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Entrepreneurial Ecosystems: A Systematic Literature Review and Research Agenda

Abstract

The emerging concept of entrepreneurial ecosystems has captured the attention of scholars, practitioners, and policy makers. Although studies on entrepreneurial ecosystems continue to grow, their contributions are still disintegrated. Thus, the purpose of this paper it to present a systematic review of extant literature on entrepreneurial ecosystems and to develop a research agenda. The study deployed a systematic literature review of 51 articles obtained from three comprehensive databases of Web of Science, Google Scholar and Scopus. The analysis includes two phases. First, a descriptive account of research on entrepreneurial ecosystems and second a content analysis based on a thematic categorization of entrepreneurial ecosystems research. The findings show that the concept of entrepreneurial ecosystems is both undertheorized and it has been recently dominated by conceptual studies. The focus of empirical research is on technology-based industries in Western economies using cases studies as methodological approach. This review contributes to the body of knowledge on entrepreneurial ecosystems research by providing a systematic review following a thematic grouping of extant research into antecedents, outputs, and outcomes of entrepreneurial ecosystems. It reveals existing theoretical and empirical gaps in research as well as offering avenues of future research on entrepreneurial ecosystems.

Keywords: *Entrepreneurial Ecosystems, Entrepreneurs, Start-up, Antecedents, Outputs and Outcomes of Entrepreneurial Ecosystems.*

2. Introduction

Entrepreneurial activities and entrepreneurs do not emerge in isolation rather in a very integrated and complex systems with multiple actors (Cowell, Lyon-Hill, & Tate, 2018). Thus, the term entrepreneurial ecosystem has been used to express and explicate the frameworks on how entrepreneurs and start-ups interact with other actors. Isenberg (2010, p. 3) referred to entrepreneurial ecosystem as "a set of interconnected elements such as leadership, culture, capital, markets, human skills and support that foster entrepreneurial development." Well established entrepreneurial ecosystems have positive effects on the economy in terms of job creation, household incomes, and economic growth (Atiase, Mahmood, Wang, & Botchie, 2018).

The concept of entrepreneurial ecosystems has recently captured the attention of scholars, practitioners and policy makers although, there is a significant knowledge gaps in terms of the conceptual meaning, the theoretical foundation and the application (Acs, Stam, Audretsch, & O'Connor, 2017; Malecki, 2018). Extant scholarly work associates the concept of entrepreneurial ecosystem with related concepts such as industrial districts, clusters and regional innovation systems (Harper-Anderson, 2018; Sambo, 2018). Unfortunately, the relatedness of entrepreneurial ecosystems to other concepts may prevent a clear understanding of the phenomenon. These more traditional concepts focus on large systems of value chain creation dominated by large and international companies with little concern on entrepreneurs and startups (Kathrin Bischoff & Volkmann, 2018; Subrahmanya, 2017).

Unlike these traditional concepts, entrepreneurial ecosystems put more focus on entrepreneurs and startups which are considered as focal actors of the system and the role of other players in supporting the whole entrepreneurial process (Nicotra, Romano, Del Giudice, & Schillaci, 2018).Recent studies on entrepreneurial ecosystems are built on Isenberg`s (2010) framework and definition (Audretsch et al., 2019; Mack & Mayer, 2015; Stam, 2015). Vibrant entrepreneurial ecosystems and their effects on economic growth can be illustrated by successful entrepreneurial ecosystems such as in London, Tel Aviv, Singapore, Silicon Valley and Boston. These entrepreneurial ecosystems are characterized by having advanced financial service systems that facilitate access to venture capital, good infrastructures, technological innovation, investment in research and development activities through universities and serious government efforts to support entrepreneurial initiatives (Acs et al., 2017).

There has been an increasing number of studies on entrepreneurial ecosystem. However, less has been done in aggregating an integrating the findings of these studies. More recently, first reviews were published focusing on selected aspects of entrepreneurial ecosystems. For example, Maroufkhani et al. (2018) presented a descriptive analysis of entrepreneurial ecosystem studies documenting methodologies applied and publication outlets. Malecki (2017) provided a bibliometric study of the entrepreneurial ecosystem literature with a focus on the choice of scale and university-centred entrepreneurial ecosystems. In this paper, we intend to complement prior reviews and contribute to the existing body of knowledge by conducting an in-depth systematic content analysis to show how various aspects of entrepreneurial ecosystem have been researched and discussed over time. We intend to address the following questions: *(1) How has entrepreneurial ecosystem research evolved over time (2) What are its key theoretical and conceptual foundations? (3) What are emerging future research streams for entrepreneurial ecosystems?*

The reminder of this article is organized as follows: Section 2 provides a description of the methodology employed by detailing data collection and analysis. Section 3 and 4 present the descriptive results and the content analysis. We conclude by presenting avenues for future research which we derived from our review.

2.1. Methodology

We deployed a systematic literature review following the approach of Tranfield, et al. (2003) who provided criterion for ensuring transparency and replicability of the analysis when using literature sources. A systematic literature review enables researchers to map extant intellectual resources and direct their research questions towards further knowledge production and development (Cook, Mulrow, & Haynes, 1997; Tranfield, Denyer, & Smart, 2003). However the process demands exhaustive consistency for it to yield rigor results (Brereton, Kitchenham, Budgen, Turner, & Khalil, 2007).

2.1.1. Sampling and Data Collection

An essential task in undertaking a systematic literature review is to ensure the extraction of relevant sources (articles) that will guide the discussion of the phenomenon. We based our search on three comprehensive databases: Web of Science, Google Scholar and Scopus. We used the following key search terms; **ecosystem for entrepreneurship* or *entrepreneurial*

ecosystem or *entrepreneurship ecosystem** within topic; title, abstract and keywords (Matthews, Chalmers, & Fraser, 2018). Furthermore, to have robust and useful articles we limited our search to peer reviewed published articles (Matthews et al., 2018) up to early 2019. At that preliminary stage we obtained 173 articles from Web of Science, 124 articles from Scopus and 226 articles from Google Scholars. By removing overlapping articles from the three lists, we arrived at 86 common articles.

We reviewed the articles with a focus on entrepreneurial ecosystems including conceptual, theoretical and empirical work and proceeded by carefully reading abstracts and excluding all articles that did not focus on the concept of entrepreneurial ecosystems for example articles discussing ecological ecosystems, (Brown, Gregson, & Mason, 2016; Dedehayir, Makinen, & Ortt, 2018). We further excluded articles that referred to entrepreneurial ecosystems as pure regional clusters (e.g., Goswami, Mitchell, & Bhagavatula, 2018; Kabbaj, Hadi, Elamrani, & Lemtaoui, 2016; Qian, 2018) as the concept of entrepreneurial ecosystem takes on a wider perspective beyond geographical limitations (Acs et al., 2017; Audretsch et al., 2019; Isenberg, 2010). This reduced our sample by another 35 articles leading to a final sample of 51 relevant articles.

2.1.2. Analysis

Our analysis followed two phases. We started with a descriptive account of research on entrepreneurial ecosystems. This was followed by a thorough content analysis. All articles were initially organized by recoding key article information such as names of author(s), year of publication, research question(s) or objectives, study methodological approaches used, theories applied, industry or sector focus and country focus (see Table 2.1 and Appendix 2.1). We then performed a content analysis by firstly organizing thematic descriptions of common patterns of themes that arose from the reviewed articles. Initial thematic descriptions were aggregated to first order themes guided by the entrepreneurial ecosystem framework of Isenberg (2010). First order themes were then aggregated to final second order themes (Matthews et al., 2018) (see Table 2.2).

2.2. Descriptive Analysis

Table 2.1: Descriptive analysis of Entrepreneurial Ecosystem Research

Analysis	Number of Articles
Publication Trend	
Year: 2006 – 2009	1
Year: 2010 – 2014	2
Year: 2015 – 2019	48
Methodological Approach	
Conceptual	16
Qualitative Approach	6
Quantitative Approach	8
Case Study Approach	19
Mixed Method Approach	2
Theoretical Basis	
Institutional Theory	2
Social Network Theory	6
Social Capital Theory	2
Stakeholder Theory	1
Field Theory	1
Without specified theory	39
Sector Focus	
Research and Development and Education	12
Technology	6
Without specific sector focus (General)	33
Unit of Analysis	
Country level	4
Entrepreneurs and other stakeholders at individual level	7
Entrepreneurs at firm level (SMEs)	10
Research and Education Institutions (R&D organizations and Universities)	12
Support Service Providers (Studies on incubators only)	2
Without specified unit of analysis (conceptual)	16
Country Focus	
African Countries	4
European Countries	11
Asian Countries	5
USA	15
Without specified country focus (conceptual)	16

2.2.1. Publication Trend

The findings presented in Table 2.1 show that the concept of entrepreneurial ecosystems emerged in the mid-2000s and captured much scholarly attention from 2015 on. Most articles in our sample were published between 2015 and 2019. This demonstrates that the concept of entrepreneurial ecosystem is still young filed of inquiry which justifies calls for more research (Malecki, 2018; Maroufkhani et al., 2018).

2.2.2. Methodological Approaches

We analysed the methodological approaches deployed. The results shown in Table.1 reveal that most studies (19) on entrepreneurial ecosystems have deployed a case study approach. The second ranked (16 articles) approach is conceptual work, that is contributions without empirical data but not necessarily including an explicit theoretical basis. The remaining empirical articles apply quantitative, qualitative, and mixed method approaches. The dominance of conceptual work reveals lack of empirical studies on the phenomenon.

Furthermore, results show that most articles have no specific unit of analysis since most are conceptual papers. About 17 articles focused on entrepreneurs (7 at individual level and 10 at firm level-SMEs) as unit of analysis. However, quite a few articles (12) focus on investigating the role of education institutions as well as research and development institutions within entrepreneurial ecosystems. Only few articles (2) analyse the role of incubator companies within entrepreneurial ecosystems. This unit of analysis is relatively important in exploring entrepreneurial ecosystems, as the focus should be placed to the central actors of the system (entrepreneurs whether at individual or firm level) (Acs et al., 2017; Audretsch et al., 2019; Isenberg, 2010)

2.2.3. Industry/Sector and Country Focus

As the many conceptual contributions lack an empirical basis most of them have a general focus, i.e., are not targeting specific sectors. Recent empirical studies considered research and development and the education sector investigating the role played by universities in fuelling entrepreneurial activities within entrepreneurial ecosystems. Few studies were conducted in the technology sector. Furthermore, Table.1 shows that many of recent studies on entrepreneurial ecosystem have been conducted in the U.S and European countries. Entrepreneurial ecosystems perform heterogeneously from one sector to another and differently across countries. Thus,

there is still a need to conduct empirical studies on entrepreneurial ecosystems in other industries especially nontechnical industries but also in different country settings such as Africa and Asia.

2.2.4. Theoretical Foundation

Many of studies on entrepreneurial ecosystems lack an explicit theoretical foundation, i.e., 39 articles do not refer to any theory. A few studies apply macro level theories mainly social network/capital and institutional theories (Apa, Grandinetti, & Sedita, 2017; Atiase et al., 2018; Cowell et al., 2018; Di Fatta, Caputo, & Dominici, 2018; Neumeyer, Santos, & Morris, 2018). These theories have been used to explain relational dimensions and networks existing within certain components (for example among universities or among business incubators) of entrepreneurial ecosystems.

2.3. Content Analysis

2.3.1. Definitions of Entrepreneurial Ecosystems.

The concept of entrepreneurial ecosystems has been defined in different ways. Some scholars associate entrepreneurial ecosystems with regional clustering and innovation ecosystems that are confined by geographical boundaries. For example, Cohen (2006) referred to entrepreneurial ecosystem as interconnected group of actors in a *local geographic* community committed to sustainable development through the support and facilitation of new sustainable ventures. Similarly Spigel (2017) referred to the phenomenon as union of *localized* and interconnected elements such as cultural outlooks, social networks, investment capital, universities and active economic policies that support innovative ventures.

Other scholars have widened the scope of entrepreneurial ecosystems beyond geographical boundaries. They view entrepreneurial ecosystems as a *network* that is not necessarily locally confined. The more influential and widely applied meaning was coined by Isenberg (2010) who referred to entrepreneurial ecosystem as a set of interconnected elements (within a network) such as leadership, culture, capital, markets, human skills and support (Audretsch et al., 2019; Mack & Mayer, 2015; Stam, 2015).

Accordingly, it can be argued that an entrepreneurial ecosystem is an interconnected system with multiple players at both micro and macro level, entrepreneurial organizations such as

venture capital providers, business angels and banks; various institutions such as universities and public sector agencies; and entrepreneurs at large, that both formally or informally connect, mediate and govern entrepreneurial performance (Philip, 2017; Theodoraki et al., 2018). Isenberg (2010) postulated further that an entrepreneurial ecosystems' sustainability should not be viewed from geographical boundaries alone rather from an extended network point of view. Under the influence of globalization, entrepreneurial ecosystems may bring together participants that are not necessarily found within same geographical location, for example putting the role of crowdfunding (Velt et al., 2018) and crowdsourcing (Maroufkhani et al., 2018) into context.

2.3.2. Thematic Analytical categorization of Entrepreneurial Ecosystem

We conducted a content analysis of the papers in our sample. We started by organizing thematic descriptions of common patterns of themes which arose from the reviewed articles. Initial thematic descriptions were then aggregated to first order themes guided by the entrepreneurial ecosystem framework of Isenberg (2010). First order themes were then aggregated to second order themes (Matthews et al., 2018). The content analysis provides for the discussion on the roles played by different actors as well as resulted outputs and outcomes of entrepreneurial ecosystems.

2.3.2.1. Entrepreneurial Culture

The success of entrepreneurial ecosystems has been argued to relate to the "entrepreneurial spirit" embedded within societies (Acs et al., 2017; Apa et al., 2017). The centre of entrepreneurial ecosystems is entrepreneurial performance (Atiase et al., 2018). Thus, entrepreneurs are the focal point of the system. Audretsch and Belitski (2017) in their study on regional entrepreneurial ecosystems among European cities, posit that entrepreneurs within societies that embrace success and failure stories are likely to develop and grow faster compared to those within societies that consider failures as misfortune.

Brownson (2013) referred to the entrepreneurial culture as a society that promotes the exhibition of the attributes, values, beliefs and behaviours that foster entrepreneurial spirit among members of such society. K. Bischoff, Volkmann, and Audretsch (2018) further posit that sound entrepreneurial culture promotes actors' collaboration within an ecosystem by inculcating trust and safety among stakeholders. Corrupt and bureaucratic societies hinder

entrepreneurial development within an ecosystem due to lack of trust and safety (de Bruin, Shaw, & Lewis, 2017). In a comparative case study on determinants for successful entrepreneurial ecosystems between Estonia and South Korea, Kshetri (2014) found that there is a dramatic change in the entrepreneurial culture of the two nations. He showed that such changes in social norms and values related to entrepreneurship have significantly contributed to the growth of entrepreneurial ecosystems in these countries.

Table 2.2: Thematic Analytical categorization of Entrepreneurial Ecosystem

Descriptive Statement	First Order	Second Order
The society that embraces success and failure entrepreneurial stories Entrepreneurs' adaptability and ability to track results and reward performance working motivational orientations and attitude	*Entrepreneurial Culture*	*Antecedents of Entrepreneurial Ecosystem*
Focal point and drivers of within entrepreneurial ecosystem Initiators of entrepreneurial decisions such as investment, innovation, starting the business or expanding it	*Entrepreneurs*	
Infrastructures and amenities such as good working spaces and transportation and other physical infrastructures	*Entrepreneurial Infrastructures*	
Institutions and organizations that play an intermediary role eg Banks and Microfinances, R&D Institutions, Universities	*Entrepreneurial Institutions*	
Various entrepreneurial support services such as product and service, promotions and marketing, mentorship, information access, professional advisory experts such as law, accountings, taxes	*Entrepreneurial Support Services*	
Entrepreneurial Policy and regulatory frameworks Presence of vibrant leaders who are committed to foster entrepreneurial performance Government intervention and support	*Entrepreneurial Policies and Regulations*	
Efficient entrepreneurial processes and activities; birth rate of new innovative ventures; individual and high growth firms; Increased job creation opportunities and reduction of unemployment	*Increased and efficient Entrepreneurial Activities and process (Productive Entrepreneurship)*	*Entrepreneurial Ecosystem Outputs*
Aggregate value creation (Improved social welfare of people) Creation of capital wealth, prosperity, and value creation; Improved competitive advantages and capabilities	*Entrepreneurial Economic Outcomes*	*Entrepreneurial Ecosystem Outcomes*
Diffusion of technology among entrepreneurs that results to invention of innovative products and services	Entrepreneurial Technological Outcomes	
non-monetary outcomes among entrepreneurial ecosystem members through delivered new products and services	Entrepreneurial Social Outcomes	

Mack and Mayer (2015) found that a lack of supportive entrepreneurial culture was among the hindering factors towards the growth of an entrepreneurial ecosystem in Phoenix, Arizona. A supportive entrepreneurial culture exhibits four features:- Entrepreneur`s willingness to share success and failure lessons (openness) (Roundy, 2017; Sambo, 2018); entrepreneur`s commitment to control internal and external milieus through evaluations and researches (adaptability) (Subrahmanya, 2017; Tracy, Jill, & Marc, 2018) as well as the ability to track results (entrepreneurial outcomes and impacts) and rewarding positive behaviours (Kathrin Bischoff & Volkmann, 2018; Yang, Kher, & Lyons, 2018).

Entrepreneurial culture is not static but rather dynamic and keeps on changing depending on the nature of the social interaction between entrepreneurs and other players (Isenberg, 2010; Motoyama & Knowlton, 2017) such as private and public sectors actors, and non-profit organizations with interest in supporting innovative business ideas within an ecosystem (Mack & Mayer, 2015; Malecki, 2018). Successful entrepreneurs act as role models and influence others to follow their steps by providing useful information and skills on how to successfully manage their ventures (Acs, Estrin, Mickiewicz, & Szerb, 2018).

2.3.2.2. Entrepreneurs

Entrepreneurs are the focal point of entrepreneurial ecosystems (Van Weele et al., 2018). Sustainable entrepreneurial ecosystems exhibit a balanced portfolio of entrepreneurs as a mix of both market-oriented and social entrepreneurs (Park & Park, 2018; Philip, 2017). Entrepreneurs are expected to drive the entrepreneurial ecosystem by initiating entrepreneurial decisions such as investment, innovation, starting a business or expanding it (Cohen, 2006; Yang et al., 2018). Other players do accelerate the process by providing needful support to entrepreneurs (Wadee & Padayachee, 2017). This entrepreneur-centric view is supported by key three elements of entrepreneurial resources (entrepreneurs need both financial and nonfinancial resources); entrepreneurial vision (an entrepreneur possesses entrepreneurial ideas) and other stakeholders` willingness to support materialization of entrepreneurial visions possessed by entrepreneurs (Malecki, 2018; Spigel, 2017).

The idea of placing an entrepreneur at the core of the entrepreneurial ecosystem distinguish it from other concepts such as regional clustering. According to Isenberg (2010), this shifts the role of other players such as government from being a leader to a feeder by ensuring conducive socioeconomic environment for sustainable entrepreneurship activities. Successful and long

term committed entrepreneurs through their networks and capital act as mentors and advisors to potential new and growing entrepreneurs (Cohen, 2006; Harper-Anderson, 2018)

Based on Neumeyer et al. (2018) who developed the typology of entrepreneurial ventures, it can be argued that entrepreneurs assume four categories within entrepreneurial ecosystems: survival entrepreneurs, lifestyle entrepreneurs, managed growth entrepreneurs and aggressive growth entrepreneurs. Survival entrepreneurs have no physical location and usually operate from arcade or public markets. They are not formally employed and have a labor-intensive orientation. Lifestyle entrepreneurs aim at serving a specific niche within a market and are always limited to one or two geographical locations. Managed growth entrepreneurs have multiple locations of operations and extend from local market. Aggressive entrepreneurs have extensive knowledge-based resources such as patents and sophisticated technologies (Neumeyer et al., 2018).

According to Subrahmanya (2017), entrepreneurship within ecosystems exhibits three stages. During the initial stage (conception) the entrepreneur needs to be exposed to opportunities mainly market access and resources (labor, technology and finance). At the development phase, the entrepreneur further develops the business through testing new ideas and improvement of existing ones. At the maturity stage, an entrepreneur implants more strongly a business within the ecosystem while creating own competitive advantages (own well-established source of resources) (Galan-Muros, 2016).

2.3.2.3. Physical Infrastructures

Efficient infrastructures are another necessary component of sustainable entrepreneurial ecosystems (Acs et al., 2017; Atiase et al., 2018). Infrastructures and amenities such as adequate working spaces and transportation will foster an easier interaction among players. Audretsch and Belitski (2017) point out that good infrastructures promote interconnections and linkages that eventually promote opportunity recognition among actors within the ecosystem. Physical infrastructures, furthermore, enhance production factor (for example labor) mobility, information exchange as well as the establishment of new networks within a particular entrepreneurial ecosystem (Bruns, Bosma, Sanders, & Schramm, 2017; Cowell et al., 2018; Velt et al., 2018).

Stam (2015) argues further that developed infrastructures create a third space within entrepreneurial ecosystems. He referred to the third space creation as a situation where pro-

active entrepreneurs, researchers and scholars, support institutions and other players within an ecosystem are pooled and connected. The role of business incubators and accelerators yield best results in areas where there are well established and efficient infrastructures (Di Fatta et al., 2018). Unreliable, poorly connected and long-time commuting transports tend to hinder entrepreneurial activities by increasing cost to producers, suppliers and customers (Audretsch & Belitski, 2017).

Audretsch and Belitski (2017) did a comparative study on the role of physical infrastructures and amenities towards creating sustainable entrepreneurial ecosystems in 70 European cities. They concluded that good amenities and better physical infrastructure and connectivity tend to pool population, facilitate employee mobility, attract other intermediary services and create new market niches. All these factors are essentials for successful entrepreneurial ecosystem (Bruns et al., 2017; Kshetri, 2014; Malecki, 2018)

2.3.2.4. Entrepreneurial Institutions

There are several institutions that fuel entrepreneurial ecosystem sustainability by playing an intermediary role (Goswami et al., 2018; Harper-Anderson, 2018). An entrepreneur as focal point of the system needs to know and interact with several organizations that in one way or another provide either financial or non-financial support throughout entrepreneurial processes (Kubera, 2017; Mack & Mayer, 2015). These institutions can be grouped into three major categories based on their support functions, i) financial support institutions, for example banks and microfinance institutions; ii) research and development institutions and iii) educational institutions (Kathrin Bischoff & Volkmann, 2018; Wadee & Padayachee, 2017; Yi & Uyarra, 2018). A clear and well-organized institutional arrangement can stimulate entrepreneurial activities within entrepreneurial ecosystems.

Acs et al. (2018) in their analysis of the impact of national entrepreneurial ecosystem in economic growth, posited that easy access to financial institutions with affordable financial services promotes both individuals and firms to engage in entrepreneurial activities. Spigel (2017) further argued that financial institutions apart from providing financial services (mainly loans provisions) also create special programs that increase financial literacy of entrepreneurs and enable them to better manage their ventures (Cohen, 2006; Economidou, Grilli, Henrekson, & Sanders, 2018). Venture capitalists and angel investors have been identified to have great support within entrepreneurial ecosystems by bridging the capital gap (Cohen, 2006; Harper-

Anderson, 2018). As it may be difficult for entrepreneurs to access funding through more traditional ways such as bank loans, venture and angel capital play an important role in supporting entrepreneurial activities (Isenberg, 2010; Roundy, 2017).

Research and development as well as educational institutions play another important role within entrepreneurial ecosystems. Sambo (2018) found a significant role of universities and research hub-based companies toward creation of sustainable entrepreneurial ecosystems in South Africa. He found that these institutions possess a huge number of experts that offer technical advice to entrepreneurs and other players e.g., venture capitalists interested in business ideas and government as regulator. Mack and Mayer (2015) further found that these institutions offer effective platforms for startups ensuring conducive business atmosphere in Arizona.

Many studies that focus on this component of supporting institutions analyse the role played by research-based institutions and educational institutions (mainly higher education institutions) and only few focuses on financial institutions. This implies that entrepreneurial education plays a crucial role within entrepreneurial ecosystems by stimulating the creation of new business ventures and by promoting entrepreneurial skills and attitudes of entrepreneurs (K. Bischoff et al., 2018; Sambo, 2018; Schaeffer & Matt, 2016; Schillo, 2018). As argued by Economidou et al. (2018) the most important resources of an entrepreneur are essential skills and knowledge for generating and making sense of innovative entrepreneurial ideas.

2.3.2.5. Entrepreneurial Support Services

Entrepreneurs need various support services to advance within entrepreneurial ecosystems (Atiase et al., 2018). Non-profit organizations can help in building networks and linking entrepreneurs to those networks (Acs et al., 2017). Entrepreneurs need promotion services and mentorship for sustainable growth (Apa et al., 2017). To facilitate access to information, the role of media is important (Audretsch & Belitski, 2017). St-Pierre and Foleu (2015) found that poor access to information was among challenges in developing sustainable entrepreneurial ecosystems in Cameroon. Isenberg (2010) posited that entrepreneurial ecosystems also need venture-oriented professionals such as lawyers, accountants, business consultants who can provide technical knowhow to entrepreneurs.

Cohen (2016) in his study revealed that entrepreneurial tax and legal support are the most frequent professional services entrepreneurs seek from professional advisors. Prior studies

(Kathrin Bischoff & Volkmann, 2018; Yang et al., 2018; Yi & Uyarra, 2018) show that most entrepreneurs seek for professional advice during the inception of their ventures. Subrahmanya (2017) in a study of success factors for the Bangalore entrepreneurial ecosystem he posited further that it can be a hindrance to successful entrepreneurship if professional advisers are not aware of the challenges faced by entrepreneurs. In a comparative study on entrepreneurial ecosystems between small and large towns, Roundy (2017) discovered that higher costs associated to access to these professional services being another challenge for entrepreneurs. Professional services need to be affordable for a wide range of entrepreneurs within an ecosystem (Mack & Mayer, 2015; Roundy, 2017; Spigel, 2017).

Another prominent entrepreneurial support service for sustainable entrepreneurial ecosystems is entrepreneurial incubation (Apa et al., 2017). In their study on critical resources in African entrepreneurial development, Atiase et al. (2018) found that during the initial phases, entrepreneurs usually lack financial resources, have limited experience and are not well connected to other potential players such as large companies and fund providers. Audretsch and Belitski (2017) therefore argued that incubators can bridge such gaps and help entrepreneurs to have an early breakthrough by facilitating working spaces and meeting venues, providing technical infrastructures and advice.

Maroufkhani et al. (2018) extended Isenberg`s entrepreneurial ecosystems framework by suggesting another overlooked but important support service, crowdsourcing, which creates an information rich environment. Entrepreneurs need easy and fast access to information and knowledge for example on potential new markets and new technologies. In many cases players within an ecosystem rely on informal channels (such as informal meetings with friends) (Cowell et al., 2018) for information sharing which can be an insufficient and ineffective means of information sharing. Sustainable entrepreneurial ecosystems need information connectors who bring together people, idea and resources. Here, media plays a vital role (Audretsch & Belitski, 2017). Acs et al. (2017) further supported the argument by adding that effective information communication technological systems (ICT) support entrepreneurial ecosystems by speeding knowledge spill-over among players.

2.3.2.6. Entrepreneurial Policies and Regulations

Policy and regulatory frameworks that govern entrepreneurial ecosystems play a vital role. Isenberg (2010) posits that a vibrant entrepreneurial ecosystem consists of determined public

leaders that stand as advocates of entrepreneurs and promote entrepreneurial activities by opening doors for committed entrepreneurs. Colombo and Dagnino (2017) in their conceptual study in models of entrepreneurial ecosystems governance, argued that the government needs to establish and promote entrepreneurial institutions such as research institutions as well as platforms for public-private entrepreneurial debates and negotiations.

By investigating the state`s roles in German entrepreneurial ecosystems, Fuerlinger and Fandl (2015) found that entrepreneurs and other players such as incubators and accelerators of entrepreneurial activities face operational legal barriers. Audretsch and Belitski (2017) by analysing entrepreneurial ecosystems diversities of European cities, found that governments play a significant role in bridging the valley of entrepreneurial failure by removing entrepreneurial barriers such as difficult business registration regulations and weak legal enforcement strategies. Kubera (2017) in a study on the impact of regulatory policies on the development of entrepreneurial ecosystems in Poland, further argued that government needs to assume a feeder/supporter-oriented role acting as an overseer rather than playing a leadership role. However, strong leadership is required for entrepreneurs who in collaboration with other actors, such as incubators and accelerators, form a network that defines the entrepreneurial ecosystems` structure (Philip, 2017; Steinz, Van Rijnsoever, & Nauta, 2016).

Furthermore, Steinz et al. (2016) in their analysis of how to create sustainable entrepreneurial ecosystems development in China, identified regulative barriers to be among challenges for foreign entrepreneurs and facilitators. Governments need to create coordinated systems among its agents that directly engage with entrepreneurial ecosystems in one way or another (Pillai & Ahamat, 2018; Pittz & Hertz, 2018). Divergent and unharmonized governmental system open room for beauacracy and corruption which act as hammer for destroying the effectiveness of entrepreneurial activities within an ecosystem.

2.3.2.7. Outputs and Outcomes of Entrepreneurial Ecosystems

Government invention through policies and regulatory frameworks aims at solving specific market failure, i.e., when the market fails to achieve desirable results by its own (Fuerlinger & Fandl, 2015). The question of what entrepreneurial ecosystems intend to achieve is of importance when designing policies and regulations (Audretsch et al., 2019). Nicotra et al. (2018) in a conceptual study on the relationship between entrepreneurial ecosystems and

productive entrepreneurship posit that outputs and outcomes created by entrepreneurial ecosystem need to be well articulated in order to have effective interventions.

Measurement indicators of outputs and outcomes of entrepreneurial ecosystems remain as an aspect that still receives little attention in research. For example, one argument is whether governments need to focus their policies on the number of new entrepreneurial ventures created as one of indicator of entrepreneurial ecosystem output. However according to Bruns et al. (2017), this provides a limited measure of entrepreneurial ecosystem success as some new ventures fail to be sustainable and exhibit stagnant growth (Di Fatta et al., 2018). Furthermore, in some cases governments do not embrace high-growth entrepreneurs (Isenberg, 2010). According to Acs et al. (2018), a sustainable entrepreneurial ecosystem should stimulate economic growth through increased productivity.

Outputs of entrepreneurial ecosystems have been discussed in an aggregated term as productive entrepreneurship (Acs et al., 2018). Productive entrepreneurship refers to increased entrepreneurial activities *(output)* where entrepreneurs see and cease entrepreneurial opportunities through innovation and eventually create aggregate value/welfare *(outcome)* to society (St-Pierre & Foleu, 2015; Theodoraki et al., 2018). Increased entrepreneurial activities can be measured by the number of innovative start-ups, high-growth start-ups and the number of new entrepreneurial employees (Philip, 2017; Pittz & Hertz, 2018). As an output of entrepreneurial ecosystems, productive entrepreneurship can be evidenced in terms of new job creations and the reduction of overall unemployment as a result of self-employment and job opportunities in new entrepreneurial ventures within an ecosystem (Nicotra et al., 2018).

Audretsch et al. (2019) categorized entrepreneurial ecosystem outcomes into three categories: economic, technological, and societal. Accordingly, economic outcomes represent capital wealth, prosperity and value creation from entrepreneurial activities. Philip (2017) in a conceptual study on economic implications of small-town entrepreneurial ecosystems argued that sustainable entrepreneurial ecosystems through attracting resource flows (human and financial capital and other supports), improve competitive advantages and capabilities of entrepreneurs which in turn improves productivity.

Technological outcomes can be traced through the role of training and educational institutions within entrepreneurial ecosystems that facilitate technological transfer among entrepreneurs (Schaeffer & Matt, 2016; Schillo, 2018). Diffused technology eventually leads to the invention

of innovative products and services that in turn improve the welfare of the society. Societal outcomes denote non-monetary outcomes among entrepreneurial ecosystem members through delivered new products and services (Szerb & Trumbull, 2018; Theodoraki et al., 2018).

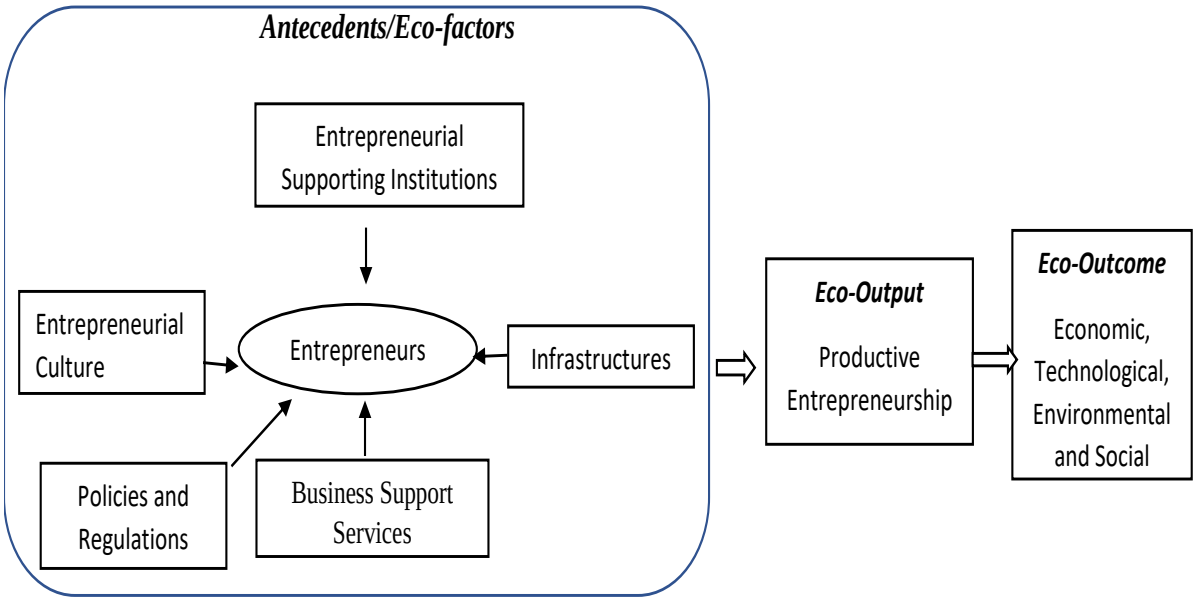

Figure 2.1: Entrepreneurial Ecosystem Framework

2.3.3. Theoretical and Empirical Gaps

Despite its popularity within entrepreneurship policies, practices and research, the concept of entrepreneurial ecosystems is still characterized not only by scarce empirical work but also by the absence of a sound theoretical foundation (Spigel & Harrison, 2018). A lack of conceptual rigor that it is theoretically driven has led to the formulation of less informed policies and practices aimed at fostering entrepreneurship development (Stam, 2015).

Most of the recent studies on entrepreneurial ecosystems apply macro level theories mainly social network/capital and institutional theories (Apa et al., 2017; Atiase et al., 2018; Cowell et al., 2018; Di Fatta et al., 2018; Neumeyer et al., 2018). These theories have been used to explain the relational dimensions and networks existing within certain components (for example among universities or among business incubators) of entrepreneurial ecosystems. However, there is a need for a more holistic theoretical foundation that describes and explains how entrepreneurial ecosystems evolve and function considering the entrepreneur-centric view.

Spigel and Harrison (2018) provided a considerable work attempting to close such theoretical gap. In their work, they conceptualized and proposed a process perspective of entrepreneurial ecosystems. They theorize that entrepreneurial ecosystems are ongoing processes of the development and flow of entrepreneurial resources. The emergence and transformation of entrepreneurial ecosystems can be better explained through the presence and circulation of these entrepreneurial resources among actors. Thus, Spigel and Harrison (2018) posited that the proposed process perspective provides a better understanding of the functioning and influence of entrepreneurial ecosystems on entrepreneurial processes that in turn enable effective policy interventions. Furthermore, they call for empirical work to test their proposed framework and propositions.

Furthermore, most of reviewed articles found to be conceptual-based studies that is contributions without empirical support (e.g., Cohen, 2006; Colombo & Dagnino, 2017; Roundy, 2017). The focus of the scarce empirical research is on technology-based industries in Western economies (e.g., Acs et al., 2018; Apa et al., 2017; Audretsch & Belitski, 2017).

2.3.4. Future Research Avenues

Our review has revealed that the phenomenon of entrepreneurial ecosystems is still undertheorized. Most contributions are conceptual providing an understanding of the different elements that form conducive entrepreneurial ecosystems. Therefore, we see a need for more empirical research, especially regarding potential causal relations between elements, context factors, outputs and outcomes of entrepreneurial ecosystems. The few empirical studies on entrepreneurial ecosystems have majorly applied case studies including qualitative methods. There is a need of deploying other methodological approaches for more rigor and generalizability purposes. For example, the use of large samples and quantitative methods for hypotheses-testing (Malecki, 2018; Nicotra et al., 2018).

Entrepreneurial ecosystems exhibit heterogenous features across industries and economies. Thus, it is relatively important that studies on entrepreneurial ecosystems being industrial and economies diverse. However, research on entrepreneurial ecosystems mostly focuses on technology-based industries in developed economies. This reveals a gap in entrepreneurial ecosystems research especially in other sectors which are economically and strategically important such as services (e.g. transportation and tourism) and primary sectors such as agriculture, fishing and natural resources. According to the World Bank Global Economic

Prospects, (2012), the service sector contributes up to 70 percent of the GDP in developed economies. The service sector is equally important even to developing economies, for example it contributes up to nearly 60 percent of Sub-Saharan Africa`s GDP. Thus promoting entrepreneurial ecosystems in this sector may contribute significantly to economic growth and development.

The agricultural sector is among the key economic sectors that drives economies in most of developing countries. It contributes to economic development through supply of food, raw materials for industries, source of foreign income through exports as well as wide pool of job creation (Emmanuel & Etim, 2012). Despite its vital role on economy, agricultural entrepreneurship still receives less attention in research (Dias, Rodrigues, & Ferreira, 2019). Thus, we propose further research on how agricultural entrepreneurial ecosystems can be fostered. It is equally important to study how ecosystems can mobilize resource allocations to promote agricultural entrepreneurships.

The natural resource endowment in any country comes with two major impacts on entrepreneurship. First, the primary sector offers new business entrepreneurial opportunities (through demand and supply of products and services along its value chain) to local people and firms. Second, it provides resource rents for governments which if spent efficiently can boost entrepreneurial development by financially supporting potential entrepreneurs that engage themselves in the sector (Adedeji, Sidique, Abd Rahman, & Law, 2016; Basco & Calabro, 2016; Majbouri, 2016). Natural resources, such as oil and gas, are non-renewable resources. Therefore, countries toned to spend their resource wealth wisely by diversifying obtained revenues to other non-resource sectors. Among the best and effective strategy is by promoting entrepreneurship development alongside the primary sector (Parlee, 2015). Thus, to have effective entrepreneurial development along the oil and gas industry it is necessary for countries to have a better understanding how different entrepreneurial actors and systems within the sector interact with each other.

2.4. Conclusion

In this review, we systematically scrutinized the literature on the emerging concept of entrepreneurial ecosystems. The concept has captured the attention of scholars and practitioners from 2000s with more publications between 2015 and 2019. The findings show that entrepreneurial ecosystems are still an under-researched phenomenon where conceptual

studies dominate recent research. There is a need for more empirical research on the phenomenon. Furthermore, we have noted that there is still a need for theorizing the concept of entrepreneurial ecosystems. A few studies have applied macro theories, but entrepreneurial ecosystem research is lacking a theoretical micro foundation. Future research on entrepreneurial ecosystems should expand its industry focus by including for example services and primary sectors and its regional scope in considering developing and emerging economies.

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Appendices

Appendix 2.1: Sample Description

Author(s)	Year	Research Question(s)/Objectives	Methodological Approach	Theoretical Basis	Industry/Sector Focus	Country Focus
Audretsch, D. B. and M. Belitski (2017)	2017	Developing a model for explaining entrepreneurial activities variations	Quantitative Survey based		General	70 European Cities
Kshetri, N. (2014)	2014	What are the sources of entrepreneurial success of Estonia and South Korea?	Quantitative Case Study		General	Estonia and South Korea
Neumeyer, X., et al. (2018)	2018	Are there distinguishable social arreys in an entrepreneurial ecosystem, and if so, what are their characteristics?	Qualitative Case study	Social Network Theory	General	United States
Acs, Z. J., et al. (2017).	2017	Linking environment around entrepreneurs and entrepreneurship environments with an economy, and gauge its performance effects on the regional economy	Conceptualization		Technology	Global
Apa, R., et al. (2017).	2017	to provide insights on the relational dimension of a networked business incubator (NBI), by linking tenants among each other, with the incubator management and external actors.	Qualitative Case Study	Social Network Theory		Italy
Atiase, V. Y., et al. (2018)	2018	to investigate the quality of entrepreneurship and the depth of the supporting entrepreneurship ecosystem in Africa	Quantitative	Institutional Theory	General	African Countries
Bischoff, K., et al. (2018)	2018	To examine the collaboration of stakeholders from the entrepreneurial ecosystem in entrepreneurship education	Qualitative Case Study	Stakeholder Theory	Education	European higher educational institutions (HEIs)

Cowell, M., et al. (2018).	2018	to explore the dynamics of entrepreneurial ecosystems with both rural and urban features,	Mixed Method Case Study	Social Network Theory	General	Virginia
Di Fatta, D., et al. (2018).	2018	To investigate the relationships between start-up firms inside incubator	Qualitative Case Study	Social Network Theory	General	Spain
Economidou, C., et al. (2018).	2018	What are fundamental reforms necessary for entrepreneurial ecosystem improvements	Conceptualization		General	Europe
Eesley, C. E. and W. F. Miller (2018).	2018	Aimed at assessing the University`s economic impact towards developing entrepreneurial ecosystem	Quantitative Survey		Education	USA
Huang-Saad, A., et al. (2018).	2018	To describe the role of universities towards development of entrepreneurial ecosystems	Qualitative Case Study		Technology	USA
Kuratko, D. F., et al. (2017).	2017	To theorize on how entrepreneurs, establish their venture legitimacy within entrepreneurial ecosystem	Conceptualization		General	
Miller, D. J. and Z. J. Acs (2017)	2017	To understand how university campus can emerge as entrepreneurial ecosystem.	Case Study		Education	USA
Muldoon, J., et al. (2018)	2018	to examine the role of trust and distrust in social networks within the entrepreneurial ecosystem	Conceptualization	Social Network Theory	General	
Nicotra, M., et al. (2018).	2018	To design the framework for operationalizing causal effects of entrepreneurial ecosystems factors on productive entrepreneurship	Conceptualization		General	
Pillai, T. R. and A. Ahamat (2018).	2018	Investigating the role of social cultural capital in youth entrepreneurial ecosystem	Qualitative based case study	Social Capital and Social Network Theories	General	Malysia

Pittz, T. G. and G. Hertz (2018).	2018	To investigate the role of entrepreneurial center in entrepreneurial ecosystem	Qualitative Delphi based study		Education	US and Europe
Roundy, P. T. (2017).	2017	To develop the framework for contextualizing entrepreneurial ecosystem in small towns	Conceptualization		General	
Schaeffer, V. and M. Matt (2016).	2016	Explore the role played by universities as hub organization in stimulating non-matured entrepreneurial ecosystem	Qualitative based case study		Education	France
Schillo, R. S. (2018).	2018	To investigate the effects of research-based spin-off companies on entrepreneurial ecosystems.	Quantitative Survey based		R & D and Education	Canada
Steinz, H. J., et al. (2016).	2016	Studying barriers for foreign cleantech start-ups in penetrating Chinese Market and possible strategies for overcoming such barriers.	Qualitative based case study	Institutional Theory	Technology	China
St-Pierre, J., et al. (2015).	2015	Challenges facing SME development in Cameroon	Quantitative Survey based		General	Cameroon
Sussan, F. and Z. J. Acs (2017).	2017	To establish the interconnection between digital ecosystem and entrepreneurial ecosystem	Conceptualization		Information Technology	
Theodoraki, C., et al. (2018).	2018	To create an understanding on sustainable university-based entrepreneurial ecosystems	Qualitative based case study	Social Capital Theory	Education	France
Van Weele, M., et al. (2018).	2018	What are the main challenges faced by start-ups in Western Europe?	Qualitative based case study		Technology	Europe
Velt, H., et al. (2018).	2018	RQ1. Which systemic elements represent a healthy entrepreneurial ecosystem? RQ2. What is the role of the entrepreneurial ecosystem in launching and growing born global start-ups?	Quantitative survey based		General	Estonia

Debbage, K. G. and S. Bowen (2018).	2018	To investigate the impact of entrepreneurial support systems by looking on how well entrepreneurs are linked to those systems	Quantitive		General	USA
Ferrandiz, J., et al. (2018).	2018	the role of higher education programs for entrepreneurs within entrepreneurial ecosystem	Quantitative based case study		Education	Spain
Harper-Anderson, E. (2018).	2018	The interconnection between partnership and leadership within entrepreneurial supporting organizations	Qualitative Case Study		General	Chicago
Kubera, P. (2017).	2017	Analyzing the impact of regulation and Regulatory Policy on entrepreneurial ecosystem	Qualitative Case Study		General	Poland
Sambo, W. (2018).	2018	How entrepreneurial ecosystem work in South Africa by reflecting the role of universities	Mixed Method		Education	South Africa
Motoyama, Y. and K. Knowlton (2017).	2017	Examining how entrepreneurial ecosystem is structured	Exploratory-Qualitative based	Social Network Theory	General	USA
Spigel, B. and R. Harrison (2018).	2018	Examining the relationship between ecosystem and clusters and regional innovation systems	Conceptualization		General	
Subrahmanya, M. B. (2017)	2017	How Bangalore Tech Start-Ups entrepreneurial ecosystem functions	Qualitative		Technology	India
Thompson, T. A., et al. (2018).	2018	How entrepreneurial Ecosystems take form	Conceptualization		General	
Yi, G. F. and E. Uyarra (2018).	2018	How a research university develops its academic entrepreneurial ecosystem	Qualitative based case study		Education	China
Wadee, A. A. and A. Padayachee (2017)	2017	To study the role played by Higher education as a catalyst towards entrepreneurial ecosystem development	Qualitative based case study		Education	South Africa

Yang, S., et al. (2018).	2018	Analyze the impact of incubation mechanisms towards entrepreneurial ecosystem development	Conceptualization		General	
Goswami, K., et al. (2018)	2018	Analyzing the intermediary role played by accelerators within entrepreneurial ecosystems	Qualitative		General	India
Harrison, B. S. R. (2018)	2018	examines the relationships between ecosystems and other existing literatures such as clusters and regional innovation systems	Conceptualization		General	
Volkmann, K. B. C. K.(2018)	2018	How does stakeholder support influence entrepreneurial ecosystem	Conceptualization		General	
Ventresca, T. A. T. J. M. P. M. J.(2018)	2018	examine the cultural cognitive and material micro-dynamics of activities occurring in support of social impact entrepreneurs and businesses	Qualitative	Field Theory	General	USA
Stam, E. (2015).	2015	Examine Entrepreneurial Ecosystem Approach and related shortcomings	Conceptualization		General	
Spigel, B. (2017)	2017	How entrepreneurial ecosystem attributes relate	Qualitative based case study		General	Canada
Morris, M. H., et al. (2018)	2018	Distinguishing Types of Entrepreneurial Ventures	Quantitative		General	USA
Mack, E. and H. Mayer (2015)	2015	to develop an evolutionary framework of EE development	Qualitative based case study		General	USA
Isenberg, D. J. (2010)	2010	How to start an entrepreneurial revolution	Conceptualization		General	
Colombo, M. G., et al. (2017).	2017	How entrepreneurial ecosystems are governed	Conceptualization		General	
Cohen, B. (2006).	2006	examines the applicability of the entrepreneurial ecosystem	Qualitative based case study		General	UK
Audretsch, D. B., et al.(2019)	2019	critically reflect on the usage of the term 'ecosystem	Conceptualization		General	