

# ***Entrepreneurial ecosystem research: present debates and future directions***

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# **Entrepreneurial Ecosystem Research: present debates and future directions**

## **Abstract**

The purpose of this article is to review the emerging research on entrepreneurial ecosystem and to guide future research into this promising area. The study presents a critical review on the entrepreneurial ecosystem, starting from its very definition and antecedents. Combining prior research with building on the main concepts that constitute an entrepreneurial ecosystem, we have developed an original set of guidelines that can help scholars and practitioners seeking an answer to the following pressing question: “How can we gain a comprehensive understanding of an entrepreneurial ecosystem?”. We will then discuss the opportunities for expanding our current knowledge on entrepreneurial ecosystems and describe the current debates and directions for future research. Lastly, we will provide guidelines that policymakers may take into consideration when designing and issuing support measures to promote entrepreneurship in their local ecosystems.

## **1. Introduction**

Entrepreneurship has been widely recognized as the engine of countries’ economic growth (e.g. Davidsson, et al., 2006; Wong, et al., 2005; Mason and Brown, 2013) and, to date, the extant literature in entrepreneurship has mostly been concerned with the characteristics and behaviours of individuals or firms (Shane, 2003; Shane and Venkataraman, 2000). This is still the case, despite the long legacy of many disciplines, including geography (Malecki, 1997; Ritsilä, 1999), sociology (Sorenson and Audia, 2000) and business research (Dubini, 1989; Bahrami and Evans, 1995), where a strong emphasis has been placed on the importance of the relationships between entrepreneurs and their local economic and social contexts. Indeed, several scholars have highlighted the need to understand entrepreneurship in broader settings, such as their regional, temporal and social arenas (Autio et al., 2014; Spilling, 1996; Van de Ven, 1993; Zahra and Wright, 2011; Zahra et al., 2014; Colombelli et al., 2017). So far, no holistic approach to entrepreneurship has focused on its interrelated

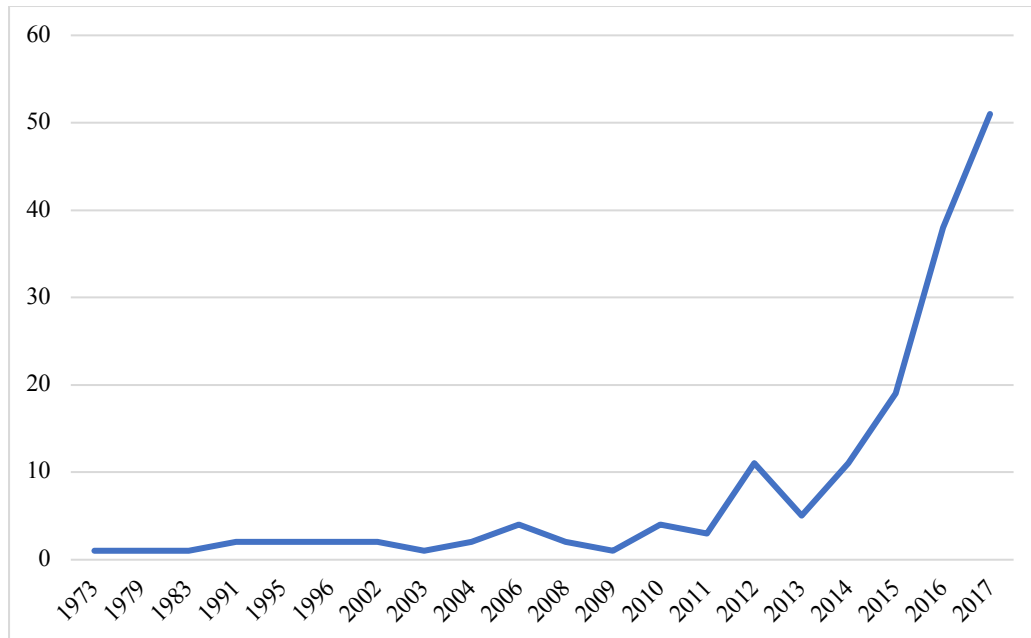
aspects (Alvedalen and Boschma, 2017). With reference to this point, recent studies have shown that scholars widely agree that the systemic nature of entrepreneurial activity is still underdeveloped (Acs et al., 2014; Gustafsson and Autio, 2011; Qian et al., 2012; Szerb et al., 2013) and few studies embrace entrepreneurship from a truly systemic and interdisciplinary perspective (Acs et al., 2014; Qian et al., 2012).

As a result, a new concept that goes in the direction of offering a “systemic view of entrepreneurship” has recently emerged, known as the Entrepreneurial Ecosystem (EE).

Although previous research has already described how interaction among entrepreneurs and other contextual elements/actors may create the conditions for the long-term entrepreneurial success (see Saxenian, 1994; Spilling, 1996; Neck et al., 2004; Kenney and Patton, 2005; Feldman, 2001; Aoyama, 2009), the EE concept gained momentum through the pioneering studies of Cohen (2006), Isenberg (2010) and Feld (2012). Their works contributed towards spreading the idea amongst leading entrepreneurs and policymakers that the community and culture of a given place can have a significant impact on entrepreneurship (Stam and Spigel, 2016; Feld, 2012; Spigel, 2017; Mack and Qian, 2016). In turn, the growing popularity of this concept also led scholars into investigating EE. Empirical studies focused on how a rich EE enables entrepreneurship and the subsequent creation of value at regional level (Fritsch, 2013; Tsvetkova, 2015). Other authors have investigated the subject at city level, including Mack and Mayer (2016), who explored entrepreneurial (ecosystem) successes in Phoenix (Arizona) and Spigel (2017), who covered the same subject in Waterloo and Calgary (Canada). Recently, Acs et al. (2014) identified a strong EE in a multi-country study and, by employing a large scale quantitative method, were able to demonstrate how different underlying local factors are associated with high levels of innovative entrepreneurship.

As well as these valuable contributions, Stam (2015, p. 1764) argued that “seductive though the entrepreneurial ecosystem concept is, there is much about it that is problematic and the rush to employ the entrepreneurial ecosystem approach has run ahead of answering many fundamental conceptual, theoretical and empirical questions”. This call for action was well received and shared among the academic community, as witnessed by the recent special issues covering the topic published in *Small Business Economics* and the *Strategic Entrepreneurship Journal*. Thus, a number of international conferences and special issues have specifically addressed the question of advancing entrepreneurial ecosystem research. As a result, we have taken note of several recent and extremely valuable contributions on the topic of EE (Fig.1). For instance, Kuratko et al. (2017) have illustrated the paradox of new venture legitimation within EEs, while Acs et al. (2017) have examined the roots of EE in terms of its antecedents in literature. Sussan and Acs (2017) have proposed an integrated framework of the “digital entrepreneurial ecosystem” composed of the highly innovative *Schumpeterian* (1911) entrepreneurs involved in creating digital companies and innovative products and services for many users and agents in the global economy (Acs et al., 2017).

**Figure 1** - Academic articles and proceedings on “Entrepreneurial Ecosystem” in Scopus Database (accessed 22 September 2017)



To sum up, particular attention has been dedicated to defining the EE and its key attributes (Roundy et al., 2017), although the debate is still ongoing, leaving room for further contributions. For instance, questions are being raised concerning the antecedents of EE literature that stem from strategy, entrepreneurship and regional development literature (Yun et al., 2017; Erina et al., 2017). In addition, scholars are currently discussing how to measure the entrepreneurial ecosystem and gain a comprehensive understanding of the subject matter. In a similar vein, bearing in mind the wide variety of actors involved in the entrepreneurial process, policymakers are struggling to identify the key action points and support the necessary measures to create and nurture entrepreneurship (Jung et al., 2017).

In response to the highly theoretical and practical relevance of the topic, we have conducted a critical review of the literature on EEs and are presenting here a set of original guidelines to advance the current understating of entrepreneurial ecosystems. Hence, the goals of this study are to review the extant research on entrepreneurial ecosystems (which stems from the fields of entrepreneurship, strategy and regional development literature) and to suggest several major research directions for guiding future theoretical and empirical research, with the objective of aiding a better understanding of entrepreneurial ecosystems at national and regional levels.

The structure of this study is as follows. In the next section, we have briefly described the method used to identify the existing contributions that deal with entrepreneurial ecosystem research. In Section 3, starting from a biological analogy and building on previous contributions, we have defined what we mean by entrepreneurial ecosystem. In Section 4, we have presented an ongoing and currently open discussion on the antecedents of research into EEs. Next, we have developed the investigation guidelines needed to gain a comprehensive understanding of EEs (Section 5) and outline the direction of future research (Section 6). The final section sets out the conclusions and discusses the contributions of the study, as well as the implications for practice and policy-making.

## 2. Method

The review is based on academic articles, conference proceedings and books covering the Entrepreneurial Ecosystem published between January 1970 and September 2017.

Similarly to previous reviews (e.g., Barreto, 2010; Di Stefano, Peteraf, and Verona, 2010; Zott, Amit, and Massa, 2011; Felekoglu, and Moultrie, 2013; West, and Bogers, 2013; Ghezzi et al., 2017), the study adopts a multi-step process.

The review began with a search through the SciVerse Scopus online database for scientific articles and books on entrepreneurial ecosystems. Since Scopus is less selective than the database provided by the Web of Science, this potentially means that the process searched through a greater number international outlets and these, in turn, were potentially more receptive to the emerging topic of entrepreneurial ecosystems.

The decision to include conference proceedings and books in this review came from the need to take account of “grey literature” (i.e. the heterogeneous body of published material that has not been submitted to the traditional peer review process – Adams, Jeanrenaud, Bessant, Denyer and Overy, 2015) and so include the more novel and relevant findings of this particularly dynamic research stream, thereby avoiding the problem of a lack of immediacy determined by the lag in academic knowledge (Adams, Smart and Huff, 2017).

As result of our first selection step, the initial sample brought up 163 documents. These 163 articles, from a total of 118 journals, were searched using two search strings, “entrep\* ecosystem” and “entrep\* system”, and then downloaded as bitext files and run through RStudio software. The selected documents included articles and conference proceedings (a decision founded on the recent fast growth of literature on EE) from 1970 to 2017.

As a second step, the initial sample of documents was further tweaked by applying the following criteria: (i) the words “entrepreneurial ecosystem/s” had to appear in the title, abstract or keywords; (ii) the documents

had to be written in English; and (iii) the documents had to explicitly relate to entrepreneurial ecosystems and had to be relevant, as inferred through a critical and detailed inspection on the part of the authors. The first criterion helped us to identify the contributions that were explicitly concerned with entrepreneurial ecosystems. However, in order to capture an inclusive spread of the antecedents of EE (such as entrepreneurial systems and regional ecosystems of entrepreneurship), a third criterion was introduced, acting as both an exclusion and inclusion criterion, which allowed us to discard irrelevant articles while adding others that were relevant. Moreover, the third criterion reflects our aim of being critical rather than systematic (or bibliometric) (e.g. see the reviews from De Massis et al., 2013; Zott et al., 2011, who followed the same approach), and so be informed by a selection of the most relevant studies.

This second step led to the sample being significantly reduced. According to the criteria applied, a total of 47 articles were found to be relevant to EE research and these were therefore selected. Details of the 47 articles selected are outlined in Table 1, together with the following information: Authors, Title and Journal.

**Table 1** - Selected studies on Entrepreneurial Ecosystem Research

<b>Author (Year)</b>	<b>Article's Title</b>	<b>Source</b>
Quinn (1979)	Technological innovation, entrepreneurship, and strategy	<i>Sloan Management Review</i>
Van de Ven (1993)	The development of an infrastructure for entrepreneurship	<i>Journal of Business venturing</i>
Watson et al. (1995)	Business owner-managers' descriptions of entrepreneurship: A content analysis	<i>Journal of Constructivist Psychology</i>
Spilling (1996)	The entrepreneurial system: On entrepreneurship in the context of a mega-event	<i>Journal of Business Research</i>
Hoskisson et al. (2004)	Corporate governance systems: Effects of capital and labor market congruency on corporate innovation and innovation and entrepreneurship and global competitiveness	<i>Journal of High Technology Management Research</i>
Iansiti and Levien (2004)	Strategy as ecology	<i>Harvard business review</i>
Neck et al. (2004)	An Entrepreneurial System View of New Venture Creation	<i>Journal of Small Business Management</i>

<b>Author (Year)</b>	<b>Article's Title</b>	<b>Source</b>
Schramm (2004)	Building entrepreneurial economies	<i>Foreign Affairs</i>
Cohen (2006)	Sustainable valley entrepreneurial ecosystems	<i>Business strategy and the environment</i>
Adner and Kapoor (2010)	Value creation in innovation ecosystems: how the structure of technological interdependence affects firm performance in new technology generations	<i>Strategic Management Journal</i>
Harrison and Leitch (2010)	Voodoo institution or entrepreneurial university? spin-off companies, the entrepreneurial system and regional development in the UK	<i>Regional Studies</i>
Isenberg (2010)	How to start an entrepreneurial revolution	<i>Harvard business review</i>
Isenberg (2011)	The entrepreneurship ecosystem strategy as a new paradigm for economic policy: Principles for cultivating entrepreneurship	<i>Presentation at the Institute of International and European Affairs</i>
Malecki (2011)	Connecting local entrepreneurial ecosystems to global innovation networks: open innovation, double networks and knowledge integration	<i>International journal of entrepreneurship and innovation management</i>
Roberts and Eesley (2011)	Entrepreneurial impact: the role of MIT	<i>Foundations and Trends in Entrepreneurship</i>
Feld (2012)	Startup communities: Building an entrepreneurial ecosystem in your city	<i>Start-up Communities: Building an Entrepreneurial Ecosystem in Your City (Book)</i>
Pitelis (2012)	Clusters, entrepreneurial ecosystem co-creation, and appropriability: a conceptual framework	<i>Industrial and corporate change</i>
Nambisan and Baron (2013)	Entrepreneurship in innovation ecosystems: entrepreneurs' self-regulatory processes and their implications for new venture success	<i>Entrepreneurship: theory and practice</i>
Qian et al. (2012)	Regional systems of entrepreneurship: the nexus of human capital, knowledge and new firm formation	<i>Journal of Economic Geography</i>
WEF (2013)	Entrepreneurial Ecosystems Around the Globe and Company Growth Dynamics	<i>World Economic Forum (WEF)</i>

<b>Author (Year)</b>	<b>Article's Title</b>	<b>Source</b>
Acs et al. (2014)	National systems of entrepreneurship: Measurement issues and policy implications	<i>Research Policy</i>
Autio and Thomas (2014)	Innovation ecosystems	<i>The Oxford Handbook of Innovation Management</i>
Autio et al. (2014)	Entrepreneurial innovation: the importance of context	<i>Research policy</i>
Kline et al. (2014)	A Spatial Analysis of Tourism, Entrepreneurship and the Entrepreneurial Ecosystem in North Carolina, USA	<i>Tourism Planning and Development</i>
Kshetri (2014)	Developing successful entrepreneurial ecosystems: lessons from a comparison of an asian tiger and a baltic tiger	<i>Baltic journal of management</i>
Mason and Brown (2014)	Entrepreneurial ecosystems and growth oriented entrepreneurship	<i>Organization for Economic Co-operation and Development (OECD)</i>
Rice et al. (2014)	University-based entrepreneurship ecosystems: a global study of six educational institutions	<i>International journal of entrepreneurship and innovation management</i>
Mack and Mayer (2015)	The evolutionary dynamics of entrepreneurial ecosystems	<i>Urban Studies</i>
Maritz et al. (2015)	The status of entrepreneurship education in australian universities	<i>Education and training</i>
Markley et al. (2015)	Creating entrepreneurial communities: building community capacity for ecosystem development	<i>Community development</i>
Stam (2015)	Entrepreneurial ecosystems and regional policy: a sympathetic critique	<i>European planning studies</i>
Tuncikiene and Drejeris (2015)	Entrepreneurship ecosystem: methodological approaches to functions' review of public sector institutions	<i>Journal of Security and Sustainability Issues</i>
Audretsch and Belitski (2016)	Entrepreneurial ecosystems in cities: establishing the framework conditions	<i>The Journal of Technology Transfer</i>



<b>Author (Year)</b>	<b>Article's Title</b>	<b>Source</b>
Brown et al. (2016)	A post-mortem of regional innovation policy failure: scotlands intermediate technology initiative (iti)	<i>Regional studies</i>
Isenberg and Onyemah (2016)	Fostering Scaleup Ecosystems for Regional Economic Growth	<i>Global Entrepreneurship Congress 2016</i>
Mack and Mayer (2016)	The evolutionary dynamics of entrepreneurial ecosystems	<i>Urban studies</i>
Mehta et al. (2016)	An educational and entrepreneurial ecosystem to actualize technology-based social ventures	<i>Advances in engineering education</i>
Acs et al. (2017)	The lineages of the entrepreneurial ecosystem approach	<i>Small Business Economics</i>
Alvedalen and Boschma (2017)	A critical review of entrepreneurial ecosystems research: towards a future research agenda	<i>European Planning Studies</i>
Audretsch and Belitski (2017)	Entrepreneurial ecosystems in cities: establishing the framework conditions	<i>Journal of Technology Transfer</i>
Auerswald and Dani (2017)	The adaptive life cycle of entrepreneurial ecosystems: the biotechnology cluster	<i>Small Business Economics</i>
Brown and Mason (2017)	Looking inside the spiky bits: a critical review and conceptualisation of entrepreneurial ecosystems	<i>Small Business Economics</i>
Bruns et al. (2017)	Searching for the existence of entrepreneurial ecosystems: a regional cross-section growth regression approach	<i>Small Business Economics</i>
Kuratko et al. (2017)	The paradox of new venture legitimation within an entrepreneurial ecosystem	<i>Small Business Economics</i>
Spigel (2017)	The relational organization of entrepreneurial ecosystems	<i>Entrepreneurship: theory and practice</i>
Sussan and Acs (2017)	The digital entrepreneurial ecosystem	<i>Small Business Economics</i>

### 3. Defining the Entrepreneurial Ecosystem

While the term “entrepreneurial”<sup>1</sup> and its meaning appear intuitive when describing an entrepreneurial ecosystem, the word ecosystem deserves further discussion (Stam, 2015). Etymologically, the term ecosystem is composed of the Greek words “οἶκος” – “eco”, which means “home” – and “σύστημα” - “system”, which means “complex”, and so it evokes both a sense of hospitality and acceptance and of complexity. An ecosystem is, therefore, a complex system hosting a number of entities. The concept of an ecosystem has been used mainly in the field of biology: first introduced by Tansley (1935), the ecosystem was initially an interactive system of living organisms – i.e. the biotic component – within their physical environment – i.e. the abiotic component. (Tansley, 1935; Molles, 2002; Chapin et al., 2002; Schulze et al., 2005; Gurevitch et al., 2006; Smith and Smith 2012). This biological analogy is frequently employed by scholars in the fields of economics and management. Marshall was the first to put forward this biological analogy (Thomas, 1991), followed by Alchian (1950), who focused on how the topic of maximizing profit. However, the most widely recognized use of a biological analogy was that introduced by Nelson and Winter (1982). Based upon selection mechanism analogies drawn from evolutionary biology (Darwin, 1859), these authors devised the first evolutionary economic theories. Later, the concept of ecosystem was introduced into management literature, first by Moore (1993) and then by Iansiti and Levien (2004). According to Moore, “business ecosystems condense out of the original swirl of capital, customer interest, and talent generated by a new innovation, just as successful species spring from the natural resources of sunlight, water, and soil nutrients” (Moore, 1993, p. 76). In other words, a business ecosystem is a network of interconnected organizations that are likely to operate around a focal firm or platform (Iansiti and Levien, 2004; Teece, 2007; Clarysse et al., 2014). This analogy with biological ecosystems in substance leads back to the complexity of relationships and interdependencies, which is also a feature of business ecosystems, in terms of both their nature and the manner in which the interested players interact. This original concept has given rise to a vast number of ecosystem types (Theodoraki and Messeghem, 2017), among which are university-based ecosystems (Rice et al., 2014), sector-based information and communication technology ecosystems (Letaifa and Rabeau, 2013), organizational ecosystems (Mars et al., 2012) and innovation or knowledge ecosystems (Clarysse et al., 2014; Zahra and Nambisan, 2011). The latter, in particular, have consistently captured the attention of scholars. Autio and Thomas (2014) defined an innovation ecosystem as a “network of interconnected organizations, organized around a focal firm or a platform, and incorporating both production and use side participants, and focusing on the development of

<sup>1</sup> Being entrepreneurial is defined as exploring, evaluating and exploiting opportunities for creating new goods and services (Schumpeter, 1934; Shane and Venkatamaran, 2000).

new value through innovation” (p.3). The ecosystem construct in literature on strategy and innovation places emphasis on the “demand side” and focuses on value appropriation rather than merely on value creation, which is, instead, the case with other constructs, such as clusters, networks and related topics (e.g. innovation network, industry network, value network). More importantly, the aspect of complexity plays a crucial role as a determinant for recreating competitive advantage and innovation in business and innovation ecosystems, respectively. One great advantage of using the ecosystem concept and its related construct is that it becomes immediately obvious that the previous linear model has become obsolete (e.g. value chain), since it underestimates the complexity of doing business between a wide spectrum of actors in an environment featuring multiple interdependencies.

Moving on to entrepreneurship, scholars refer to the entrepreneurial ecosystem as the interaction of systemic conditions and framework conditions – thus considering both the biotic and the abiotic components of the EE (Stam and Spiegel, 2016). Hence, in the same way as the system of living organisms is considered to be at the heart of the ecosystem in biology, in entrepreneurship, the systemic conditions, such as networks of entrepreneurs, leadership, finance, talent, knowledge and support services, are considered to be at the heart of the entrepreneurial ecosystem, while the framework conditions entail a social context that enables or constrains human interaction (Stam and Spiegel, 2016). In a similar vein, Autio and Levie (2015) and Sussan and Acs (2017) use the terms agents and micro-ecosystem, respectively, when referring, the former, to the biotic component and, the latter, to the institutional and macro-ecosystem for the abiotic component of the entrepreneurial ecosystem. A virtuous and reinforcing cycle can be generated between the biotic and abiotic components, which are regarded as linked together through nutrient cycles and energy flows (Sussan and Acs, 2017), whereas, in an EE such flows can be represented by local “successful” startups with a proven business model that scale up globally. It is, indeed, very likely that these “successful” startups bring value back - from the global to the local arena - in the form, for instance, of financial resources to be invested in other local and promising startups. Policymakers should make it priority to activate cycles of this kind and so enable these flows.

According to Mason and Brown (2014), the ecological approach of the EE framework has links to ‘economic gardening’, seen as a metaphor for local economic development, where specific environments promote high numbers of both new business startups and high-growth firms. Auerswald (2015) compares EEs to dynamically stable networks of interconnected organisms and inorganic resources that form their own distinct domain of analysis. The biological/ecological view of entrepreneurship can help us to establish the structure of the ecosystem and the relationships within it. Ecosystems are also described as geographically bounded areas with mutually dependent components (Auerswald, 2015; Napier and Hansen, 2011). The dynamics of ecosystems are analyzed through ecological concepts such as diversity, selection, related diversification, resilience and

adaptation (Auerswald and Dani, 2017; Boschma, 2015; Alvedalen and Boschma, 2017). According to Roundy et al. (2017), scholars should carefully consider the biological metaphor of the ecosystem: they argue that the EE is more complex than the biological ecosystem, since, in the latter, agents have no aspirations about how the system should function.

As a whole, using the biological analogy, it is clear the concept of EE is driving towards an approach to entrepreneurship that is evolutionary, socially interactive and non-linear (Cooke, 2016; Colombelli et al., 2017). In particular, the ecosystem approach draws attention to the fact that entrepreneurship takes place in a community of interdependent actors, individuals, entities and regulatory bodies within a given geographic area (Freeman and Audia, 2006; Isenberg, 2010; Malecki, 2011; Kuratko et al., 2017).

Entrepreneurship literature already provides several definitions of EE. Table 2 contains a list of the main EE definitions provided in literature. In reality, the concept has been used diversely in literature, making it rather 'chaotic' (Martin and Sunley, 2003) or 'fuzzy' (Markusen, 1999). According to Spiegel, the concept can be seen as "[...] a conceptual umbrella encompassing a variety of different perspectives on the geography of entrepreneurship rather than a coherent theory" (Spigel, 2017, p. 1). In this paper, on the basis of Stam (2015, p. 5), we take entrepreneurial ecosystem to mean a "set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory". Early definitions of EE (e.g. Van de Ven, 1993; Spilling, 1996; Neck et al., 2004) have pointed out two main aspects: 1) the interaction between actors and components is a dimension of complexity; and 2) the creation of new ventures is the end aim of the EE. Other scholars describe in more detail the actors and components involved in EE (e.g. Mason and Brown, 2014; Isenberg, 2011) and introduce a regional development perspective as its ultimate aim. Building on previous contributions, Stam (2015) has the merit of shifting the locus of EE's investigation to "productive" (i.e. innovative and growth-oriented) entrepreneurship, which is a key change in perspective for entrepreneurship research - typically more inclusive and wide-ranging when considering new ventures. In a similar vein, Spigel (2017) captured this "productive" dimension, connecting it to a broad stream of research in entrepreneurship literature that already existed before the concept of EE had emerged. Moreover, according to Stam's (2015) definition, territory-specificity is a dimension of EE rather than a tool for regional and local EE development (see Spilling, 1996; Cohen, 2006). Following Stam (2015), other scholars have stressed the "territory"-specific dimension of an EE (e.g. Colombelli et al., 2017; Cavallo et al., 2018), despite the argument that the current trends of digital technology and globalization should be reducing spatial dependence (Anselin et al., 1997; Florida et al., 2017; Acs et al., 2017).

In view of these arguments, Stam's (2015) definition has been widely endorsed in literature for its comprehensive nature, since it encompasses all the key features of the EE (Acs et al., 2017).

**Table 2 - Definitions of the Entrepreneurial Ecosystem**

<b>Authors (year)</b>	<b>Article's Title</b>	<b>Source</b>	<b>Definition of EE</b>
Van de Ven (1993)	<i>The development of an infrastructure for entrepreneurship</i>	<i>Journal of Business Venturing</i>	“Networks of actors involved in developing each function, and how these functions and networks of actors interacted over time to facilitate and constrain innovation development” (p.218)
Spilling (1996)	<i>The Entrepreneurial System: On Entrepreneurship in the Context of a Mega-Event</i>	<i>Journal of Business Research</i>	“The entrepreneurial system consists of a complexity and diversity of actors, roles, and environmental factors that interact to determine the entrepreneurial performance of a region or locality” (p.1)
Neck, Meyer, Cohen and Corbett (2004)	<i>An Entrepreneurial System View of New Venture Creation</i>	<i>Journal of Small Business Management</i>	Entrepreneurial ecosystems are defined as the interacting components of entrepreneurial systems, which foster new firm creation in a specific regional context.
Cohen (2006)	<i>Sustainable Valley Entrepreneurial Ecosystems</i>	<i>Business Strategy and the Environment</i>	“Sustainable entrepreneurial ecosystems are defined as an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures” (p. 3)
Isenberg (2011)	<i>Introducing the entrepreneurship ecosystem: Four defining characteristics</i>	<i>Forbes</i>	“The entrepreneurship ecosystem consists of six domains. Actually, the entrepreneurship ecosystem consists of hundreds of specific elements that, for convenience, we group into six general domains: a conducive culture, enabling policies and leadership, availability of appropriate finance, quality human capital, venture-friendly markets for products, and a range of institutional and infrastructural supports” (p.1)

<b>Authors (year)</b>	<b>Article's Title</b>	<b>Source</b>	<b>Definition of EE</b>
Roberts and Eesley (2011)	<i>Entrepreneurial impact: the role of MIT-an updated report</i>	<i>Foundations and Trends in Entrepreneurship</i>	“A complex community of living and non-living things that are functioning together as a unit” (p.51)
Qian, Acs, and Stough (2013)	<i>Regional systems of entrepreneurship: The nexus of human capital, knowledge and new firm formation</i>	<i>Journal of Economic Geography</i>	“Those economic, social, institutional and all other important factors that interactively influence the creation, discovery and exploitation of entrepreneurial opportunities” (p. 561).
Acs, Autio, and Szerb (2014)	<i>National systems of entrepreneurship: Measurement issues and policy implications.</i>	<i>Research Policy</i>	“A dynamic, institutionally embedded interaction between entrepreneurial attitudes, abilities, and aspirations, by individuals which drives the allocation of resources through the creation and operation of new ventures” (p.479)
Mason and Brown (2014)	<i>Entrepreneurial ecosystems and growth oriented entrepreneurship<sup>2</sup></i>	<i>Organization for Economic Co-operation and Development (OECD)</i>	“A set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of ‘blockbuster entrepreneurship’, number of serial entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment” (p. 5)
Mack and Mayer (2015)	<i>The evolutionary dynamics of entrepreneurial ecosystems</i>	<i>Urban Studies</i>	“Entrepreneurial ecosystems (EE) consist of interacting components, which foster new firm formation and associated regional entrepreneurial activities” (p.3)

<sup>2</sup> Background paper prepared for the workshop organised by the OECD LEED Programme and the Dutch Ministry of Economic Affairs on Entrepreneurial Ecosystems and Growth Oriented Entrepreneurship

<b>Authors (year)</b>	<b>Article's Title</b>	<b>Source</b>	<b>Definition of EE</b>
Stam (2015)	<i>Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique</i>	<i>European Planning Studies</i>	“The entrepreneurial ecosystem as a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory (p.1765)
Audretsch, and Belitski (2016)	<i>Entrepreneurial ecosystems in cities: establishing the framework conditions</i>	<i>The Journal of Technology Transfer</i>	“A dynamic community of inter dependent actors (entrepreneurs, suppliers, buyer, government, etc.) and system-level institutional, informational and socioeconomic contexts... interact via information technologies and networks to create new ideas and more efficient policies” (p. 4)
Auerswald, and Dani (2017)	<i>The adaptive life cycle of entrepreneurial ecosystems: the biotechnology cluster</i>	<i>Small Business Economics</i>	“Represents the higher-level infrastructure that enables interactions between the entrepreneurial agents and institutions in the industrial sector... They cut across industries and focus on the environment surrounding entrepreneurs - with entrepreneurs and entrepreneurship clearly at the centre” (p.98 and p.113)
Bruns, Bosma, Sanders, and Schramm (2017)	<i>Searching for the existence of entrepreneurial ecosystems: a regional cross-section growth regression approach</i>	<i>Small Business Economics</i>	“Entrepreneurial ecosystem as a multidimensional set of interacting factors that moderate the effect of entrepreneurial activity on economic growth” (p.1)
Kuratko, Fisher, Bloodgood and Hornsby (2017)	<i>The paradox of new venture legitimization within an entrepreneurial ecosystem</i>	<i>Small Business Economics</i>	“Entrepreneurial ecosystem as coordinated attempts to establish environments that are conducive to the probabilities of success for new ventures following their launch... entrepreneurial ecosystems are focused on creating environments conducive to the success of entrepreneurs and their new ventures” (p.120)

<b>Authors (year)</b>	<b>Article's Title</b>	<b>Source</b>	<b>Definition of EE</b>
Spigel (2017)	<i>The Relational Organization of Entrepreneurial Ecosystems</i>	<i>Entrepreneurship Theory and Practice</i>	“A combination of social, political, economic, and cultural elements within a region that support the development and growth of innovative start-ups and encourage nascent entrepreneurs and other actors to take the risks of starting, funding, and otherwise assisting high-risk ventures” (p.50)

By comparing the EE construct with business and innovation ecosystems, we can highlight some key EE features. EE constructs share several aspects with business and innovation ecosystems, mostly connected to the “ecosystem approach” itself. In particular, EE emphasizes the complexity and non-linearity of entrepreneurship, properties that, previously, were equally a major feature of business and innovation ecosystems in the fields of strategy and innovation, respectively. Identifying the precise boundaries of an ecosystem may be an impossible task (Iansiti and Levien, 2004); therefore, entrepreneurial, business and innovation ecosystems all typically encompass several shared domains. For instance, the innovation domain is central to innovation ecosystems as well as to “productive” EEs. Similarly, collaboration between large organizations and small innovative new ventures are a crucial component of business and innovation as well as of entrepreneurial ecosystems. Nevertheless, when analyzing collaborations of this kind, the perspective changes for entrepreneurial, business and innovation ecosystems in terms of their focal point, critical relations and main outcome. In business ecosystems, a focal firm must learn how to orchestrate its ecosystem so that it can pursue a competitive advantage (Iansiti and Levien, 2004); in innovation ecosystems, the main aim is to create new value through innovation (Autio and Thomas, 2014); while, in EEs, the focal point is represented by the creation of new ventures (Stam, 2015).

Together with creating the abstract concept of an EE, the extant literature has also produced a considerable number of frameworks that describe the main components and key attributes of an EE (Kuratko, 2017, p. 5). Borrowing from Mason and Brown (2014), an EE is made up of “...entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of ‘blockbuster entrepreneurship’, number of serial entrepreneurs,



degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment”. Early research on EEs focused on the economic actors in charge of building the EE, their interaction through formal and informal networks, the environmental factors that exist in a given region and the physical infrastructures found there (Spilling, 1996; Neck, 2004; Cohen, 2006). Subsequently, more detailed representations of an EE have emerged (Isenberg, 2011; Feld, 2012; WEF, 2013; Mason and Brown, 2014). Irrespective of the differences between the elements characterizing this second generation of EE frameworks, all highlight the importance of entrepreneurial culture within the ecosystem.

The flourishing of frameworks that describe EEs also encountered its critics. According to several scholars (e.g. Stam, 2015), too much attention has been spent on the elements of the system without proper importance being given to the connections between these elements and their dynamics of evolution (Acs et al., 2016). Some of the frameworks have been dismissed as nothing more than a “long laundry list of relevant factors without a clear reasoning of cause and effect” (Stam, 2015, p.1764). These EE frameworks have proposed a static point of view that describes relationships within an EE without considering its evolution over time (Borissenko and Boschma, 2017) and where all the elements seem to be considered as equally important. Furthermore, the EE literature has been criticized for its poor clarity concerning the level of analysis (e.g. city, region or country) relating to this approach (Stam, 2015).

Hence, addressing the lack of any dynamic and multi-scalar perspective or a cause-effect relationship seems to be the starting point for all eventual future studies on EEs, with the purpose of creating core analytical EE frameworks (Mack and Mayer, 2016). The open debates and direction of future research will be discussed in detail in the following sections.

## **4. Antecedents of the Entrepreneurial Ecosystem**

The traditional entrepreneurship literature had focused heavily on the ‘Schumpeterian’ entrepreneur, while little attention has been spent on studying the systemic nature of entrepreneurship (Zahra and Wright, 2011; Zahra et al., 2014). Research in entrepreneurship has tended to neglect the role of context, providing as a consequence generic models of entrepreneurial activity (Zahra et al., 2014). The context was mostly considered by means of a proxy or control variables without any deeper analysis of the cultural, social and economic structures that have a high influence over the entrepreneurs’ action space and the efficiency of their action. Before the outset of entrepreneurial ecosystem research, only few scholars dwelled on the role of an

entrepreneurial-friendly environment (Pennings, 1982; Dubini, 1989; Van de Ven, 1993; Bahrami and Evans, 1995). These contributions can be considered as antecedents of EE research. In actual fact, EE research builds on a specific pillar: without the right socio-economic conditions, the Schumpeterian entrepreneur's efforts may prove to be vain. Contextual variables have been the locus of investigation in regional development literature. According to Acs et al. (2017), a family of related concepts, which include industrial districts, regional industrial clusters, regional and/or national innovation systems and innovative milieus, and are part of the wider regional development literature, are themselves antecedents of EE research (Arikan and Schilling, 2011; Delgado et al., 2010; Pyke et al., 1990; Marshall, 1920). In common with the literature on regional development, EE research also places extreme attention on institutional factors and on regional and social settings. Specifically, while adopting an ecosystem perspective, scholars recognize that social context plays a fundamental role in allowing (and restricting) entrepreneurship, without discarding the individual perspective (Acs et al., 2014; Neck et al., 2004). Although the Schumpeterian tradition greatly shapes regional development literature, national innovation systems treat individuals almost exogenously. Entrepreneurship is a broader field which includes contexts relating to temporal, social, organizational and market dimensions (Zahra, 2007; Zahra et al., 2014). EE research combines contextual factors relating to the individual in a truly systemic view of entrepreneurship (Stam, 2015; Sussan and Acs, 2017). There has been a shift in the locus of investigation from entrepreneurs seen as 'economic supermen' to entrepreneurship seen as a process embedded in a particular social and local context (Steyaert and Katz, 2004).

Location may also have a great and complex influence over entrepreneurship (Johannisson, 2011). Cooke (2016) argues that the emerging research into EE necessarily entails an evolutionary, socially interactive and non-linear approach. In particular, according to his evolutionary perspective, individual and collective learning inevitably takes place between firms and their supporting institutional factors. The interactive nature of the entrepreneurial process is in contrast with previous literature based on a unitary, atomistic and individualistic view of entrepreneurship (Cooke, 2016). On the other hand, the role of the Schumpeterian entrepreneurs in the EE approach is not only retained, but is crucial and, according to Feld (2012, p.25), is "the most critical component of a startup community is that entrepreneurs must lead it". In addition, Feld (2012) says that the attempts by policymakers to build an entrepreneurial environment often fail because of a lack of engagement with entrepreneurs.

In a similar vein, innovation system literature can also be considered as an antecedent to EE. Both these literature streams explore how institutions influence the interactions within the networks of actors and how they are involved in the generation, diffusion and use of innovations (Borissenko and Boschma, 2017). The main difference lies, however, in the fact that literature on innovation systems focuses on organizations and

institutions, treating individuals as if they were external to the subject matter, while in EE the focal point is the entrepreneur, rather than the enterprise.

According to Acs et al. (2017), literature on strategy also contains concepts that can be regarded as antecedents to EE research. He specifically refers to the concept of the business ecosystem, introduced by Moore (1993). One great merit of the business ecosystem concept is that it introduces the need to orchestrate a set of actors if a value proposition is to materialize in the market (Adner, 2017). Business ecosystems are seen as the context in which firms must exercise their capacity of creating and capturing value generated in the surrounding systems, producing complementary products and services (Moore, 1993; Iansiti and Levien, 2004; Adner and Kapoor, 2010; Williamson and De Meyer, 2012; Letaifa, and Reynoso, 2015; Acs et al., 2017). Acs et al. (2017) claim that the entrepreneurial ecosystem may represent the breeding ground for a business ecosystem. Autio et al. (2017) provide a further argument that links strategy literature and EE research, stating that there is a “predominance of business model innovation...” within the EE (Autio et al., 2017, p. 6). Experimenting with business models is facilitated in an entrepreneurial ecosystem, since entrepreneurs can create and capture value by interacting with the key EE actors. EEs are systems that entail the entrepreneurial opportunities of discovering, pursuing and scaling up new ventures (Acs et al., 2014; Autio et al., 2017). In this context, digitization plays a fundamental role in enabling new ventures to re-invent the way in which they create, capture and deliver value (Autio et al., 2017; Prahalad and Ramaswamy, 2003; Urbinati et al., 2018) within an EE.

The current debate on EE research highlights the point that the EE is not an industry-specific concept, which is instead the case for industrial districts and other cluster forms embedded in regional development literature (Autio et al., 2017; Spigel, 2017; Pitelis, 2012). Investigations into EEs should embrace firms operating in a variety of industries, all of which must necessarily be innovative and growth-oriented (Stam and Spigel, 2016). Furthermore, recently scholars have argued that digitization is reducing spatial dependence and that entrepreneurship is becoming much less of a local phenomenon (Autio et al., 2017), thus highlighting another reason to remove EE research from the category of traditional literature on regional development. Opposing this view, other scholars still consider the local dimension to be crucial for investigating entrepreneurship (Acs et al., 2017); they consider it useful to analyze EE by drawing on regional development mechanisms, such as district economies, urban economies and localization economies. Table 3 summarizes the main antecedents of EE research.

### **Table 3 - Antecedents of the Entrepreneurial Ecosystem**

Concept	Emphasis /Key findings	Examples
<i>Industrial districts</i>	It emphasizes the local division of labour of an industry and the concentration of small businesses of a similar character in particular localities, leveraging on external economies of scale.	<i>Marshall (1920)</i>
<i>Regional industrial clusters</i>	It focuses on geographic concentrations of interconnected companies, which benefit from the local sectoral specialisation and knowledge spillovers.	<i>Porter (1998)</i>
<i>City/Regional/ National innovation systems</i>	Refer to the networks and institutions linking knowledge producing hubs such as universities and public research labs with innovative firms within a city/region/nation. These linkages allow knowledge to spill over between different organizations, increasing a region's overall innovativeness	<i>Cooke et al. (1997)</i>
<i>Business ecosystem</i>	It refers to the set of partners that need to be brought into alignment in order for a value proposition to materialize in the market place	<i>Moore (1993); Adner (2017)</i>
<i>Entrepreneurial Infrastructure</i>	It focuses on how the networks of actors involved in developing several functions interact over time to facilitate and constrain innovation development.	<i>Van de Ven (1993)</i>
<i>Entrepreneurial environment</i>	It refers to a combination of environmental conditions (economic, sociocultural, and political factors) that play a role in the development of entrepreneurship and enhancement of entrepreneurial activities.	<i>Dubini, (1989), Gnyawali and Fogel (1994)</i>
<i>Entrepreneurial system</i>	It refers to diversity and complexity of actors, roles, and environmental factors that interact to determine the entrepreneurial performance of a region.	<i>Spilling (1996)</i>
<i>Entrepreneurial ecosystems</i>	It emphasizes the interactions of entrepreneurial attitudes, abilities, and aspirations characterizing the individuals, which drive the creation and operation of new ventures.	<i>Acs, Autio, and Szerb (2014)</i>

## 5. Entrepreneurial Ecosystem Research: Investigation Guidelines

The current debate on entrepreneurial ecosystems is still open on several critical points. Recent literature has provided several definitions for EE, as well as a number of reference frameworks describing the key EE elements and factors (Kuratko et al., 2017; Alvedalen and Boschma, 2017). The antecedents of EE taken from regional development and strategy literature have been described in many studies (Acs et al., 2017) and empirical investigations have also been conducted in specific social contexts (Stam and Spigel, 2016). Acs et al. (2014) used quantitative methods to analyze a number of strong entrepreneurial ecosystems that resulted in innovative entrepreneurship. Other studies have focused on how a rich EE can enable entrepreneurship (Fritsch, 2013; Tsvetkova, 2015; Spigel, 2017). Even when they do not introduce the specific term EE, other works on regions, including Silicon Valley (Saxenian, 1994; Kenney and Patton, 2005), Washington DC (Feldman, 2001) and Kyoto (Aoyama, 2009) have examined the factors that nurture entrepreneurship within a specific environment (Stam and Spigel, 2016). Recently, Acs et al. (2017) have looked at the number of Unicorns (i.e. new ventures valued at more than \$1 billion), considering this to be a measure of performance for an EE. This use is consistent with the definition of EE provided by Stam (2015), which predominately means a productive entrepreneurship emanating from ambitious entrepreneurs who are keen to grow rapidly and scale up as soon as possible (Stam et al., 2012). Neumeyer et al. (2017) used social network data analysis to examine the EE, seen as a complex social organization. Scholars have also provided comparisons between EEs (e.g. Kshetri, 2014), while using measures that are traditional in entrepreneurship, such as job creation, while Bell-Masterson and Stangler (2015) have provided an early proposal to weigh and measure EEs.

Although several empirical investigations have been undertaken on EEs, little is known about how an EE can be studied, evaluated and measured. EEs have been widely recognized as complex and “evolving” and dynamic systems (Acs et al., 2014; Feld, 2012; Isenberg, 2010; Spigel, 2017; Dubina et al., 2017). Studying a dynamic and complex system as a whole may ultimately be an irksome task, and scholars are still asking themselves which methods are best suited to this challenge (Harrison et al., 2007). In keeping with one of the main goals of this study, we are offering a set of guidelines that can be used to assess and gain a fully comprehensive understanding of an EE.

Building on the main constituting concepts found in EE’s definition provided by Stam (2015), in Table 4, we have shown the EE guidelines and related supporting extant research. Following on, we will provide the theoretical foundation and description of each Entrepreneurial Ecosystem guideline.

**Table 4 - EE Research: Investigation Guidelines**

EE conceptualization (Stam, 2015)	EE research - Investigation Guidelines	Extant research
“set of interdependent actors”	<i>1) Study the main entrepreneurial dynamics and their governance</i>	e.g. Dutta and Folta, 2016; Croce et al., 2016; Colombo and Grilli, 2010; Stam and Elfring, 2008; Grimaldi and Grandi, 2005; Colombelli et al., 2017.
..“enable productive entrepreneurship”..	<i>2) Start from analysis of sub-systems or micro-systems part of the wider Entrepreneurial Ecosystem</i>	e.g. Miller and Acs, 2017; Sterman, 2000; Ghaffarzadegan et al., 2011; Forrester, 2007; Pruyt 2013.
..”within a..territory”	<i>3) Focus on innovative and growth oriented entrepreneurship</i>	e.g. Shane, 2009; Stam et al., 2012; Mason and Brown, 2013; Henrekson and Sanandaji, 2014; Stam and Spigel, 2016.
	<i>4) Focus on a specific territory</i>	e.g. Neck; 2004; Acs et al., 2017; Anselin et al., 1997; Florida, 2004; Florida et al., 2017; Acs et al., 2017

***EE Investigation guideline 1: Study the main entrepreneurial dynamics and their governance***

The term entrepreneurial dynamics typically refers to three main phases in a startup lifecycle, from its formation to its stability or exit phase (Kazanjian, 1988). These three phases are: a) new venture creation; b) new venture growth and c) new venture stability or exit phase – which, in the best case, can lead to an initial public offering (IPO) and, in the worst case, to a write-off. Hayward et al. (2006) argue that the literature on entrepreneurship should examine the overall entrepreneurial process, from when a new venture is formed to its exit, and so include the failures. The extant literature explains how interaction among different actors can

influence entrepreneurial dynamics. For instance, according to Gartner (1985), entrepreneurial creation dynamics are the outcome of the interaction among several actors and factors. He pays particular attention to “environmental” factors, which may arguably be considered as antecedents of EE research. Stam and Elfring (2008) have shown how the performance of a new venture can be influenced by networks and social ties between entrepreneurs both within and from outside that specific industry. Dutta and Folta (2016), Croce et al. (2016) and Colombo and Grilli (2010) have investigated the role played by investors in affecting a new venture’s performance and growth. Recently, Nylund and Cohen (2017), while introducing the concept of collision density (Cohen and Muñoz, 2016), have investigated the growth of urban EEs. Grimaldi and Grandi (2005) have examined the interaction between new ventures and incubators, while explaining the dynamics of entrepreneurial creation. Similarly, Pena (2004) analyzed the influence of incubators on entrepreneurial growth dynamics. These examples are merely a selection from among the numerous studies that examine entrepreneurial dynamics resulting from the interaction between new ventures and other actors, although they do not explicitly adopt an ecosystem perspective. Moreover, the debate is currently open on how these entrepreneurial dynamics can be governed (see e.g. Colombo et al., 2017) and which key actors are likely to play a major role here. Among the proposed candidates are: nothing/ nobody; Isenberg’s (2010) “invisible hand”; policymakers; (Stam, 2015); universities (Miller and Acs, 2017); large corporations (Bhawe and Zahra, 2017), investors (Colombo and Murtinu, 2017); and joint ventures (Audretsch and Link, 2017). Questions have also been raised about the phase in the EE evolutionary process in which these actors should participate and intervene (Colombelli et al., 2017). There is, thus, an emerging need to place order among the recent and valuable contributions and create a common perspective shared by scholars on the governance mechanisms that regulate the EE evolutionary process.

### ***EE Investigation guideline 2: Analyze sub-systems of the wider Entrepreneurial Ecosystem***

Scholars in EE research have criticized the systematic use of static approaches modelling the EE and its main relationships (Mack and Mayer, 2016; Mason and Brown, 2014; Spigel, 2017; Alvedalen and Boschma, 2017). EEs are evolving, socially interactive and non-linear systems (Cooke, 2016), where successful entrepreneurs can contribute towards creating the conditions and culture that spur on further entrepreneurial development (Spigel, 2017). This can be considered as a virtuous or self-reinforcing cycle. Spigel (2017), indeed, has observed that, in an EE, elements can develop simultaneously and reinforce each other, though they can never replace one another completely (Acs et al., 2014). Roundy et al. (2017) argued in favour of the heterogeneous nature of EEs, considering the diversity of the relative participants, type of ventures, business models and support organizations. Other scholars have called attention to the “connectivity” between EE elements/actors,

seeing them as interconnected and interdependent on each other (Motoyama and Knowlton, 2017). As described above, the entrepreneurial ecosystem can, therefore, be considered as a system that is complex and adaptive or dynamic (Acs et al., 2014; Feld, 2012; Isenberg, 2010; Spigel, 2017; Neumeier et al., 2017). Forrester (1970), followed by Sterman (2001) and other scholars, developed a mathematical modelling technique to frame and study a complex and dynamic system. Using simulations and computer modelling, this methodology became quite successful and effective in both the public and private sectors. In line with this, some scholars have provided early studies that introduce system dynamics into EE research (Yearworth, 2010; Yun et al., 2017): however, so far, simulations have been applied in a very limited manner within the management field – especially when dealing with qualitative rather than quantitative information – and the area is still underdeveloped due to issues in the validation process (Harrison et al., 2007). Scholars have also questioned the feasibility of modelling a complex and dynamic system as a whole (Pruyt 2013). One of the traps that novice modellers fall into is to build big models to address big issues. The assumption is that the more all-encompassing and detailed the model, the more “valid” it tends to be and there is a general tendency to model “big problems with big models” (Barlas, 2007, p.470). However, it may be more useful to develop smaller systems, focusing on one part of a wider ecosystem (Sterman, 2000; Ghaffarzadegan, 2011). This concept was taken up by Forrester (2007) himself, who argued that smaller models can be incredibly powerful. As result, for instance, some scholars have recently decided to focus on smaller but representative sub-systems that are part of the wider EE (see Miller and Acs, 2017; Huang-Saad et al., 2016).

### ***EE Investigation guideline 3: Focus on innovative and growth-oriented entrepreneurship***

Previous research had already focused on high-quality startups. For instance, basing their research on signalling theory, several scholars have concentrated on funded startups or, more precisely, on VC-backed startups (e.g. Davila et al., 2003). The need to focus on “productive entrepreneurship” emerged explicitly in Stam (2015), as he provided the very definition of EE. In exploring entrepreneurial ecosystems, Stam (2015) and Acs et al. (2014) observed that EEs should lead to successful entrepreneurs and firms. In line with this, Acs et al. (2017) proposed to concentrate on Unicorns, a small elite group of startups that had demonstrated their scalable potential by exploiting a given platform strategy (Evans and Schmalensee, 2016). However, by narrowing the entrepreneurial ecosystem to Unicorns, taken as the expression or symbol of the best of the best new ventures, we risk losing part of the entrepreneurial picture. Thus, scholars consider the entrepreneurs’ intention<sup>3</sup> as the strongest predictor of entrepreneurial activity (Krueger et al., 2000; Obschonka et al., 2010)

<sup>3</sup> Entrepreneurial intention is defined as the conscious state of mind that directs personal attention, experience and behaviour towards planned entrepreneurial behaviour (Bird, 1988)



and focus on firms led by ambitious entrepreneurs who intend to grow and scale rapidly – i.e. high-growth startups or ‘scale-ups’ (Stam et al., 2012; World Economic Forum, 2013; Mason and Brown, 2014; Stam and Spigel, 2016). According to Alvedalen and Ron Boschma (2017), EE research aims to provide an explanation of entrepreneurship and, specifically, of high-quality, ambitious entrepreneurship. Although this may seem over-exclusive, it is clear that EE research does not, by definition, include the traditional entrepreneurship and traditional indicators of entrepreneurship, such as ‘self-employment’ or ‘small businesses’ (Stam and Spigel, 2016). As a result, the literature on entrepreneurship shows a growing and predominant interest in innovative and growth-oriented new ventures, rather than on the traditional measures of entrepreneurship (Shane, 2009; Stam et al., 2012; Mason and Brown, 2013; Henrekson and Sanandaji, 2014; Stam and Spigel, 2016; Cavallo et al., 2018).

#### ***EE Investigation guideline 4: Focus on a specific territory***

Although Acs et al. (2014) recently undertook a cross-country analysis, making a comparison between various entrepreneurial ecosystems, several scholars have specifically directed their research towards studying region-specific ecosystems (Fritsch, 2013; Tsvetkova, 2015; Spigel, 2017). Even before the emergence of EE research, some scholars would refer to a specific territory. Saxenian (1994) and Kenney and Patton (2005) analyzed the agglomeration of tech firms in Silicon Valley. Similarly, Feldman (2001) focused on Washington DC and Aoyama (2009) on the city of Kyoto (Stam and Spigel, 2016). Cluster literature employed various mechanisms, including Marshallian economies, Jacob economies and district economies, to reach the conclusion that new venture agglomerations are localized and regional systems of learning and innovation (Autio et al., 2017; Asheim et al., 2011). Autio et al. (2017, p. 20), however, argued that the “locus of entrepreneurial opportunities exploited by new ventures in entrepreneurial ecosystems are largely external to a cluster”, as a result of digitization and globalization. In other words, entrepreneurship is losing its local dimension. In opposition to this view and in agreement with Acs et al. (2017), Anselin et al. (1997) and Florida et al. (2017), we have considered the local dimension to still be a dominant ingredient in entrepreneurship, and deserving of further research.

## 6. Avenues for future research on Entrepreneurial Ecosystem

In this section, we discuss the main underdeveloped topics of research, following on from each of the investigation guidelines previously proposed. Therefore, we have suggested and formulated a set of promising research questions that could advance EE research.

### *EE Investigation guideline 1: research questions*

As stated previously, a wide body of entrepreneurship literature is already involved in exploring the main entrepreneurial dynamics of new venture creation, growth, and stability – though less attention has been spent on the cases of failure. Therefore, we are adamant that studies on new venture lifecycles are essential if we are to gain an understanding of EEs, since several EE scholars consider the lifecycle to be at the heart of EE research (Stam, 2015).

At this point, scholars should embrace a further step and focus on what we could call the dynamics and governance of the entrepreneurial ecosystem. Scholars should advance the current understanding of how to create an EE, what makes it grow and, ultimately, what leads to a sustainable EE. The traditional literature on entrepreneurship sheds light on the main entrepreneurial dynamics, by focusing on new ventures and their interaction with a few other agents/actors, which, actively or passively, take part in the wider EE life. Future studies should try to involve a wider spectrum of actors that play a major role in the EE lifecycle – i.e. its creation, growth, stability or sustainability – in order to advance the EE research along the right lines. Hence, we suggest the following questions:

- Q1: How is an EE created?
- Q2: How is the EE's growth nurtured?
- Q3: How is the EE's sustainability ensured?

Moreover, scholars should study whether entrepreneurial ecosystems are governed by “natural” and/or “artificial” mechanisms (Colombo et al., 2017), which allow them to exploit their potential to its full, in terms of entrepreneurial dynamics. A reasonable answer could be that we must find a sensible equilibrium between heavy policy intervention and self-regulating mechanisms, although scholars are still debating on this point. In addition, policymakers have the faculty of introducing measures that make a direct impact on entrepreneurial dynamics or, more realistically, they can facilitate and encourage “natural” and self-regulating mechanisms.

As a result, this argument opens up a very promising debate on the role that policymakers should play in EEs. Specifically:

- Q4: How should policymakers intervene to enable rather than regulate the entrepreneurial dynamics concerning the origins, growth and stability of new ventures?

### ***EE Investigation guideline 2: research questions***

One of the main concerns of scholars with reference to EE research is to define how an EE can be studied. The tendency to model “big problems with big models” (Barlas, 2007, p.470) is also found in studies dealing with EEs as complex and dynamic systems (Acs et al., 2014). Similarly, we have witnessed the systematic use of static approaches to model EEs and their main relationships (Mack and Mayer, 2016; Mason and Brown, 2014; Spigel, 2017; Alvedalen and Boschma, 2017). Studying complex and dynamic systems has never been an easy task. This is especially true when modelling a complex and dynamic system as a whole from a static perspective. While dealing with this issue, scholars have been trying to draw on system dynamics (SD) and simulation methodology (e.g. Yearworth, 2010), others have made use of network analysis (Neumeier et al., 2017). While we recognize that applying SD as mentioned above could be problematic in management-related fields of research (Harrison et al., 2007), it may be a welcome methodological challenge for scholars keen to publish more work. This consideration leads to the following methodological research question:

- Q5: How can the System Dynamics methodology support EE research?

In addition, and consistently with the investigation guidelines set out above, another way to deal with the complexity of EEs is to focus on its main sub-components and how they interact (Simatupang et al., 2015). Several scholars have concentrated on smaller sub-systems, that are however representative of the wider EE, such as business incubators (e.g. Theodoraki and Messeghem, 2017). Scholars engaged in early attempts to study EEs by making use of SD methodology are also concentrating on smaller subsystems. Yearworth (2010), for instance, studied a subsystem composed of new ventures, incubators and investors. We believe that identifying and understanding the main sub-systems of an EE and, accordingly, studying their interactions, is potentially a promising direction for future research. This could lead to distinguishing between critical and non-critical sub-systems, and scholars and policymakers should be aware of this distinction. Isenberg (2010) argues that policymakers should act to enhance every aspect and component of an EE. While we believe that this remark is true, realistically, it cannot always be applied. As scholars, we should help policymakers to identify priorities and focal components of EEs. As a result, we have proposed a further set of research questions:

- Q6: Which critical EE sub-systems should policymakers give greater priority to?
- Q7: How do critical EE sub-systems interact?
- Q8: What are the key relations between critical sub-systems and between critical and non-critical subsystems in an EE?

### ***EE Investigation guideline 3: research questions***

Regarding the third guideline, we can clearly see that most of the extant research is already going in the direction of investigating innovative and growth-oriented entrepreneurship. For instance, several special issues recently published in academic outlets, such as *Research Policy* and the *Strategic Entrepreneurship Journal*, have dealt explicitly with Digital Entrepreneurship. Generally, digital ventures are considered as an expression of “productive entrepreneurship”, which is implicitly associated with innovation and growth-orientation. Furthermore, some scholars have already introduced the concept of the digital entrepreneurial ecosystem (Sussan and Acs, 2017). However, scholars should not take for granted that every digital new venture is innovative *per se* and, on the contrary, that everything that is not digital is not innovative. In addition, the hi-tech sector also includes industries other than digital, such as clean-tech, life-science and biotech. Several suggested research questions stem from this area:

- Q9: What are the factors that enable the growth of new digital ventures?
- Q10: What is the relationship between the growth of new ventures (firm level) and that of EEs (system level)?
- Q11: What are the key similarities and differences between EEs and Digital EEs?

### ***EE Investigation guidelines 4: research questions***

As a fourth investigation guideline, we argue that the local dimension is still relevant, despite the processes of digitization and globalization (Autio et al., 2017). Scholars have investigated EE at urban, regional and national level. We believe that the optimal level of analysis for an EE is still a matter in need of further contributions. For instance, scholars may use network analysis to identify where there is a dense network of relationships. As a consequence, we have set the final research question:

- Q12: How can the optimal level of analysis for the EE be identified?

## 7. Conclusion

This study provides a critical literature review on EE and the avenues for future research. We have reviewed the concept of EE, its key attributes and the antecedents stemming from entrepreneurship, strategy and regional development literature. Combining prior research with building on the main constituting concepts of the entrepreneurial ecosystem, we have developed an original set of guidelines for scholars and practitioners, which can help in the process of gaining a comprehensive understanding of an entrepreneurial ecosystem. Finally, we have discussed the opportunities for extending our current knowledge and directing future research on entrepreneurial ecosystems, and developed a set of suggested research questions.

This study is not free of limitations. First, our literature review is based on a selected sample of relevant articles dealing with EE research, rather than being an extensive or systematic process. It follows that, as the selection was partly influenced by the authors' critical opinion of whether a given study was relevant or not to EEs, there is the possibility that other potentially relevant studies were excluded during the selection process. Basing the literature review on the more inclusive Scopus database could possibly reduce this limitation, whereas our careful critical scrutiny of the articles to decide whether a document was to be included or excluded certainly helped our sample to be more significant. Second, while the definition taken from Stam (2015) and used to determine the four investigation guidelines is robust and comprehensive when compared to the whole body of knowledge on EE, had we selected a different pivotal definition, this may have led to identifying other areas of investigation. Third, the suggested research questions pertinent to each investigation area could have been fine-tuned or split into a selection of alternatives or sub-questions. However, supplying a fully comprehensive list of perfectly honed research questions goes beyond the objective of this review on EEs as a whole.

Beyond these limitations, this study contributes to EE research by providing a review of the key concepts that emerged in the extant research on EE. We addressed the current debate on EE research, which remains open on several critical points, such as its definitions and the role of its antecedents. More importantly, we have prepared a set of investigation guidelines that scholars could consider when attempting to gain a comprehensive understanding of a specific EE, although we are fully aware that scholars may be unable to follow those guidelines in a single study. Hence, we expect that several studies - framed within a broad research field while remaining consistent internally - will be necessary, if we are to attain a true in-depth understanding

of a specific local EE. Our study can serve as common ground for such research endeavours.

The study also has direct policymaking implications. The investigation guidelines provided by us are directed to policymakers who deal with the measures and mechanisms for encouraging economic growth. Several works have shown that promoting entrepreneurship is a key action point in this sense. However, when dealing with entrepreneurship, policymakers have recently been introduced to and induced by scholars (e.g. Isenberg, 2010) to adopt an ecosystem perspective. The ecosystem perspective more than likely fuzzy and dispersive, making it difficult to adopt without driving guidelines. While this study has contributed towards clarifying the EE concept, it also intends to address future research avenues that may help policymakers engaged in the crucial work of encouraging economic growth through the enhancement of the entrepreneurship that is developing within various ecosystems.

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