The author described innovation communities as composed of organizational and individual actors interested in creating or applying a particular innovation. The rationale of the discussion on innovation is also based on the premise that innovation does not succeed in a water-tight compartment, and successful innovation implementation depends on the interactions between actors that evolve over time. Thompson et al. (2018) argued that the entrepreneurial ecosystem's emergence through individual interactions creates the shared meaning and resources needed to develop innovative ventures and make a social impact. The findings revealed that the nature of interactions changes over time, from an initial disparate activity to a more coordinated form in a later stage. Stephens et al. (2019) explored why entrepreneurs shift to new regions or stay within a particular region in a technology sector. The findings revealed three key indicators: (1) networks, (2) investment capital, and (3) innovation. Specifically, entrepreneurs embedded in networks are more likely to stay in a particular region, providing access to other actors, such as incubators and accelerators, social groups, and social events. Goswami et al. (2018) explored the role of intermediaries in developing an entrepreneurial ecosystem. The findings revealed the crucial role of accelerator expertise in the form of connections, development, coordination, and selection, resulting in innovation success and the development of the ecosystem. Hernández-Chea et al. (2021) examined the role of incubators in forming an entrepreneurial ecosystem. The authors proposed three types of collaboration in the entrepreneurial ecosystem—one-side dependency, joint dependency, and mutual dependency.

Pustovrh et al. (2020) advocated the role of an accelerator's open innovation process in the entrepreneurial ecosystem. The authors examined how accelerators support the development of new ventures using the *stage-gate* process of acceleration. The authors found that accelerators in emerging markets need to expand and scale up new ventures. Likewise, Radziwon and Bogers (2019) explored how small firms organize and exploit open innovation. The findings revealed that open innovation provides new knowledge and supports building partnerships. The geographical proximity between partners enables knowledge transfer and allows stakeholders to co-develop knowledge. Similarly, Mei et al. (2019) examined the effect of interfirm linkage on small firms' open innovation. The authors theorize that an SME's linkage with other stakeholders in the ecosystem plays a crucial role as a driver of innovation performance. Usman and Vanhaverbeke (2017) explored how start-ups organize open innovation by collaborating with large firms and overcoming the liability of newness. The prior experience of start-up managers and network strategy are crucial drivers of open innovation success. Rashid and Ratten (2020) examined how small firms leveraged dynamic capabilities to survive during COVID-19 pandemic. While sensing capabilities allowed them to interpret new opportunities, seizing and transforming capabilities allowed them to transform their businesses.

Further, studies have examined challenges faced by actors in the entrepreneurial ecosystem and how knowledge flows and spillover due to the interaction between entrepreneurial firms within the ecosystem shapes innovation success. Van Weele et al. (2018) explored institutional challenges faced by new ventures and practices employed by incubators to surmount challenges. The challenges include a lack of market orientation, a lack of early-stage capital, a small domestic market, a lack of an entrepreneurial culture, and a lack of focus on entrepreneurship by universities. To overcome the challenges, incubators encouraged start-ups to engage with customers, acted as mentors, provided access to funding, and facilitated the outsourcing of skills. In addition, entrepreneurs organized start-up tours, created a support community, and contributed to healthy competition among start-ups. In brief, the ecosystem approach extends beyond the value created by a single actor and includes challenges encountered by interacting actors while creating new value (Adner and Kapoor, 2010; Theodoraki and Meseghem, 2017). The working of the ecosystem is based on knowledge distributed among various stakeholders.

However, a research gap remains regarding how different actors can be organized formally and informally to achieve individual and collective ecosystem outcomes (Audretsch et al., 2019). We lack clarity on individual actors' roles in shaping, evolving, and sustaining the ecosystem. While focusing on productive entrepreneurship and innovation, we also noted sparse research on the role of informal actors (Igwe et al., 2020). We propose the following research questions: **PRQ4**. How can different actors be organized to leverage the benefits of the ecosystem? What are the potential benefits and pitfalls of the entry of new players into the entrepreneurial ecosystem? How do nascent entrepreneurs enable the flow of knowledge in an ecosystem? How do informal entrepreneurs and social entrepreneurs shape entrepreneurial ecosystems in developing countries? **PRQ5**How can returnee entrepreneurs contribute to developing the entrepreneurial ecosystem in their native country? **PRQ5.1**. How does the experience of entrepreneurs influence the performance of the ecosystem? **PRQ5.2**. What is the impact of formal and informal networking on the entrepreneurial ecosystem? **PRQ6**. How do dealmakers influence the success of firms within an entrepreneurial ecosystem?

4.3. Innovation outcomes of an entrepreneurial ecosystem

Our review points out that the commercialization of knowledge and its transformation through innovation is a measure of the entrepreneurial ecosystem's success (Granstrand and Holgersson, 2020; Madanaguli et al., 2022). Innovation capacity is important as novel ideas and

innovation are key sources of entrepreneurial opportunity exploitation and business success in a region (Acs et al., 2013; Ferreira et al., 2017; Kansheba, 2020).

Indeed, innovation has a crucial effect on firms in the industry (Madanaguli et al., 2022). Innovation helps entrepreneurial ventures create niche markets and profitable opportunities (Szerb et al., 2019; Talwar et al., 2020). For example, start-ups based on entrepreneurial ideas provide innovative products or services that are less likely to be imitated. The successful implementation of innovation strengthens start-ups and smaller firms and simultaneously increases competitive pressure on larger firms (Berman et al., 2021). Jarchow and Röhm (2018) adopted a knowledge spillover lens to investigate how patent-based investment funds facilitate innovation within entrepreneurial ecosystems. The authors emphasize the crucial role of fund activities in filling the finance gaps in the early stage of technological development. Igwe et al. (2020) explored how entrepreneurial ecosystems influence frugal innovation in Africa. The findings revealed the role of resources, market access, and family connections. Kansheba (2020) theorized the role of innovation in the entrepreneurial ecosystem, resulting in productive entrepreneurship.

The thematic analysis further reveals sustainable innovation as the predominant outcome of the entrepreneurial ecosystem. Indeed, entrepreneurial ecosystem conceptualization adopts an evolutionary approach similar to its biological peers, linking the entrepreneurial ecosystem to sustainability. This opens up an important question of how the entrepreneurial ecosystem resolves sustainability problems. For example, Canh et al. (2021) investigated how excessive entrepreneurial activity harms the environment. Employing the ecological perspective, the authors contend that excessive entrepreneurial activity may harm the environment. Further, our literature review reveals the role of actors and linkages between the entrepreneurial ecosystem and sustainable business models (Volkmann et al., 2021). For example, universities support external actors like start-ups in developing sustainable products and services (Abdelkafi and Hansen, 2018). In a similar vein, Doblinger et al. (2019) pointed out the importance of alliances to catalyze innovations based on sustainability. The authors proposed that the patenting activity of sustainability-based innovations increases with increased government partnerships in technology alliances. A support system that incorporates actors, institutions, and resources can help entrepreneurs innovate successfully and sustainably, consistent with regional and national goals (Fichter and Clausen, 2016).

In brief, creating and recognizing sustainable entrepreneurial opportunities is a complex challenge for entrepreneurs (Belz and Binder, 2017). Different actors in the entrepreneurial ecosystem work overtime to make provisions for resources and enable sustainability-related outcomes (Cohen, 2006). Thus, we propose the following questions. **PRQ7**. How do entrepreneurial ecosystems influence sustainability outcomes in varied contexts? How do entrepreneurial ecosystems influence urban sustainability? **PRQ8**. what role do various actors play in the entrepreneurial ecosystem and sustainable entrepreneurship? How do different actors in the entrepreneurial ecosystem support sustainable entrepreneurship and the overall sustainable development of the region? **PRQ9**. What are the barriers and success factors related to the implementation of university-supported sustainable entrepreneurship programs? What role can governments play in developing start-ups with sustainability goals? **PRQ10**. What is the role of the ecosystem as the driver of frugal innovation in emerging economies (Igwe et al., 2020)?

Finally, scholars have theorized about the challenges and nuances of entrepreneurial ecosystems in the digital age. Scholars have elaborated on the role of digital actors (Elia et al., 2020), governance mechanisms (Li et al., 2017), and digital infrastructure (Torres and Godinho, 2022; Wibisono, 2023).

Specifically, thematic analysis has revealed varied benefits of digitalization (Song, 2019). First, digitalization allows the reorganization of value-creating activity around digital platforms beyond geographical proximity (Tilson et al., 2010). Digitalization enables the development

of trust between actors and allows reciprocal knowledge sharing, experimentation, and the chance for opportunities beyond geographical proximity. It allows entrepreneurs to gain new learning, create innovation paths, and develop new products and services (Autio et al., 2018; Sussan and Acs, 2017). Second, digitalization affords the coordination of geographically dispersed actors, opens new ways of coordination between actors, reduces dependence on location-specific assets, and shapes the emergence of entrepreneurial opportunities within the ecosystem (Endres et al., 2022). As an illustration, Song et al. (2021) addressed how digital technologies transform a traditional ecosystem into an entrepreneurial ecosystem and identified the specific mechanisms underlying the process. The findings revealed how the transition from a wholesale market (ecosystem) to an entrepreneurial ecosystem was enabled by digital technologies. The business model innovation resulted in reduced transaction costs, balanced power relationships resulting in trustful relationships, reduced information asymmetry, diversified business scope, and value creation. Likewise, Endres et al. (2022) found that digital technologies enhance the efficiency of new product development by enabling knowledge exchange between actors.

Despite the crucial role of digital technologies as a driver of entrepreneurial ecosystems, there is a need to understand how digitalization shapes value creation and delivery (Autio et al., 2018). We lack an understanding of how the entrepreneurial ecosystem leverages digital technologies and what constitutes a successful digital entrepreneurial ecosystem (Wibisono, 2023). This gap leads to the following research questions. **PRQ11.** How do digital technologies enable entrepreneurs to recognize opportunities outside their geographical location? **PRQ12.** What are the drivers and barriers to developing a digital entrepreneurial ecosystem? **PRQ13.** How various actors in the digital entrepreneurial ecosystem manage conflicts.

5. Theoretical framework

We summarized the findings from the thematic analysis of the selected studies by developing a conceptual framework to support theory-building and policy outcomes. We adapt our framework from Wurth et al. (2021) to provide entrepreneurial ecosystems' drivers and innovation outcomes. We conceptualize that the term entrepreneurial ecosystem consists of two elements: entrepreneur and ecosystem and theorize the crucial roles of entrepreneurial actors (Tiba et al., 2021), institutions (Lo and Theodoraki, 2021), and infrastructure (Xie et al., 2021). Specifically, the mere presence of entrepreneurs is insufficient to build an ecosystem and leverage its advantages (Cao and Shi, 2020; Wurth et al., 2021). Actors like incubators and accelerators play a central role as they provide business and intermediation activities connecting start-ups with resource providers (Hernández-Chea et al., 2021). In brief, the engagement of multiple stakeholders is more likely to support the effective implementation of policies.

Further, we posit that the interactions between entrepreneurial actors and institutions occur in complex ways, resulting in varied outcomes (Kamalaldin et al., 2021). The interactions between actors enable information and resource flow among entrepreneurial and non-entrepreneurial actors (Hernández-Chea et al., 2021). Institutions, especially universities, support ecosystems by providing training and access to expertise and technologies (Civera et al., 2019). Likewise, governments play a role in establishing research institutes and providing policy support in the genesis of entrepreneurial ecosystems (Mack and Mayer, 2016). Furthermore, culture, the availability of resources, digital capabilities, human capital, and innovation capacity are crucial drivers of innovation (Tilson et al., 2010; Vedula and Kim, 2019). Specifically, digital technologies reduce the cost of interaction between actors and shape the development of digital entrepreneurship (Leendertse et al., 2022; Sussan and Acs, 2017). Digitalization transforms the traditional ecosystem by facilitating new ways of coordinating between geographically dispersed actors and allowing multiple users to participate and cooperate (Endres et al., 2022; Song et al., 2021; Sussan and Acs, 2017).

This hastens knowledge sharing and allows entrepreneurs to learn and co-create new products and services (Autio et al., 2018; Sussan and Acs, 2017).

Finally, traditionally, the outcomes of entrepreneurship are linked with profit generation. We theorize that firms engaging in formal and informal knowledge interactions with actors within the ecosystem are likely to introduce new products and services (Fudickar et al., 2018). The interactions between actors result in productive entrepreneurship and sustainability-related outcomes (Wurth et al., 2021; Volkmann et al., 2021), for example, the development of sustainable products and services (Abdelkafi and Hansen, 2018), and the development of new alliances between sustainability-focused stakeholders (Doblinger et al., 2019). A support system incorporating actors, institutions, and resources can help entrepreneurs successfully and sustainably pursue innovations (Fichter and Clausen, 2016). The motivation to engage in sustainability-related entrepreneurial outcomes is collective rather than individual (Moya-Clemente et al., 2020), and we theorize an ecosystem as a set of interconnected actors that interact formally and informally, resulting in productive entrepreneurship (Kamalaldin et al., 2021).

To summarize, our conceptual framework, *ENTRUST*, presents (a) the interactions between various elements as antecedents of the entrepreneurial ecosystem, (b) innovation as the outcome of the entrepreneurial ecosystem, and (c) sustainability as the outcome of the entrepreneurial ecosystem (see Fig. 7).

6. Discussion

The linkage between the entrepreneurial ecosystem and innovation intuitively evokes interest among scholars and practitioners. While some scholars have attempted to address why certain regions consistently display a higher level of productive entrepreneurship and innovation, others have criticized the inconsistency in conceptualizing the entrepreneurial ecosystem and its association with innovation (Marshall et al., 2019). As our understanding of the linkage between the entrepreneurial ecosystem and innovation is somewhat fragmented, we examined the prior research to understand its theoretical underpinnings and linkage with innovation. In doing so, we contribute to the entrepreneurial ecosystem literature.

Specifically, we address the following questions: RQ1. What is the profile of existing research on entrepreneurial ecosystems and innovation? RQ2. What are the predominant themes? RQ3. What are the potential avenues for future research? RQ1 was intended to explain the research profile. We selected relevant studies on entrepreneurial ecosystems and innovation from Scopus and WOS databases. The results revealed the academic progress of the field, management journals' contribution, geographical location of studies, and methodological considerations. Notably, we observed the relevance of varied management theories, for example, network theory, knowledge spillover theory, and innovation systems theory. RQ2 identifies the emerging themes in the entrepreneurial ecosystem literature.

We applied thematic analysis to trace emerging themes. The predominant themes are the role of universities, entrepreneurial actors, and innovation outcomes. The key finding of our research is the role of different actors in the entrepreneurial ecosystem in organizing and implementing innovation. In particular, universities play a crucial role in commercializing innovation (Theodoraki et al., 2018). Incubators, accelerators, start-ups, and small businesses are key actors. The incubators intermediate between start-ups and other entrepreneurial actors supporting start-ups and enable resource exchanges (Hernández-Chea et al., 2021). The interactions between actors shape entrepreneurial innovation's economic, technological, and societal consequences.

Finally, the review revealed that several questions remain unanswered. We elucidate research gaps and present a future research plan. Despite the growing body of literature, we found the following notable

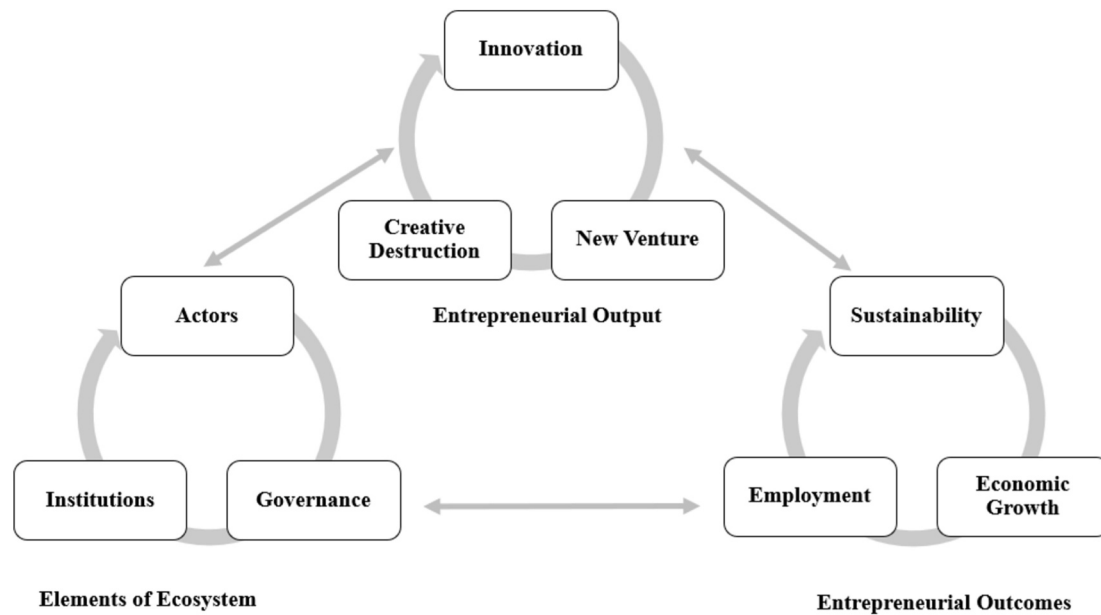


Fig. 7. Conceptual framework 'ENTRUST'.

gaps. First, we still lack an understanding of the process through which an ecosystem evolves over a period of time and how varied interactions between the various subsystems of an entrepreneurial ecosystem drive ecosystem success. There is a need to understand why particular regions foster a high level of entrepreneurship, what the role of globalization and digitalization is in developing the entrepreneurial ecosystem, and how spillover from neighboring ecosystems affects the entrepreneurial ecosystem. Second, there is a lack of clarity on the role of context in influencing the emergence of the ecosystem, how the behavior of actors within the ecosystem varies with context, and how context influences the diffusion of technology. There is a need to explore how cultural values guide the entrepreneurial ecosystem and how trust between actors results in the emergence of the entrepreneurial ecosystem. We lack clarity on how relational ties develop between actors and how entrepreneurial leaders shape policies that affect the development of the ecosystem. How does the diversity of actors shape ecosystem success, and how do user-driven activities influence the emergence of the ecosystem? Future research needs to explore the role of technology and institutions in the genesis of the entrepreneurial ecosystem. Knowing the answers to the research questions above may guide policymakers in choosing better ways to allocate resources while developing necessary factors (Xie et al., 2021). In addition, methodological challenges remain a bottleneck in measuring the interaction between actors at various levels, such as entrepreneurs, large organizations, regulators, universities, competitors, and complementors (Ritala and Gustafsson, 2018). The research in the field predominantly employs qualitative and quantitative methodologies; thus, this area needs more longitudinal studies to improve theory development.

6.1. Theoretical implications

Our review contributes to the extant literature in four ways.

First, we argue that entrepreneurial ecosystems are distinct from clusters and innovation systems. While cluster and national innovation systems are theorized in terms of their ability to provide access to resources, the entrepreneurial ecosystem posits entrepreneurs as the key actors and focuses on their ability to access resources. Moreover, while industry clusters are industry-specific, the entrepreneurial ecosystem's core focus is on entrepreneurs and innovation (Hernández-Chea et al., 2021; Mason and Brown, 2013). In brief, entrepreneurial and innovation system literature focuses on actors, artifacts, and institutions that

compete as well as collaborate, resulting in innovation performance (Granstrand and Holgersson, 2020).

Second, we provide an overview of existing literature streams and a holistic understanding of the nexus between entrepreneurial ecosystems and innovation. The review points out the crucial role of knowledge spillovers and networks. The knowledge spillover due to close interaction actors allows them to generate and exploit new knowledge (Yi et al., 2021). The systematic interaction between entrepreneurial actors facilitates knowledge spillover and, in turn, the genesis of the entrepreneurial ecosystem.

Third, our study enriches the existing entrepreneurial ecosystems literature by giving a comprehensive picture of antecedents that drive entrepreneurship and its outcomes (Xie et al., 2021). In particular, our review reveals the crucial role of the entrepreneur in driving innovation due to their ability to create new opportunities by disrupting existing structures (Wurth et al., 2021).

The collaboration between actors, including intermediaries facilitated by institutional factors, shapes the emergence of the entrepreneurial ecosystem (Hernández-Chea et al., 2021). The key argument is that multiple competing and cooperating firms enhance new ventures' competitiveness by providing access to resources and generating market intelligence. The outcomes of the entrepreneurial ecosystem include access to new markets, support for the growth of ventures, and achievement of sustainable outcomes (Chaudhary et al., 2023; Goswami et al., 2018; Spigel and Harrison, 2008).

Fourth, as there is an agreement in the literature that entrepreneurship is context-dependent, we attempted to elaborate on how entrepreneurial actors within social, institutional, and cultural contexts act as the drivers of innovation. The interactions of actors help elucidate how entrepreneurial ecosystems evolve over time, resulting in varied outcomes, including the achievement of sustainability goals (Chaudhary et al., 2023).

Finally, the role of digitalization is crucial to solving the coordination problem between actors (Chauhan et al., 2022) and improving the quality of productive entrepreneurship (Endres et al., 2022). With the emergence of digital technologies, the crucial barrier of physical distance is surmounted (Torres and Godinho, 2022). First, digital infrastructure solves the problem of coordination between actors, enables access to resources, and achieving legitimacy goals (Bouncken and Kraus, 2021; Chauhan et al., 2022), thereby improving entrepreneurship quality and quantity in the form of digital unicorns (Endres et al., 2022;

Sussan and Acs, 2017; Torres and Godinho, 2022; Xie et al., 2021). Second, the role of match makers is crucial in the digital entrepreneurial ecosystem (Sussan and Acs, 2017) as they play a vital role in reducing transaction costs and connecting diverse users. In brief, digitalization can enable the transformation of traditional business models and hastened knowledge sharing based on trust-based relationships (Autio et al., 2018; Song, 2019; Sussan and Acs, 2017).

6.2. Practical implications

Our study proposes the following implications for practice. First, the main purpose of policymakers is to foster economic growth by identifying and developing policy measures (Stam and van de Ven, 2021). We point out the potential role of resources and incentive structures in supporting the scale-up of ventures and innovation commercialization (Wagner et al., 2021). In this line of reasoning, policymakers are advised to emphasize entrepreneurial knowledge to increase new venture creation (De Brito and Leitão, 2021). Policymakers need to decide how to allocate available resources and provide necessary and sufficient conditions to achieve entrepreneurship quality, particularly productive entrepreneurship based on innovation.

Second, the vibrancy of the ecosystem is contingent upon a network of actors who create knowledge spillover, leveraging social networks (Pittz et al., 2019). Policymakers need to provide incentives for experienced entrepreneurs and employees to become involved in creating start-ups rather than simply focusing on encouraging start-ups (Feldman et al., 2019). The policymakers should also consider the ecosystem's bottlenecks at individual actor levels (Acs et al., 2014) and create favorable conditions. Our findings reveal that policymakers need to be more sensitive to the context of entrepreneurship.

Third, public institutions should not waste resources to replicate successful ecosystems in other contexts and instead try to build an entrepreneurial ecosystem based on the uniqueness of their own context (Theodoraki and Messeghe, 2017). While investing in the entrepreneurial ecosystem, policymakers need to invest in developing market potential, human and financial capital, and infrastructure. Moreover, cultural, social, political, and economic factors are crucial drivers of entrepreneurial behavior in a region (Stam and van de Ven, 2021).

Fourth, policymakers are concerned with facilitating sustainable entrepreneurial ventures and balancing environmental, social, and economic outcomes (Raposo et al., 2022). Entrepreneurship quality depends upon a constellation of factors rather than a single factor (Xie et al., 2021). Therefore, identifying relevant actors and resources may allow policymakers to facilitate the pursuance of sustainable practices. In addition, policymakers need to take an integrative view of policy, funding, culture, human capital, and markets to foster new venture growth (Maroufkhani et al., 2018).

Fifth, the policymakers have a crucial role in the success of the digital entrepreneurial ecosystem by providing regulations promoting productivity, protecting users' privacy, facilitating trust-based relationships, and minimizing inefficient regulations (Wibisono, 2023). Digital infrastructure and match makers can reduce transaction costs and facilitate innovation (Li et al., 2017; Song, 2019).

Finally, our review has important implications for individual entrepreneurs. We find agreement in the literature that particular entrepreneurial actors only perform a limited role in the ecosystem and depend upon other actors to accomplish entrepreneurial outcomes. As a consequence, individual actors need to make strategic choices concerning their engagement with other actors to achieve individual and collective goals. Specifically, entrepreneurs need to build a network and collaborate to leverage the benefits of the ecosystem (Maroufkhani et al., 2018). Finally, the study points out the crucial role of other stakeholders, including universities, research institutions, and government partners, as the drivers of innovation (Dedehayir et al., 2018).

6.3. Limitations and future work

Our systematic review has the following limitations. First, our list of keywords might not be exhaustive, with the possibility that relevant studies were not considered in our research database. One potential direction is additional keywords to ensure robust selection criteria. Second, our sample is based on peer-reviewed scholarly publications in English, employing the Scopus and WoS databases. We excluded edited chapters and academic conference proceedings from our selection. Hence, we concede missing related literature and the overlooked studies could have contributed to our findings. Future researchers may include proceedings, edited chapters, and studies available on various academic databases not included in our study. Third, the screening of research papers is subject to human error. Our review focused on entrepreneurial ecosystems and innovation. We note that limited attention has been paid to the role of crowdsourcing as a driver of knowledge transfer and innovation (Maroufkhani et al., 2018). Therefore, we suggest that future reviews explore the role of digital ecosystems and smart cities. The possible extension of this review can be a synthesis of work on entrepreneurial ecosystems and various forms of innovation.

Data availability

Data will be made available on request.

References

- Abdelkafi, N., Hansen, E.G., 2018. Ecopreneurs' creation of user business models for green tech: an exploratory study in e-mobility. *Int. J. Entrepreneurial Ventur.* 10 (1), 32–55.
- Acs, Z.J., Audretsch, D.B., Lehmann, E.E., 2013. The knowledge spillover theory of entrepreneurship. *Small Bus. Econ.* 41 (4), 757–774.
- Acs, Z.J., Autio, E., Szerb, L., 2014. National systems of entrepreneurship: measurement issues and policy implications. *Res. Pol.* 43 (3), 476–494.
- Acs, Z.J., Stam, E., Audretsch, D.B., O'Connor, A., 2017. The lineages of the entrepreneurial ecosystem approach. *Small Bus. Econ.* 49 (1), 1–10.
- Adner, R., 2006. Match your innovation strategy to your innovation ecosystem. *Harv. Bus. Rev.* 84 (4), 98.
- Adner, R., 2017. Ecosystem as structure: an actionable construct for strategy. *J. Manag.* 43 (1), 39–58.
- Adner, R., Kapoor, R., 2010. Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations. *Strat. Manag. J.* 31 (3), 306–333.
- Aman, S., Seuring, S., 2021. Interestingly it's innovation: reviewing sustainability performance management in the base of the pyramid (BoP). *Technovation* 112 (4), 102394, 2020.
- Audretsch, D.B., Belitski, M., 2017. Entrepreneurial ecosystems in cities: establishing the framework conditions. *J. Technol. Tran.* 42, 1030–1051.
- Audretsch, D.B., Cunningham, J.A., Kuratko, D.F., Lehmann, E.E., Menter, M., 2019. Entrepreneurial ecosystems: economic, technological, and societal impacts. *J. Technol. Tran.* 44 (2), 313–325.
- Auerswald, P.E., 2015. Enabling Entrepreneurial Ecosystems: Insights from Ecology to Inform Effective Entrepreneurship Policy. Kauffman Foundation Research Series on city, metro, and regional entrepreneurship.
- Autio, E., Kenney, M., Mustar, P., Siegel, D., Wright, M., 2014. Entrepreneurial innovation: the importance of context. *Res. Pol.* 43 (7), 1097–1108.
- Autio, E., Nambisan, S., Thomas, L.D., Wright, M., 2018. Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems. *Strateg. Entrep. J.* 12 (1), 72–95.
- Belz, F.M., Binder, J.K., 2017. Sustainable entrepreneurship: a convergent process model. *Bus. Strat. Environ.* 26 (1), 1–17.
- Berman, A., Cano-Kollmann, M., Mudambi, R., 2021. Innovation and entrepreneurial ecosystems: fintech in the financial services industry. *Review of Managerial Science* 1–20.
- Bouncken, R.B., Kraus, S., 2021. Entrepreneurial ecosystems in an interconnected world: emergence, governance and digitalization. *Review of Managerial Science* 16 (1–14), 0123456789.
- Brem, A., Radziwon, A., 2017. Efficient Triple Helix collaboration fostering local niche innovation projects—A case from Denmark. *Technol. Forecast. Soc. Change* 123, 130–141.
- Brown, R., Mason, C., 2014. Inside the high-tech black box: a critique of technology entrepreneurship policy. *Technovation* 34 (12), 773–784.
- Brown, R., Mason, C., 2017. Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems. *Small Bus. Econ.* 49, 11–30. <https://doi.org/10.1007/s11187-017-9865-7>.
- Calabrò, A., Vecchiari, M., Gast, J., Campopiano, G., De Massis, A., Kraus, S., 2019. Innovation in family firms: a systematic literature review and guidance for future research. *Int. J. Manag. Rev.* 21 (3), 317–355.

- Canh, N.P., Nguyen, B., Thanh, S.D., Kim, S., 2021. Entrepreneurship and natural resource rents: evidence from excessive entrepreneurial activity. *Sustain. Prod. Consum.* 25, 15–26.
- Cao, Z., Shi, X., 2020. A systematic literature review of entrepreneurial ecosystems in advanced and emerging economies. *Small Bus. Econ.* 57, 75–110.
- Carayannis, E.G., Campbell, D.F., 2009. 'Mode 3' and 'Quadruple Helix': toward a 21st century fractal innovation ecosystem. *Int. J. Technol. Manag.* 46 (3–4), 201–234. <https://doi.org/10.1504/IJTM.2009.023374>.
- Carayannis, E.G., Grigoroudis, E., Campbell, D.F., Meissner, D., Stamati, D., 2018. The ecosystem as helix: an exploratory theory-building study of regional co-opetitive entrepreneurial ecosystems as Quadruple/Quintuple Helix Innovation Models. *R&D Management* 48 (1), 148–162.
- Cavallo, A., Ghezzi, A., Balocco, R., 2019. Entrepreneurial ecosystem research: present debates and future directions. *Int. Enterpren. Manag. J.* 15 (4), 1291–1321.
- Chaudhary, S., Kaur, P., Talwar, S., Islam, N., Dhir, A., 2022. Way off the mark? Open innovation failures: decoding what really matters to chart the future course of action. *J. Bus. Res.* 142, 1010–1025.
- Chaudhary, S., Kaur, P., Alofaysan, H., Halberstadt, J., Dhir, A., 2023. Connecting the Dots? Entrepreneurial Ecosystems and Sustainable Entrepreneurship as Pathways to Sustainability. *Business Strategy and the Environment*.
- Chauhan, C., Parida, V., Dhir, A., 2022. Linking circular economy and digitalisation technologies: a systematic literature review of past achievements and future promises. *Technol. Forecast. Soc. Change* 177, 121508.
- Cho, D.S., Ryan, P., Buciuni, G., 2021. Evolutionary entrepreneurial ecosystems: a research pathway. *Small Bus. Econ.* 58, 1865–1883. <https://doi.org/10.1007/s11187-021-00487-4>.
- Christofi, M., Leonidou, E., Vrontis, D., Kitchen, P., Papasolomou, I., 2015. Innovation and cause-related marketing success: a conceptual framework and propositions. *J. Serv. Market.* 29 (5), 354–366.
- Christofi, M., Leonidou, E., Vrontis, D., 2017. Marketing research on mergers and acquisitions: a systematic review and future directions. *Int. Market. Rev.* 34 (5), 629–651. <https://doi.org/10.1108/IMR-03-2015-0100>.
- Christofi, M., Pereira, V., Vrontis, D., Thrassou, A., 2021a. Agility and flexibility in international business research: a comprehensive review and future research directions. *J. World Bus.* 55.
- Christofi, M., Vrontis, D., Cadogan, J.W., 2021b. Micro-foundational ambidexterity and multinational enterprises: a systematic review and a conceptual framework. *Int. Bus. Rev.* 30 (1).
- Civera, A., Meoli, M., Vismara, S., 2019. Do academic spinoffs internationalize? *J. Technol. Tran.* 44, 381–403. <https://doi.org/10.1007/s10961-018-9683-3>.
- Cohen, B., 2006. Sustainable valley entrepreneurial ecosystems. *Bus. Strat. Environ.* 15 (1), 1–14.
- Cooke, P., 2001. Regional innovation systems, clusters, and the knowledge economy. *Ind. Corp. Change* 10 (4), 945–974.
- Cooke, P., Uranga, M.G., Etxebarria, G., 1997. Regional innovation systems: institutional and organisational dimensions. *Res. Pol.* 26 (4–5), 475–491.
- Cukier, D., Kon, F., Lyons, T.S., 2016. Software startup ecosystems evolution: the New York City case study. In: 2016 International Conference on Engineering, Technology and Innovation/IEEE International Technology Management Conference (ICE/ITMC). IEEE, pp. 1–8.
- De Brito, S., Leitão, J., 2021. Mapping and defining entrepreneurial ecosystems: a systematic literature review. *Knowl. Manag. Res. Pract.* 19 (1), 21–42.
- Dedehayir, O., Mäkinen, S.J., Roland Ortt, J., 2018. Roles during innovation ecosystem genesis: a literature review. *Technol. Forecast. Soc. Change* 136, 18–29.
- Doblinger, C., Surana, K., Anadon, L.D., 2019. Governments as partners: the role of alliances in US cleantech startup innovation. *Res. Pol.* 48 (6), 1458–1475.
- du Plessis, M., Boon, J.A., 2004. Knowledge management in eBusiness and customer relationship management: South African case study findings. *Int. J. Inf. Manag.* 24 (1), 73–86.
- Duarte, L.O., Reis, D.A., Fleury, A.L., Vasques, R.A., Filho, H.F., Koria, M., Barueque-Ramos, J., 2021. Innovation Ecosystem framework directed to Sustainable Development Goal #17 partnerships implementation. *Sustainable Development* 29 (5), 1018–1036. <https://doi.org/10.1002/sd.2191>.
- Elia, G., Margherita, A., Passiante, G., 2020. Digital entrepreneurship ecosystem: How digital technologies and collective intelligence are reshaping the entrepreneurial process. *Technological Forecasting and Social Change* 150, 119791. <https://doi.org/10.1016/j.techfore.2019.119791>.
- Endres, H., Huesig, S., Pesch, R., 2022. Digital innovation management for entrepreneurial ecosystems: services and functionalities as drivers of innovation management software adoption. *Review of Managerial Science* 16 (1), 135–156.
- Feldman, M., Siegel, D.S., Wright, M., 2019. New developments in innovation and entrepreneurial ecosystems. *Ind. Corp. Change* 28 (4), 817–826.
- Ferreira, J.J., Ratten, V., Dana, L.P., 2017. Knowledge spillover-based strategic entrepreneurship. *Int. Enterpren. Manag. J.* 13, 161–167.
- Fichter, K., 2009. Innovation communities: the role of networks of promoters in Open Innovation. *R&D Management* 39 (4), 357–371.
- Fichter, K., Clausen, J., 2016. Diffusion dynamics of sustainable innovation-insights on diffusion patterns based on the analysis of 100 sustainable product and service innovations. *Journal of Innovation Management* 4 (2), 30–67.
- Fritsch, M., 2013. New business formation and regional development: a survey and assessment of the evidence. *Foundations and Trends® in Entrepreneurship* 9 (3), 249–364.
- Fudickar, R., Hottenrott, H., Lawson, C., 2018. What's the price of academic consulting? Effects of public and private sector consulting on academic research. *Ind. Corp. Change* 27 (4), 699–722.
- Goswami, K., Mitchell, J.R., Bhagavatula, S., 2018. Accelerator expertise: understanding the intermediary role of accelerators in the development of the Bangalore entrepreneurial ecosystem. *Strateg. Entrep. J.* 12 (1), 117–150. <https://doi.org/10.1002/sej.1281>.
- Granstrand, O., Holgersson, M., 2020. Innovation ecosystems: a conceptual review and a new definition. *Technovation* 90, 91.
- Grimaldi, R., Kenney, M., Siegel, D.S., Wright, M., 2011. 30 years after bayh-dole: reassessing academic entrepreneurship. *Res. Pol.* 40 (8), 1045–1057.
- Hakala, H., O'Shea, G., Farny, S., Luoto, S., 2020. Re-storying the business, innovation and entrepreneurial ecosystem concepts: the model-narrative review method. *Int. J. Manag. Rev.* 22 (1), 10–32.
- Halbinger, M.A., 2020. The relevance of makerspaces for university-based venture development organizations. *Enterpren. Res. J.* 10 (2).
- Heaton, S., Siegel, D.S., Teece, D.J., 2019. Universities and innovation ecosystems: a dynamic capabilities perspective. *Ind. Corp. Change* 28 (4), 921–939.
- Hernández-Chea, R., Mahdad, M., Minh, T.T., Hjortso, C.N., 2021. Moving beyond intermediation: how intermediary organizations shape collaboration dynamics in entrepreneurial ecosystems. *Technovation* 108.
- Hu, Q., Hughes, M., 2020. Radical innovation in family firms: a systematic analysis and research agenda. *Int. J. Entrepreneurial Behav. Res.* 26 (6), 1199–1234.
- Huang-Saad, A., Duval-Couetil, N., Park, J., 2018. Technology and talent: capturing the role of universities in regional entrepreneurial ecosystems. *J. Enterprising Communities People Places Glob. Econ.* 12 (2), 92–116. <https://doi.org/10.1108/JEC-08-2017-0070>.
- Huggins, R., Williams, N., 2011. Entrepreneurship and regional competitiveness: the role and progression of policy. *Enterpren. Reg. Dev.* 23 (9–10), 907–932.
- Igwe, P.A., Odunukan, K., Rahman, M., Rugara, D.G., Ochianinwata, C., 2020. How entrepreneurship ecosystem influences the development of frugal innovation and informal entrepreneurship. *Thunderbird Int. Bus. Rev.* 62 (5), 475–488.
- Isenberg, D.J., 2010. How to start an entrepreneurial revolution. *Harv. Bus. Rev.* 88 (6), 40–50.
- Jarchow, S., Röhm, A., 2018. Patent-based investment funds: from invention to innovation. *The Journal of Technology Transfer* 44 (2), 404–433. <https://doi.org/10.1007/s10961-018-9691-3>.
- Kamalaldin, A., Sjödin, D., Hullova, D., Parida, V., 2021. Configuring ecosystem strategies for digitally enabled process innovation: a framework for equipment suppliers in the process industries. *Technovation* 105.
- Kansheba, J.M.P., 2020. Small business and entrepreneurship in Africa: the nexus of entrepreneurial ecosystems and productive entrepreneurship. *Small Enterprise Research* 27 (2), 110–124. <https://doi.org/10.1080/13215906.2020.1761869>.
- Kansheba, J.M.P., Wald, A.E., 2020. Entrepreneurial ecosystems: a systematic literature review and research agenda. *J. Small Bus. Enterprise Dev.* 27 (6), 943–964.
- Kaur, P., Dhir, A., Singh, N., Sahu, G., Almotairi, M., 2020a. An innovation resistance theory perspective on mobile payment solutions. *J. Retailing Consum. Serv.* 55, 102059. <https://doi.org/10.1016/j.jretconser.2020.102059>.
- Kaur, P., Dhir, A., Talwar, S., Alrasheedy, M., 2020b. Systematic literature review of food waste in educational institutions: setting the research agenda. *Int. J. Contemp. Hospit. Manag.* 33 (4), 1160–1193.
- Khan, S.J., Dhir, A., Parida, V., Papa, A., 2021. Past, present, and future of green product innovation. *Bus. Strat. Environ.* 30 (8), 4081–4106.
- Khanra, S., Dhir, A., Mäntymäki, M., 2020. Big data analytics and enterprises: a bibliometric synthesis of the literature. *Enterprise Inf. Syst.* 14 (6), 737–768.
- Kraus, S., Breier, M., Dasí-Rodríguez, S., 2020. The art of crafting a systematic literature review in entrepreneurship research. *Int. Enterpren. Manag. J.* 16, 1023–1042.
- Kraus, S., Breier, M., Lim, W.M., et al., 2022. Literature reviews as independent studies: guidelines for academic practice. *Review of Managerial Science* 16, 2577–2595. <https://doi.org/10.1007/s11846-022-00588-8>.
- Krugman, P., 1991. Increasing returns and economic geography. *J. Polit. Econ.* 99 (3), 483–499.
- Lai, Y., Vonortas, N.S., 2019. Regional Entrepreneurial Ecosystems in China. *Industrial And Corporate Change*.
- Leendertse, J., Schrijvers, M., Stam, E., 2022. Measure twice, cut once: entrepreneurial ecosystem metrics. *Res. Pol.* 51 (9), 104336.
- Leonidou, L.C., Katsikeas, C.S., Samiee, S., Aykol, B., 2018. International marketing research: a state-of-the-art review and the way forward. *Advances in Global Marketing: A Research Anthology* 3–33.
- Leydesdorff, L., Etkowitz, H., 1998. The triple helix as a model for innovation studies. *Sci. Publ. Pol.* 25 (3), 195–203.
- Li, W., Du, W., Yin, J., 2017. Digital entrepreneurship ecosystem as a new form of organizing: the case of Zhongguancun. *Front. Bus. Res. China* 11, 1–21.
- Lo, A., Theodoraki, C., 2021. The influence of alliance ambidexterity on innovation performance and the moderating role of firm age. *IEEE Trans. Eng. Manag.* 68 (2), 418–429.
- Mack, E., Mayer, H., 2016. The evolutionary dynamics of entrepreneurial ecosystems. *Urban Stud.* 53 (10), 2118–2133.
- Madanaguli, A., Kaur, P., Mazzoleni, A., Dhir, A., 2022. The innovation ecosystem in rural tourism and hospitality – a systematic review of innovation in rural tourism. *J. Knowl. Manag.* 26 (7), 1732–1762.
- Mariani, M.M., Al-Sultan, K., De Massis, A., 2021. Corporate social responsibility in family firms: a systematic literature review. *J. Small Bus. Manag.* 00 (00), 1–55.
- Maroufkhan, P., Wagner, R., Wan Ismail, W.K., 2018. Entrepreneurial ecosystems: a systematic review. *Journal of Enterprising Communities* 12 (4), 545–564.
- Marshall, S.E., Caputo, A., Mehtap, S., 2019. Nurturing innovation through entrepreneurial ecosystems: what does the literature say? *The Anatomy of Entrepreneurial Decisions*. In: *The Anatomy of Entrepreneurial Decisions* (Issue January, pp. 313–328).

- Mason, C., Brown, R., 2013. Creating good public policy to support high-growth firms. *Small Bus. Econ.* 40, 211–225.
- Mei, L., Zhang, T., Chen, J., 2019. Exploring the effects of inter-firm linkages on SMEs' innovation from an ecosystem perspective: an empirical study of Chinese manufacturing SMEs. *Technol. Forecast. Soc. Change* 144, 118–128. March 2018.
- Moore, J.F., 1993. Predators and prey: a new ecology of competition. *Harv. Bus. Rev.* 71 (3), 75–86.
- Moya-Clemente, I., Ribes-Giner, G., Pantoja-Díaz, O., 2020. Configurations of sustainable development goals that promote sustainable entrepreneurship over time. *Sustain. Dev.* 28 (4), 572–584.
- Nofal, A.M., Nicolaou, N., Symeonidou, N., Shane, S., 2018. Biology and management: a review, critique, and research agenda. *J. Manag.* 44 (1), 7–31. <https://doi.org/10.1177/0149206317720723>.
- Ozdemir, D., Sharma, M., Dhir, A., Daim, T., 2022. Supply chain resilience during the COVID-19 pandemic. *Technol. Soc.* 68, 101847.
- Pitelis, C., 2012. Clusters, entrepreneurial ecosystem co-creation, and appropriability: a conceptual framework. *Ind. Corp. Change* 21 (6), 1359–1388. <https://doi.org/10.1093/icc/dts008>.
- Pittaway, L., Cope, J., 2007. Entrepreneurship education: a systematic review of the evidence. *Int. Small Bus. J.* 25 (5), 479–510.
- Pittz, T.G., Intindola, M.L., Adler, T., Rogers, S., Gard, C., 2019. Collaborating smartly: the role of open strategy in absorptive capacity. *J. Small Bus. Manag.* 57 (4), 1595–1615.
- Porter, M.E., 1996. Competitive advantage, agglomeration economies, and regional policy. *Int. Reg. Sci. Rev.* 19 (1–2), 85–90.
- Pustovrh, A., Rangus, K., Drnovšek, M., 2020. The role of open innovation in developing an entrepreneurial support ecosystem. *Technol. Forecast. Soc. Change* 152. <https://doi.org/10.1016/j.techfore.2019.119892>.
- Qian, H., Acs, Z.J., Stough, R.R., 2013. Regional systems of entrepreneurship: the nexus of human capital, knowledge and new firm formation. *J. Econ. Geogr.* 13 (4), 559–587.
- Radziwon, A., Bogers, M., 2019. Open innovation in SMEs: exploring inter-organizational relationships in an ecosystem. *Technol. Forecast. Soc. Change* 146, 573–587.
- Raposo, M., Fernandes, C.I., Veiga, P.M., 2022. We dreamed a dream that entrepreneurial ecosystems can promote sustainability. *Manag. Environ. Qual. Int. J.* 33 (1), 86–102.
- Rashid, S., Ratten, V., 2020. Entrepreneurial ecosystems during COVID-19: the survival of small businesses using dynamic capabilities. *World Journal of Entrepreneurship, Management and Sustainable Development* 17 (3), 457–476.
- Ritala, P., Gustafsson, R., 2018. Q&A. Innovation and entrepreneurial ecosystem research: where are we now and how do we move forward? *Technology Innovation Management Review* 8 (7), 52–58.
- Sarpong, D., AbdRazak, A., Alexander, E., Meissner, D., 2017. Organizing practices of university, industry and government that facilitate (or impede) the transition to a hybrid triple helix model of innovation. *Technol. Forecast. Soc. Change* 123, 142–152.
- Schaeffer, V., Matt, M., 2016. Development of academic entrepreneurship in a non-mature context: the role of the university as a hub-organisation. *Enterpren. Reg. Dev.* 28 (9–10), 724–745.
- Schwab, A., Zhang, Z., 2019. A new methodological frontier in entrepreneurship research: big data studies. *Entrep. Theory Pract.* 43 (5), 843–854. <https://doi.org/10.1177/1042258718760841>.
- Secundo, G., Ndou, V., Del Vecchio, P., De Pascale, G., 2020. Sustainable development, intellectual capital and technology policies: a structured literature review and future research agenda. *Technol. Forecast. Soc. Change* 153, 119917.
- Shane, S., Venkataraman, S., 2000. The promise of entrepreneurship as a field of research. *Acad. Manag. Rev.* 25 (1), 217–226.
- Shipilov, A., Gawer, A., 2020. Integrating research on interorganizational networks and ecosystems. *Acad. Manag. Ann.* 14 (1), 92–121.
- Snyder, H., 2019. Literature review as a research methodology: an overview and guidelines. *J. Bus. Res.* 104, 333–339.
- Song, A.K., 2019. The digital entrepreneurial ecosystem—a critique and reconfiguration. *Small Bus. Econ.* 53 (3), 569–590.
- Song, Y., Escobar, O., Arzuabaga, U., De Massis, A., 2021. The digital transformation of a traditional market into an entrepreneurial ecosystem. *Review of Managerial Science* 1–24.
- Spigel, B., 2017. The relational organization of entrepreneurial ecosystems. *Entrep. Theory Pract.* 41 (1), 49–72.
- Spigel, B., Harrison, R., 2008. Towards a process theory of entrepreneurial ecosystems. *Strateg. Entrep. J.* 12 (1), 151–168.
- Stam, E., 2015. Entrepreneurial ecosystems and regional policy: a sympathetic critique. *Eur. Plann. Stud.* 23 (9), 1759–1769.
- Stam, E., van de Ven, A., 2021. Entrepreneurial ecosystem elements. *Small Bus. Econ.* 56 (2), 809–832.
- Stephens, B., Butler, J.S., Garg, R., Gibson, D.V., 2019. Austin, Boston, Silicon Valley, and New York: Case studies in the location choices of entrepreneurs in maintaining the technopolis. *Technol. Forecast. Soc. Change* 146, 267–280.
- Suchek, N., Fernandes, C.I., Kraus, S., Filser, M., Sjögrén, H., 2021. Innovation and the circular economy: a systematic literature review. *Bus. Strat. Environ.* 30 (8), 3686–3702.
- Sussan, F., Acs, Z.J., 2017. The digital entrepreneurial ecosystem. *Small Bus. Econ.* 49, 55–73.
- Szerb, L., Lafuente, E., Horváth, K., Páger, B., 2019. The relevance of quantity and quality entrepreneurship for regional performance: the moderating role of the entrepreneurial ecosystem. *Reg. Stud.* 53 (9), 1308–1320.
- Talwar, S., Talwar, M., Kaur, P., Dhir, A., 2020. Consumers' resistance to digital innovations: a systematic review and framework development. *Australas. Market J.* 28 (4), 286–299. <https://doi.org/10.1016/j.ausmj.2020.06.014>.
- Talwar, S., Kaur, P., Fosso Wamba, S., Dhir, A., 2021a. Big Data in operations and supply chain management: a systematic literature review and future research agenda. *Int. J. Prod. Res.* 59 (11), 3509–3534.
- Talwar, S., Talwar, M., Kaur, P., Singh, G., Dhir, A., 2021b. Why have consumers opposed, postponed, and rejected innovations during a pandemic? A study of mobile payment innovations. *Australasian Journal of Information Systems* 25, 1–27.
- Theodoraki, C., Meseghem, K., 2017. Exploring the entrepreneurial ecosystem in the field of entrepreneurial support: a multi-level approach. *Int. J. Enterpren. Small Bus.* 31 (1), 47–66.
- Theodoraki, C., Meseghem, K., Rice, M.P., 2018. A social capital approach to the development of sustainable entrepreneurial ecosystems: an explorative study. *Small Bus. Econ.* 51 (1), 153–170.
- Thompson, T.A., Purdy, J.M., Ventresca, M.J., 2018. How entrepreneurial ecosystems take form: evidence from social impact initiatives in Seattle. *Strateg. Entrep. J.* 12 (1), 96–116. <https://doi.org/10.1002/sej.1285>.
- Tiba, S., van Rijnsoever, F.J., Hekkert, M.P., 2021. Sustainability start-ups and where to find them: investigating the share of sustainability start-ups across entrepreneurial ecosystems and the causal drivers of differences. *J. Clean. Prod.* 306, 127054.
- Tilson, D., Lyytinen, K., Sørensen, C., 2010. Research commentary—digital infrastructures: the missing IS research agenda. *Inf. Syst. Res.* 21 (4), 748–759.
- Torres, P., Godinho, P., 2022. Levels of necessity of entrepreneurial ecosystems elements. *Small Bus. Econ.* 59 (1), 29–45.
- Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *Br. J. Manag.* 14 (3), 207–222.
- Usman, M., Vanhaverbeke, W., 2017. How start-ups successfully organize and manage open innovation with large companies. *Eur. J. Innovat. Manag.* 20 (1), 171–186.
- Van de Ven, H., 1993. The development of an infrastructure for entrepreneurship. *J. Bus. Ventur.* 8 (3), 211–230.
- van Weele, M., van Rijnsoever, F.J., Eveleens, C.P., Steinz, H., van Stijn, N., Groen, M., 2018. Start-EU-up! Lessons from international incubation practices to address the challenges faced by Western European start-ups. *J. Technol. Tran.* 43 (5), 1161–1189.
- Vedula, S., Kim, P.H., 2019. Gimme shelter or fade away: the impact of regional entrepreneurial ecosystem quality on venture survival. *Ind. Corp. Change* 28 (4), 827–854.
- Volkman, C., Fichter, K., Klostner, M., Audretsch, D.B., 2021. Sustainable entrepreneurial ecosystems: an emerging field of research. *Small Bus. Econ.* 56 (3), 1047–1055.
- Wagner, M., Schaltegger, S., Hansen, E.G., Fichter, K., 2021. University-linked programmes for sustainable entrepreneurship and regional development: how and with what impact? *Small Bus. Econ.* 56 (3), 1141–1158.
- Wang, H., Ramiller, N.C., 2009. Community learning in information Technology innovation. *Management Information Systems Quarterly* 33 (4), 709. <https://doi.org/10.2307/20650324>.
- Wibisono, E., 2023. The digital entrepreneurial ecosystem in the European Union: evidence from the digital platform economy index. *Eur. Plann. Stud.* 31 (6), 1270–1292.
- Williams, D.W., Wood, M.S., Mitchell, J.R., Urbig, D., 2019. Applying experimental methods to advance entrepreneurship research: on the need for and publication of experiments. *J. Bus. Ventur.* 34 (2), 215–223.
- Witell, L., Snyder, H., Gustafsson, A., Fombelle, P., Kristensson, P., 2016. Defining service innovation: a review and synthesis. *J. Bus. Res.* 69 (8), 2863–2872.
- Wurth, B., Stam, E., Spigel, B., 2021. Toward an entrepreneurial ecosystem research program. *Enterpren. Theor. Pract.* 46 (3), 729–778.
- Xie, Z., Wang, X., Xie, L., Duan, K., 2021. Entrepreneurial ecosystem and the quality and quantity of regional entrepreneurship: a configurational approach. *J. Bus. Res.* 128, 499–509.
- Yi, L., Wang, Y., Upadhyaya, B., Zhao, S., Yin, Y., 2021. Knowledge spillover, knowledge management capabilities, and innovation among returnee entrepreneurial firms in emerging markets: does entrepreneurial ecosystem matter? *J. Bus. Res.* 130, 283–294.
- Zahra, S.A., 2007. Contextualizing theory building in entrepreneurship research. *J. Bus. Ventur.* 22 (3), 443–452.

Sanjay Chaudhary (PhD) is an Associate Professor of Strategy at the O.P. Jindal Global University, India. He holds a Fellowship in Strategic Management from the Indian Institute of Management, Kashipur, India. Dr. Sanjay's research interests are corporate entrepreneurship and small family businesses. His research has been published in multiple international peer-reviewed (ABDC/ABS ranked) journals, including Group and Organization Management, Industrial Marketing Management, Entrepreneurship and Regional Development, Journal of Business Research, Journal of Knowledge Management, Business Strategy and the Environment, Management Decision, International Journal of Emerging Markets, and Measuring Business Excellence.

Puneet Kaur (DSc) is an Associate Professor in Work and Organization Psychology at the University of Bergen, Norway. Her research appears in the Human Relations, Journal of Business Ethics, Journal of Sustainable Tourism, Technology Forecasting and Social Change, Journal of Business Research, Business Strategy and Environment, IEEE Transactions on Engineering Management, Computers in Human Behaviour, among others.

Alberto Ferraris, PhD in Business and Management, is currently working as an Associate Professor at the University of Turin. He is also Research Fellow of the Laboratory for International and Regional Economics, Ural Federal University (Russia) and Fellow (F-EMAB) and an active member of the EuroMed Research Business Institute. He is author of many academic and scientific articles as well as he serves as Guest Editor or he is in the Editorial Board in several prestigious international journals, such as Journal of International Management, Journal of Business Research, Journal of Intellectual Capital. He is also the Co-Editor in Chief of British Food Journal.

Stefano Bresciani, Ph.D. in Business Administration. Full professor in Business Management. Academic activity: Senior fellow of the EuroMed Research Business Institute, Director of the Ph.D in Business & Management, Director of Master in Business Administration, Member of the Executive Board of SIMA and CIMA, Member of the Scientific Board of B.S.Lab. He is author of many academic and scientific articles as well as he

is editor in several prestigious international journal, such as British Food Journal, British Journal of Economics, Management & Trade, Management, Global Perspective on Engineering Management.

Amandeep Dhir (DSc, PhD) is a Professor of Research Methods at the University of Agder, Norway. He is also a visiting professor at the Norwegian School of Hotel Management, University of Stavanger, Norway. His research appears in the Journal of Business Ethics, Human Relations, Tourism Management, Asia Pacific Journal of Management, Journal of Sustainable Tourism, International Marketing Review, Psychology and Marketing, Technology Forecasting and Social Change, Journal of Business Research, Technovation, Business Strategy and Environment, IEEE Transactions on Engineering Management, Computers in Human behavior, Computers in Industry, International Journal of Hospitality Management, Information Technology & People among others.