Entrepreneurial ecosystems: a holistic and dynamic approach

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Abstract

Purpose – The purpose of this paper is to add a holistic and dynamic approach to the emerging body of knowledge of entrepreneurial ecosystems (EEs). It aims to synthesise research and related neoteric EE concepts by proposing a conceptual framework for the study of the composition and interactions of such systems.

Design/methodology/approach – The authors provide an emergent enquiry perspective by introducing a systematic literature review to inform the development of a conceptual framework, based upon theoretical underpinnings of institutional and network theory.

Findings – This paper highlights neoteric holistic and dynamic approaches to recent scholarship of EEs, including antecedents, related concepts, shortcomings, features, actors, components and resources, recommendations for application, network and institutional perspectives, pathways for future research, and ultimately, a conceptual framework merging aspects of entrepreneurial activity, value creation, EE elements, relational interactions and institutional inferences.

Research limitations/implications – Primary limitations are associated with holistic and dynamic approaches adopted in this study, highlighting that EE heterogeneity is unlikely conducive to a "one-size-fits-all" scenario; further empirical research on the dynamics of EEs is suggested to circumvent such implications while adding to the emerging and growing body of knowledge and application of EEs.

Practical implications – The findings and conceptual framework provide a theoretical platform to base applications to practice in developing nascent and emerging EEs.

Originality/value – A first of its kind study adds a holistic and dynamic emergent enquiry approach with institutional and network underpinnings to EE frameworks.

Keywords Entrepreneurship, Conceptual framework, Entrepreneurial ecosystems

Paper type Research paper

1. Introduction

The concept of entrepreneurial ecosystems (EEs) has recently received much research and scholarly attention, highlighting the need for a more holistic and dynamic approach (Mason, 2019), consisting of an interactive and systemic view (Autio *et al.*, 2014; Alvedalen and Boschma, 2017; Motoyama and Knowlton, 2017; Spigel, 2017; Cavallo *et al.*, 2018) of individuals, institutions and firms within an entrepreneurship context (Belitski and Heron, 2017). Building on previous research (Mason and Brown, 2014; Brown and Mason, 2017), to guide this research, we define the EE as a set of interconnected entrepreneurial actors, organisations, institutions and entrepreneurial processes, which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment, involving a dynamic and systemic nature, within a supportive environment.

As an emerging field of study within the broader entrepreneurship context, studies currently require significant conceptual, theoretical and empirical challenges to be addressed before advancing practice and application (Stam, 2015). For example, calls for further research on EEs include multi-level and multi-component methods on the dynamic

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interaction, connectivity and interdependence between EE elements (Audretsch and Belitski, 2017; Audretsch *et al.*, 2018). To address these calls, the aim of this study is to provide a synthesis comprising advancements of the EE concept, theoretical underpinnings and elements influencing its dynamics. The systematic review unfolds EE antecedents, theoretical limitations, distinctive features, elements and measurement approaches. Furthermore, it provides clarification and distinction from related concepts, adding to the efforts towards the conceptualisation of EEs, and paves the way for further research. The study contributes to the body of knowledge, first, by providing a synthesis on EE research and related concepts. Second, it proposes a framework for the study of the composition and interactions of EEs, replicating and expanding Stam's (2015) and Spigel's (2017) work, and draws inference to the impact of context, networks and institutional environments on the configuration and dynamic practices of EEs through the application of institutional and network theoretical perspectives.

The remainder of the paper is organised as follows. Section 2 introduces the methodology, followed by Section 3, which briefly describes overall findings. Section 4 reports findings and outlines aspects of institutional and network perspectives. Section 5 provides a conceptual framework, Section 6 provides pathways for further research and Section 7 concludes.

2. Methodology

We adopted emergent inquiry being a collaborative or participative research method (Keegan, 2009). Our objective was to incorporate genres of content analysis, conversation analysis and possible discourse analysis by implementing a systematic literature review approach. This enhanced a holistic, systematic and integrated overview of the context of the EE, its social arrangement, its ways of working and its explicit and implicit rules. This involved a process of deep attentiveness of empathetic understanding and of suspending or bracketing preconceptions about EEs. The data collected were coded in an attempt to describe and develop a theoretical understanding of responses of the literature review, being a combination of facilitation, observation, leadership, analysis, critical thinking, reflectivity, emotional and sensory awareness, improvision, creating narrative and creative thinking (Keegan, 2008). This review consists of a systematic approach adapted from Belitski and Heron's (2017) work on ecosystems, and it is based on Hart's (1998) and Tranfield *et al.*'s. (2003) systematic literature review inferences. Such search strategy allows the identification of key scientific contributions to a field, the attempt to reduce researchers' biases and the improvement of the quality of the review process. It aims objectivity, providing descriptions of the steps taken and a traceable pathway of the researchers' decisions, procedures and conclusions. However, the approach is not without limitations, for relevant work might have been omitted in the process.

First, a broad literature overview in the fields of entrepreneurship and entrepreneurship education was conducted, allowing three main insights: linking entrepreneurship education (Fayolle, 2013); adopting a broader approach to entrepreneurship, contributing towards a more comprehensive view of the dynamic interactions and processes involved (Brown and Mason, 2017), contributing to the understanding of the topic and aspects occurring in practice; and networks and institutions as theoretical frameworks proposed to be integrated to this broader view (Estrin *et al.*, 2013; Alvedalen and Boschma, 2017; Spigel, 2017).

Second, a systematic literature review was conducted to uncover aspects of the antecedents and evolution of EEs, theoretical underpinnings and its relation to entrepreneurship education. The search strategy included the main search term "entrepreneurial ecosystems" in conjunction with the following search strings that emerged from the first literature overview: antecedents and conceptualisation; education; components; partnerships; national innovation and entrepreneurship systems; best practice;

institutions and networks; and geographical dimension. Utilising the electronic search engine, Web of Science, the review covered sources published between 1997 and 2017. Additional articles that were considered included sources from the references listed on selected items and updated sources. A variety of sources were considered in the attempt of gathering information and insights from different perspectives (Tranfield *et al.*, 2003), bearing in mind attention to quality. Sources included peer-refereed journals, book chapters and special issues, relevant reports and selected conference papers such as Isenberg (2011). Both empirical and conceptual papers were included.

3. Descriptive analysis of the findings

The search retrieved a copious number of hits due to the broad number of topics attached to the main term. To keep the study manageable, the first 40 items under each of the 8 categories were screened by title and abstract. This narrowed down the items to approximately 200 articles. Finally, a list of 72 articles and items from other sources were selected, forming the main basis of this review, out of which, 34 were derived from the systematic search and 38 from the additional relevant sources.

Main themes that emerged comprised of the following: definitional aspects and under-theorisation of the concept; features and related concepts; EEs as a tool for creating resilient economies and recommendations for governments for creating them; actors and elements composing EEs and value of gaining understanding on the interdependencies and flow of resources occurring between them; shortcomings; universities and education as drivers of EEs; and dynamic and contextual aspects. The review indicated that the investigation of EEs is gaining momentum, as evidenced by the majority of the studies addressing this topic being published after 2010. Recent studies focus on possible constructs for theorisation, measurement approaches, relevance of interactions and the crucial role of universities and an entrepreneurial culture.

Although all selected articles related to the EE phenomenon, only 30 (out of 72) were deemed to be either directly addressing EEs research or were closely related. Findings from these specific articles present characteristics as those found at a nascent theory development stage of a field of research (Edmondson and McManus, 2007). Accordingly, there is a prevalence of conceptual (70 per cent) over empirical (30 per cent) studies addressing the topic of EEs. With regard to the research approach, empirical studies have a predominant cross-sectional design. Most findings are based on qualitative inquiry; case studies design and other presenting ethnographic fieldwork, thematic and narrative approaches. Findings are presented next.

4. The entrepreneurial ecosystem approach

4.1 Antecedents

Concepts related to the "EEs" construct are historical in nature, spanning many years (Van de Ven, 1993). However, the directly related EE publications are more recent and published within the last 17 years, gaining momentum in the past few years (Alvedalen and Boschma, 2017). Research in this area includes topics such as the relevance of contextual factors to the entrepreneurship process (Brown and Mason, 2017; Acs *et al.*, 2014; Welter, 2011), relational approaches attending to interactions between key aspects of the systems (Motoyama and Knowlton, 2017; Motoyama and Watkins, 2014), local embeddedness (Brown and Mason, 2017; Motoyama and Watkins, 2014), network interactions (Acs *et al.*, 2017), relevance of universities and education to EEs (Fayolle and Kyro, 2008; Audretsch, 2014; Trippl *et al.*, 2015; Guerrero, Urbano and Fayolle, 2016; Guerrero, Urbano, Fayolle, Klofsten and Mian, 2016; Trivedi, 2016; Maritz *et al.*, 2015, 2016; Belitski and Heron, 2017; Maritz, 2017; Ferreira *et al.*, 2018), entrepreneurial diversity (Welter *et al.*, 2017), resilience (Boschma, 2015;

Roundy *et al.*, 2017), significance to governments and policy (Brown and Mason, 2017; Autio *et al.*, 2014; Isenberg, 2010, 2011), and dynamic perspectives on institutions and networks (Autio *et al.*, 2014; Mack and Mayer, 2016; Alvedalen and Boschma, 2017; Fraiberg, 2017; Spigel, 2017) amongst others.

With origins from the business literature as well as practitioner communities, the EE concept offers both a theoretical and practical perspective (Brown and Mason, 2017). Although a concept originally introduced by Moore (1993), describing its association with the biological concept, it was Isenberg (2010, 2011) who popularised EE within non-academic audiences. Although as a field under development, there is no commonly accepted definition of EEs, there have been many attempts to define it (Alvedalen and Boschma, 2017). Collectively, the concept involves a dynamic and systemic nature, encompassing multiple actors, processes and institutions (Brown and Mason, 2017). Auerswald (2015) described ecosystems as geographically delimited areas with mutually dependent components and compares EEs to dynamic networks of interconnected organisms, resources and relationships among them. Mason and Brown (2014, p. 5) elaborated to define the EE: "a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations (e.g. firms, venture capitalists, business angels, banks), institutions (universities, public sector agencies, financial bodies) and entrepreneurial processes (e.g. business birth rate, numbers of high-growth firms, levels of 'blockbuster entrepreneurship', number of serial entrepreneurs, degree of sellout 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". Spigel (2017) referred to ecosystems as supportive environments that foster innovation-based ventures, which include culture, social networks, investments, universities and economic policies, that are critical for economies based on entrepreneurial innovation (e.g. Boulder and Waterloo in Canada). Stam (2015, p. 1765) defined EEs as a "set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship". This study adopted the following definition: a set of interconnected entrepreneurial actors, organisations, institutions and entrepreneurial processes, which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment (Mason and Brown, 2014), involving a dynamic and systemic nature (Brown and Mason, 2017), within a supportive environment.

4.2 Related concepts

The term EE inevitably draws connections to previous work on cluster theory, industrial agglomerations and innovation systems. These perspectives have common understandings regarding regional resources, leading to increased entrepreneurship and growth: shared cultural understandings and institutional environments conducive to cooperation; social networks for knowledge spillovers; and government policies and universities supporting these views, funding specific support programmes and removing institutional barriers to entrepreneurs (Spigel, 2017). However, although the concept of EE has commonalities with these perspectives, it is important to differentiate them. Table I shows a synthesis of related constructs to the concept of EEs depicting a brief description, focus, actors involved and representative works. The information provided of related constructs allows a demarcation of similarities and differences between these terms, providing a clearer depiction of the systemic view of what an EE is and what it is not.

4.3 Shortcomings of the entrepreneurial ecosystem approach

The concept of EEs can be useful to analyse the dynamics of new venture formation and other entrepreneurial activities within specific geographical locations; however, the literature does not show common understanding of what EEs are, portraying a lack of

Table I.
Related constructs to the concept of entrepreneurial ecosystems

Construct	Period	Definition/Description	Key focus	Central actors	Representatives
Agglomeration economies	1890s	Development of specialist infrastructure, human capital, suppliers	Industry localisation. Specialisation of industrial concentrations	Firms in same market collaborating and sharing knowledge	Marshall (1920)
Economic geography	1980s–1990s	Study of the location of factors of production in space (Krugman, 1991)	Inter-related SMEs based around traditional industrial sectors (e.g. ceramics in Italy). Pays attention to regional economies and organisations' benefits from related variety	SMEs and industrial sectors	Malecki (1997)
Clusters	1990s	Geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions that compete but also cooperate (Porter, 2000, p. 15)	Firms' benefit from local specialisation, geographic location and knowledge spillovers	Firms, institutions and individual actors	Porter (2000), Saxenian (1996)
National innovation systems (NIS)	1990s–2000s	Knowledge is a main resource in the economy; it is produced and accumulates through innovation processes within national institutional context that is important for innovation outcomes (Lundvall, 1999)	Systemic processes and its relation to localised knowledge generation and transfer. Emphasis on relational aspects between actors and the innovation process	Institutional actors	Freeman (1995), Lundvall (2010)
Regional innovation systems	1990s–2000s	Networks and institutions linking knowledge producing hubs with innovative firms in a region, producing knowledge spillovers and increasing innovativeness (Cooke *et al.*, 1997)	Construction and transfer of knowledge during the innovation process within regions	Universities, research organisations, regulatory bodies, venture capitalists	Cooke *et al.* (1997)
National systems of entrepreneurship (NSE)	2000s	Resource allocation systems are driven by individual-level opportunity pursuit, through creation of new ventures, with outcomes regulated by country-specific institutional characteristics (Acs *et al.*, 2014, p. 476)	NIS focus on institutions, whereas NSE focus on individuals. Systemic approach to entrepreneurship. Fails to address the spatial specificities of entrepreneurship	Entrepreneurs	Acs *et al.* (2014)

Source: Compiled by authors

sufficient theoretical and empirical study (Stam, 2015; Audretsch *et al.*, 2018). Although the concept is appealing to policymakers, the lack of understanding can lead to misapplication (Brown and Mason, 2017).

The role of networks (Ter Wal and Boschma, 2011) and interactions of individual elements within the EEs has not been sufficiently explored (Motoyama and Watkins, 2014). Past studies have focussed on identifying elements without considering the relationships between them. The lack of understanding of how EE elements interact makes it difficult to comprehend ecosystem dynamics (Motoyama and Knowlton, 2017). Furthermore, research is needed on how the various elements of EE enhance entrepreneurship (Alvedalen and Boschma, 2017).

Another shortcoming is the misconception that ecosystems' main focus is on start-ups (Isenberg, 2011). Furthermore, there is a tendency to narrow the approach to "high-growth start-ups", with the idea that this type of entrepreneurship is more conducive to innovation, productivity and growth (Mason and Brown, 2014; WEF, 2013). Although new firms are important for employment growth, it is only a fraction of these firms that create the majority of employment growth and are able to scale up (Acs *et al.*, 2017). Thus, ecosystems are supportive environments for entrepreneurial activity, be potential entrepreneurs, start-ups, growth-oriented innovative firms and larger corporate entities (Brown and Mason, 2017).

Another limitation is the measurement and success of EEs (Spigel, 2017). Studies have pursued to measure them through "dealmakers" as a measure of dynamism (Feldman and Zoller, 2012). The specific elements were measured, focussing on density, fluidity, connectivity and diversity (Stangler and Bell-Masterton, 2015). National-level approaches utilised the Global Entrepreneurship Development Index (Acs *et al.*, 2014). The number of unicorns (i.e. start-ups valued over $1bn) was used as a measure of performance and presence of EEs (Acs *et al.*, 2017). Nevertheless, due to their heterogeneity and complexity, EEs present considerable challenges when attempting to be measured.

4.4 Features

EEs are multi-actor, multi-level systems with a heterogeneous nature (Motoyama and Knowlton, 2017). They present significant geographic variations (Audretsch *et al.*, 2018). Regions offer particular characteristics, whereas resources tend to be concentrated locally and they attract each other (Isenberg, 2011). Entrepreneurship is largely a local phenomenon, with inputs such as the localised cultural, social and material attributes supporting entrepreneurial activity (Spigel, 2017). Due to the various actors, diversity of resources and connectors involved, policy interventions should take holistic approaches (Isenberg, 2010, 2011; Audretsch and Belitski, 2017). The concept of an information-rich environment wherein information is both accessible and shared (Mason and Brown, 2014) is inherently dynamic. EEs are "naturally evolving systems" (Isenberg, 2010). They recognise the importance of entrepreneurial processes and the interactions occurring within (Brown and Mason, 2017), emphasising an adoption of relational approaches addressing the interactions between key aspects of the systems (Motoyama and Watkins, 2014).

4.5 Actors, components and resources

Actors and components of EE include the following: entrepreneurs, at the heart of the entrepreneurial concept (Isenberg, 2010); firms, attracting skilled workforce, incubating entrepreneurs and generating spillovers (Brown and Mason, 2017); culture, more specifically, an entrepreneurial culture in which formal and informal institutions foster entrepreneurial activity and positive attitudes towards entrepreneurship, shaping entrepreneurial behaviour (Krueger *et al.*, 2013; Liñán *et al.*, 2015); universities, particularly elements such as entrepreneurship education, entrepreneurial university,

academic entrepreneurship, technology transfer offices (TTOs), incubators and accelerator programmes; they all foster entrepreneurship, develop human capital and contribute to the efforts of changing attitudes towards entrepreneurship (Davidsson and Honig, 2003; Fayolle and Kyro, 2008; O'Connor, 2013; Maritz *et al.*, 2015; Guerrero, Urbano and Fayolle, 2016; Guerrero, Urbano, Fayolle, Klofsten and Mian, 2016; Maritz, 2017; Belitski and Heron, 2017; Lombardi *et al.*, 2017; Nabi *et al.*, 2017). They also include finance, comprising venture capital, corporate venture capital, angel investment, crowdfunding and accelerators (Drover *et al.*, 2017), as finance is crucial for entrepreneurial activity and its success (Schwarzkopf, 2016), and network processes (Slotte-Kock and Coviello, 2010). Supporting organisations include organisations within or outside universities. Within universities, TTOs, science parks, incubators and accelerators not only provide infrastructure and support to faculty and researchers to create spin-offs, but also to start-ups, enabling interactions with industry, organisations and government entities (Guerrero, Urbano, Fayolle, Klofsten and Mian, 2016; Wright *et al.*, 2017; Bliemel *et al.*, 2019). Other supporting organisations that assist entrepreneurs in providing a range of services on technical and business advice include finance, dealmakers and professional associations (O'Connor *et al.*, 2018). Table II shows classifications elaborated in past research.

Regarding resource generation and mobilisation and its relation to EEs, it was found that traditionally, the process of new venture creation relied predominantly on the resource-based approach (Kor *et al.*, 2007). However, more recently, other aspects of entrepreneurship have drawn attention to scholars such as the development of dynamic capabilities (Teece, 2007), the behavioural, social and cultural attributes (Sarasvathy, 2001; Baker and Nelson, 2005), and benefits of demarcating boundaries while trying to understand economic behaviour (Welter, 2011). Despite of this, Edelman and Yli-Renko (2010) did not underestimate the significance of resources. They stated that entrepreneurs' perceptions for identifying or creating opportunities, and perceptions of resource availability are derived from the environment and from its dynamism, suggesting that the environmental dynamism influences entrepreneurs' intentions to enter the risky arena and complexities of starting new ventures.

Approach	Elements	Source
Domains of the entrepreneurship ecosystem	1) A conducive culture, 2) enabling policies and leadership, 3) availability of appropriate finance, 4) quality human capital, 5) venture-friendly markets for products and 6) a range of institutional and infrastructural supports	Isenberg (2011)
Attributes of a successful start-up community	1) Leadership, 2) intermediaries, 3) network density, 4) government, 5) talent, 6) support services, 7) engagement, 8) companies and 9) capital	Feld (2012)
Entrepreneurial ecosystem pillars	1) Accessible markets, 2) human capital/workforce, 3) funding and finance, 4) support systems/mentors, 5) regulatory framework and infrastructure, 6) education and training, 7) major universities as catalysts and 8) cultural support	World Economic Forum (2013)
Entrepreneurial ecosystem elements	Systemic conditions: networks, leadership, finance, talent, knowledge, support services. Framework conditions: formal institutions, culture, physical infrastructure, demand	Stam (2015)
Attributes of entrepreneurial ecosystems	1) Cultural: cultural attitudes, histories of entrepreneurship; 2) Social: networks, investment capital, mentors and dealmakers, worker talent; 3) Material: universities, support services and physical infrastructure, policies and governance, strong local markets	Spigel (2017)

Source: Compiled by authors

Table II.
Elements composing entrepreneurial ecosystems

4.6 Recommendations for application of the entrepreneurial ecosystem approach

Recommendations for EE application include Isenberg's (2010) key principles: stop imitating Silicon Valley, develop the ecosystem around local conditions, engage the private sector from the start, favour high potentials, get a big win on the board, tackle cultural change, stress the roots, do not overengineer clusters, help them grow organically and reform legal, bureaucratic and regulatory frameworks. Isenberg and Onyemah (2016) provided recommendations from the Babson Entrepreneurship Ecosystem Platform (which launches and operates regional economic development projects) for fostering scale-up ecosystems: identify a region with a moderately dense metro population; identify influencers within that region (formal or informal leaders) in each of the six entrepreneurship ecosystem domains and engage them; set objectives for the number and time frame of companies to enter into measurably scale-up trajectories; compose funding from a cross-section of local funders; generate "quick wins" by focussing on firms with an existing revenue base; continually escalate and broaden activation and alignment; and communicate from the outset that BEEP will have a time-limited presence and that local stakeholders will eventually develop and execute all of the local programming.

When considering successful EEs, the most prevalent ones are found in the innovation-driven economies, with countries such as Switzerland, the Netherlands and Finland standing out (GEM, 2017). Silicon Valley, London and New York continue to dominate as start-up hubs, whereas the top 10 ecosystems for local connectedness include Greater Helsinki, Silicon Valley, Tel Aviv, Sydney, London, Houston, Los Angeles, Atlanta, Amsterdam and Singapore. In Australia, some of the vibrant ecosystems include that of Melbourne, Sydney (Startup Genome, 2018) and Queensland start-up and innovation ecosystem (Haines, 2016).

4.7 Network and institutional perspectives

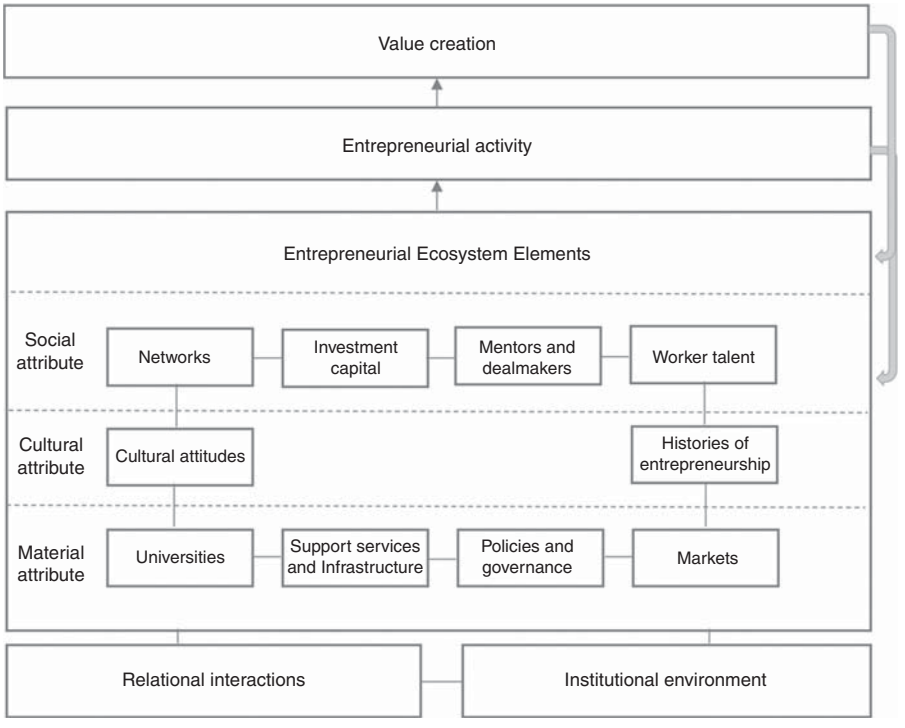
The concept of networks is relevant to entrepreneurship research because it recognises the environmental context of the entrepreneur and deals with ties between individuals or a group of individuals (O'Donnell *et al.*, 2001). Past research includes entrepreneurial network spillover effects (Aarstad *et al.*, 2010); institutional quality and network effects (Ahlstrom and Bruton, 2006; Bastian and Zali, 2016); dynamics of international ventures (Coviello, 2006; Sullivan Mort and Weerawardena, 2006); networks relation to entrepreneurial growth (Anderson *et al.*, 2010); opportunity recognition (Arenius and De Clercq, 2005); evolution of firm networks (Hite and Hesterly, 2001); network content, structure and governance (Hoang and Antoncic, 2003); embeddedness (Johannisson *et al.*, 2002); entrepreneurial learning and its connection to network activities (Lefebvre *et al.*, 2015); and strategic alliances and cooperation (Ireland *et al.*, 2002). Adopting a dynamic network approach to EEs could help understand elements that enhance entrepreneurship, for instance, investigating the nature of network ties between actors, role of networks and type of linkages that matter (Gulati and Higgins, 2003; Partanen *et al.*, 2014; Alvedalen and Boschma, 2017; Ter Wal and Boschma, 2011; Audretsch *et al.*, 2018).

Institutional theory addresses how individuals, groups and organisations comply with rules and norms, which vary across countries and cultures, to secure their positions and legitimacy (Scott, 2007). According to Sine and David (2010), the institutional perspective emphasises "how socially constructed environments shape organisational behaviours and outcomes" (p. 3), comprising dimensions (normative, cultural-cognitive and regulative) that also impact the entrepreneurial process. The institutional perspective plays an important role in explaining the elements that shape entrepreneurial success, for rather than focussing only on efficiency, it also incorporates regulatory, social and cultural aspects influencing organisations (DiMaggio, 1997; Bruton *et al.*, 2010). Adopting a dynamic perspective on institutions to study EEs could help identify the institutions, and the spatial scale, that impact the structure and performance of these systems. This approach could be employed to

analyse formal (e.g. rules and laws, entrepreneurial support organisations) and informal (e.g. culture, social norms and peer influences) institutions conforming the ecosystem, and to help determine aspects of their characteristics and configuration (Autio *et al.*, 2014; Alvedalen and Boschma, 2017).

5. Conceptual framework

The conceptual framework, as represented in Figure 1, is an integration derived from merging aspects of entrepreneurial activity, value creation and interactions (Stam, 2015); it is a relational organisation of attributes of the EE (Spigel, 2017), in addition to aspects of social networks and institutional perspectives (Alvedalen and Boschma, 2017). Entrepreneurial action involves behaviours conducive to entrepreneurship activity derived by the critical element of entrepreneurial thinking (Krueger, 2007). Entrepreneurial behaviour comprises a range of activities such as start-up, scale up, entrepreneurial employees, opportunity recognition, market development and economic development (Audretsch *et al.*, 2018), placing emphasis that the EE approach expands to a variety of entrepreneurial activities, rather than solely focussing on start-ups (Brown and Mason, 2017). Through value creation, entrepreneurship is an engine to create economic, social and personal value (Neck and Greene, 2011). These aspects in conjunction with the interdependent actors within the ecosystem depict the variety of interactions and relations occurring in these systems (Stam, 2015). The framework utilises attributes (social, cultural and material) defined by Spigel (2017): cultural attitudes, historical perspectives of entrepreneurship, networks, investment capital, mentors and dealmakers, worker talent, universities, support services and physical infrastructure, policies and governance and markets.



Sources: Adapted from Stam (2015) and Spigel (2017)

Figure 1. Composition and interactions of the entrepreneurial ecosystem

These attributes provide benefits and resources to entrepreneurs, whereas the relationships between the elements compliment EE, varying in their configurations. Network and institutional perspectives are incorporated to the framework as additional layers relevant for studying the dynamics occurring within these systems. This in an attempt to expand our understanding regarding the composition and relational interactions within the ecosystem. The network perspective aims a focus on interactions, that is, establishing the type of relationships and the manner in which the proposed elements are connected in the EE (Alvedalen and Boschma, 2017; Motoyama and Knowlton, 2017). The institutional perspective is utilised to study environmental factors from the point of view of institutions. Specifically, it suggests utilising North's (1990) classification of institutions, in which formal institutions relate to laws and procedures, whereas informal institutions refer to a specific community's values, beliefs and culture. Formal and informal factors constitute the "rules of the game" in a community and influence the birth and the development of new ventures; this institutional framework influences the decision to become an entrepreneur and related entrepreneurial activities (Fuentelsaz *et al.*, 2018).

6. Pathways for further research

Outcomes of this review include the delineation of avenues for further research. Although it does not suggest an exhaustive list, the following are some of the identified items calling for attention for further research and directions for the advancement of the EE field. We focus on the following parameters: contextualised view; support mechanisms and resources; and dynamics, institutional and network perspectives, education and performance. Table III provides an overview of the research focus, identified aspects and information sources.

7. Conclusion

A myriad of research has contributed towards shifting the entrepreneurship literature from a focus on the identification of traits and characteristics present in entrepreneurial individuals and lists of factors that enhance entrepreneurship to a much broader focus. However, the still eminent and almost "myopic focus" on the individual (Autio *et al.*, 2014) and the venture dominates, forming a gap regarding the view and the relevance of context and its influence on behaviour and performance (Autio and Acs, 2010), consequently, articulating a need for the study of EEs for its further development and enhancement (Brown and Mason, 2017; Motoyama and Watkins, 2014).

EE strategy and application is aimed to stimulate economic prosperity and inclusivity (Audretsch *et al.*, 2018). While significant for cluster strategies, innovation systems, knowledge-based economies and national competitiveness, the policy has undermined significant aspects of entrepreneurship and its application (Isenberg, 2011). Despite the progress made in existing literature, the EE concept remains under-theorised (Acs *et al.*, 2017). This study contributed to entrepreneurship research by providing a synthesis of the emerging concept of EEs as a dynamic and holistic approach to the study of entrepreneurship; by providing a clarification and distinction from other related concepts (e.g. clusters, regional innovation systems and national systems of entrepreneurship), adding to the efforts towards its conceptualisation; by proposing a framework for the study of the composition and interactions of EEs, building from Stam's (2015) and Spigel's (2017) previous work that draws attention to the impact of context, interactions and institutional environment through the application of an institutional and network view; and by providing avenues identified for further research.

Our conceptual framework of the composition and interactions of EEs provides a holistic and dynamic perspective reflecting value creation, entrepreneurial activity EE elements and relational interactions within institutional environments. The longitudinal phase of this research will be to empirically validate this framework.

Research focus	Identified aspects to address	Source
Contextualised view	Situational and temporal boundaries for entrepreneurship; qualitative/combined methods capturing richness and diversity of context(s) in which entrepreneurship occurs	Welter (2011), Björklund and Krueger (2016)
	Interaction between entrepreneurs and their context, considering not only start-up but also other forms of entrepreneurial activity (adopting multi-level thinking and analysis)	Zahra *et al.* (2014)
	In-depth analysis on the characteristics of the local or regional environment, and understanding the complex relationships among the environment, perceptions and entrepreneurial start-up efforts	Edelman and Yli-Renko (2010)
Support mechanisms and resources	The types of support that start-ups seek, use and find valuable, and how that compares to what is offered	Motoyama and Knowlton (2017)
	Policymakers' interventions and support to enable and grow EEs	Cavallo *et al.* (2018), Audretsch *et al.* (2018)
	The role played by different types of resources in the formation of new ventures	Edelman and Yli-Renko (2010)
Entrepreneurial ecosystem dynamics	Interactions between different actors and components	Acs *et al.* (2017)
	Identifying the attributes of EEs and their relationships; ecosystem's internal dynamics; its role in economic development	Spigel (2017)
	Interactions between actors and resources, cultural interaction and exchange, infrastructure support. How ecosystems enable/constrain multi-level interrelations?	Audretsch and Belitski (2017)
	EEs creation, growth and how can they be sustained	Cavallo *et al.* (2018), Audretsch *et al.* (2018)
	Individuals within EE, with focus on interactions with firms and institutions, for a further understanding on outputs and outcomes resulting from entrepreneurial behaviour	Audretsch *et al.* (2018)
Institutions and network perspectives	Dynamic perspective on institutions to study EEs; which institutions impact the structure and performance of EE?	Alvedalen and Boschma (2017)
	Formal and informal institutions to determine relevant elements and characteristics of EEs and the influence of context in the configuration of EEs	Autio *et al.* (2014), Alvedalen and Boschma (2017)
	Nature of network ties is described in proximity terms: how types of links, besides individual characteristics (e.g. education, work experience), enhance entrepreneurship	Alvedalen and Boschma (2017)
	Types of linkages, within EEs, that matter	Partanen *et al.* (2014)
	Role of networks and dynamic network approach to EEs	Ter Wal and Boschma (2011), Audretsch *et al.* (2018)

(*continued*)

Table III.
Pathways for further research

Research focus	Identified aspects to address	Source
Education and entrepreneurial ecosystems	Drivers of the variety and the effectiveness of student EEs	Wright *et al.* (2017)
	Role of entrepreneurship education and the entrepreneurial university as drivers and/or contributors to EEs	Maritz *et al.* (2015), Maritz (2017), Guerrero, Urbano, Fayolle, Klofsten and Mian (2016)
Evolution, measurement and performance of entrepreneurial ecosystems	Evolution and performance over time; comparative and multi-scalar perspectives	Mack and Mayer (2016), Alvedalen and Boschma (2017)
	Study smaller sub-systems, representative of the wider ecosystem. Identification and understanding of the main sub-systems, and their interactions	Cavallo *et al.* (2018)
	Identification of the optimal level of analysis for the EE	Cavallo *et al.* (2018).
	Digital EE, with a greater focus on the digital economy, could help understand high-growth scalable businesses using digital technologies	Sussan and Acs (2017), Cavallo *et al.* (2018)
	Legitimacy judgements and differences across various audience contexts within and beyond EEs	Kuratko *et al.* (2017)

Table III.

Due to the EE concept attracting a lot of attention in a relatively short period of time, together with the value attributed to the economy and society, we have provided a holistic and dynamic overview of this development during the last few decades. As a result, we suggest various pathways or suggestions for further research, primarily focussed on gaps in the EE literature around contextualised views, support mechanisms and resources, EE dynamics, institutional and network perspectives, education and performance measurement of EEs. Although our approach entails many dynamic variables, heterogeneity is unlikely conducive to a "one-size-fits-all"; further empirical research on the dynamics of EEs is suggested to add to the emerging and growing body of knowledge and application of EEs.

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Further reading

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