

# THE ENTREPRENEURIAL ECOSYSTEM AS A NETWORK-RICH SYSTEM: A SYSTEMATIC MAPPING STUDY

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## ABSTRACT

*Many researchers recognise that the entrepreneurial ecosystem is a network, defined as the interaction between the components (actors & factors), but little research has been conducted on the systematic analysis of network properties. Although, several systematic literature reviews exist on either entrepreneurial ecosystem or network, but none of them has addressed the specific realm of the research. The purpose of this study is to provide a useful literature map about entrepreneurial ecosystem research especially in determining the position of network theory and also to identify gaps and state-of-the-art in research as well as implications and guidelines for both scholars and practitioners. This paper presented a systematic mapping study that found 206 papers of entrepreneurial ecosystem. These papers were surveyed, analysed and classified according to research focus, research method, paper type, and publication trends that change over time. Analyses of the 206 articles showed that research on entrepreneurial ecosystem with focus on network theory is still limited. The most widely used research method and paper type for this topic are qualitative and philosophical paper type. The trend of publication showed a significant development especially in 2016-2017. Based on the SMS results, it can be a state of the art of entrepreneurial ecosystem research from network theory perspective which is still limited and needed to be explored.*

**Keywords:** Entrepreneurial Ecosystem, Network, Network Theory, Entrepreneurship.

## INTRODUCTION

The entrepreneurial ecosystem has been recognised as a collection of interlinked actors, institutions, social structures and cultural values in generating entrepreneurial activity (Breznitz & Taylor, 2014; Feld, 2012; Mason & Brown, 2014; Neck et al., 2004; Roundy, 2016; Spigel, 2017; Spilling, 1996; Van de Ven, 1993; Roundy, 2017), interacting and encouraging the establishment of new business and regional entrepreneurial activities (Mack & Mayer, 2016). Isenberg (2011) states the components of entrepreneurial ecosystems interact in a complex and specific way, leading to the unique configuration of different entrepreneurial ecosystems. Spigel (2015) focuses on components that develop simultaneously and reinforce each other: an ecosystem's attributes are sustained and reproduced through their relationships with other attributes'. Although components can support each other, they cannot completely replace one another (Acs et al., 2014). Feld (2012) states the importance of interaction in successful startup communities and high network density among actors and groups of actors, where everyone is willing to contribute to the ecosystem (Borissenko & Boschma, 2016).

Most experts agree that entrepreneurial ecosystems have geographic boundaries. According to system boundaries, when defined geographically, entrepreneurial ecosystems can be on any scale (Qian et al., 2013). Therefore, entrepreneurial ecosystems are heavily dependent on location and evolve due to historical, cultural and other local factors that then shape the economic landscape. Policies that do not take into account differences in entrepreneurial ecosystems can result in inefficient spending (Evans & Boguchwal, 2015).

Associated with these geographic boundaries, entrepreneurial ecosystem literature links clearly to research on clusters (Mason & Brown, 2014; Borissenko & Boschma, 2016). Clusters provide opportunities for entrepreneurship, such as specialised labor markets or knowledge spillovers that exist in local geographies (Rocha & Sternberg, 2005; Delgado et al., 2010; Borissenko & Boschma, 2016). Cluster literature is increasingly adopting a network approach. This shows not only the presence of actors in the group that improve the company's performance but also the position of actors in the local knowledge network (Boschma & Ter Wal, 2007; Giuliani, 2007; Borissenko & Boschma, 2016).

The current study of entrepreneurial ecosystems has focused on identifying and understanding the role of components in the entrepreneurial ecosystem (Roundy, 2017). This concept means that little understanding still exists on interdependence between components in the entrepreneurial ecosystem and its evolutionary dynamics (Mack & Mayer, 2016). Although many researchers recognise that the entrepreneurial ecosystem is a network, little research has been conducted on the systematic analysis of network properties, such as density and network bond strength (Granovetter, 1983) in the entrepreneurial ecosystem, which is believed to have important implications for ecosystem function and strategy (Roudy, 2017).

Motoyama & Watkins (2014) criticise the entrepreneurial ecosystem literature related to system components without giving proper attention to the relationships between the components and treating all the components as equally important. In addition, the entrepreneurial ecosystem literature shows that networks connect components at the aggregate level of entrepreneurial ecosystems but also consider the network as a component of the entrepreneurial ecosystem. The literature of entrepreneurial ecosystems has not resulted in a comprehensive network approach that can answer the important question of why some entrepreneurial ecosystems successfully make vital connections while others fail (Borissenko & Boschma, 2016). Experts realise that the interaction between components within the entrepreneurial ecosystem will improve entrepreneurial performance in an area (Borissenko & Boschma, 2016). Unfortunately, few studies examine entrepreneurship from a systemic and interdisciplinary perspective (Qian et al., 2013; Acs et al., 2014; Borissenko & Boschma, 2016).

To understand the development of the study of entrepreneurial ecosystems, especially related to network theory, researchers conducted a Systematic Mapping Study (SMS). The study of the entrepreneurial ecosystem as a network-rich system is the first SMS study that was conducted. Although several Systematic Literature Reviews (SLRs) have been conducted on entrepreneurial ecosystems (Fritsch et al., 2008; Isenberg, 2011; Clarysse et al., 2014, Mason & Brown, 2014; Stam, 2015; Stam & Spigel, 2016; Borissenko & Boschma, 2016; Xaver et al., 2017) no studies address specific areas of network theory. Therefore, the purpose of this study is to provide a useful literature map about entrepreneurial ecosystem research especially in determining the position of network theory and also to identify gaps and state-of-the-art in research as well as implications and guidelines for both scholars and practitioners.

The complexity of the entrepreneurial ecosystem has been cited in many sources (Isenberg, 2011; Clarysse et al., 2014; Mason & Brown, 2014; Stam, 2015; Stam & Spigel,

2016; Roundy, 2017). Also network theory is known as a holistic approach to manage complexity (Evans & Boguchwal, 2015; Xaver et al., 2017). This understanding of the complexity of entrepreneurial ecosystem and network theory motivated this study to find out how the network theory issue has been addressed by the entrepreneurial ecosystem in literature.

In a study of the entrepreneurial ecosystem, researchers used 11 electronic databases, namely, Doaj, Ebscohost, Emerald, Gale Cengage, Jstor, Pro Quest, SAGE, Science Direct, Scopus, Springer and Google Scholar. The use of 11 electronic databases has become a distinct feature of this research, because most research that performs SMS use only one source database, such as Scopus (Banaeianjahromi & Smolander, 2016). The use of 11 electronic databases means there is no room for research on the entrepreneurial ecosystems missed in the SMS process. From these electronic databases, the researchers obtained 206 journals related to the topic of entrepreneurial ecosystems. The main answered research questions in this study include:

- RQ1. What are research focuses of current entrepreneurial ecosystem research? What is the position of network theory as a research focus in entrepreneurial ecosystem research?
- RQ2. What methodologies and paper types are utilized?
- RQ3. How has the number of publications changed over time??

## **LITERATURE REVIEW**

### **Entrepreneurial Ecosystem**

Entrepreneurship is embedded in social relationships (Nijkamp, 2003; Stuart & Sorenson, 2005; Borissenko & Boschma, 2016). The capital acquired by an entrepreneur from social relations can be (Borissenko & Boschma, 2016): (1) new knowledge of opportunities and technologies developed in companies and universities (Owen-Smith & Powell 2004); (2) financial means, as information asymmetry diminishes as investors use their social networks to identify new companies (Shane & Cable, 2002; Fritsch & Schilder, 2008; Steijvers et al., 2010); (3) trust to reduce market costs (Doloreux, 2005); (4) entrepreneurial skills shared within networks involving entrepreneurs and mentors and supported by entrepreneurial organisations (Stam & Spigel, 2016); (5) access to talented workers; (6) access to customers and suppliers (Spigel, 2015); and (7) collective learning capacity enhanced by local networks, especially informal social relations (Doloreux, 2005).

Stam & Spigel (2016) define an entrepreneurial ecosystem as a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory’.

Mason & Brown (2014) define an entrepreneurial ecosystem as a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisations, institutions and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment’.

Many entrepreneurial ecosystem researchers criticise the lack of a holistic approach to entrepreneurship that focuses on interrelated aspects of entrepreneurship. A study of the relationship between networking and entrepreneurship began to emerge in the late 1980s, exploring different roles for new activities and more specific ethnic entrepreneurship (O’Donnell et al., 2001; Hoang & Antoncic, 2003; Borissenko & Boschma, 2016). For example, research

conducted by Birley (1986) on formal and informal networks and that by Dubini & Aldrich (1991) found a wide distinction between private and public networks. However, as explained earlier, many researchers agree that the study of systemic roles in entrepreneurial activity is still undeveloped (Gustafsson & Autio, 2011; Szerb et al., 2012; Qian et al., 2013; Acs et al., 2014, Borissenko & Boschma, 2016). In addition, some entrepreneurial research treats entrepreneurial opportunities as something exogenous, not considering the creation of opportunities as part of the entrepreneurial process (Qian et al., 2013). By contrast, in the systemic view of entrepreneurship, entrepreneurs act on new opportunities and mobilise resources from their environment to exploit these opportunities (Acs et al., 2014; Borissenko & Boschma, 2016).

Therefore, a study of how the interaction patterns of components within the network of an entrepreneurial ecosystem from the perspective of a comprehensive network system is still limited and needs to be conducted to understand the network structure to maximise the performance of the entrepreneurial ecosystem.

### **Network Theory**

Over the past decade, several important research advances have been made towards understanding complexity in the context of network theory where it is explained that each complex system has a network, which is further defined as the interaction between components (Evans & Boguchwal, 2015). Network theory refers to the mechanisms and processes of interaction within the network structure to obtain specific results for individuals and groups (Burt, 1992; Fritsch et al., 2008; Boggati & Halgin, 2011; Xaver & Susana, 2017).

The network consists of a set of actors or shared nodes in a set of certain bond types (such as friendship) that connect them. The relationship is interrelated to achieve the same goal to form a path that indirectly connects actors who are not connected or directly bound. The bond pattern in the network produces a certain structure, and the actor occupies a position within this structure. Most network theory analyses look at the characteristics of the network structure and the position of the actor (centrality) and attempt to relate it to the achievements/outputs generated by groups and actors (Boggati & Halgin, 2011).

### **Entrepreneurial Ecosystem as a Network-Rich System**

Economic development practitioners, economists and sociologists have recently begun using network analysis techniques. In 1988, Dr Bengt Johannisson of the University of Jönköping in Sweden stated that entrepreneurship is a network. People and organisations connected with entrepreneurship are the most significant resource of the firm (Evans & Boguchwal, 2015).

The entrepreneurial ecosystem framework is presented as a system or network that consists of many components that interact in complex ways. The entrepreneurial ecosystem consists of networks that are both formal and informal between the ecosystem components (Isenberg, 2010; Roudy, 2017). A constellation of connections exists between the two individuals (e.g. entrepreneurs, investors) and organisations (universities, support institutions, governments, large corporations) (Neck et al., 2004; Roudy, 2017). The ecosystem is seen as a reflection of how the entrepreneurial community has a deep and well-connected relationship with investors, advisers, and cross-sectoral advocates (Case & Harris, 2012; Roudy, 2017).

In the network theory perspective, the perceived aspect is the relational structure

between the various stakeholders in the entrepreneurial ecosystem, the level of connectivity between entrepreneurs, government agencies, incubators or members of accelerator organisations, investors or members of higher education organisations affecting social network connectivity (Xaver & Susana, 2017). The network definition used by Neck et al. (2004) is a set of nodes (for example, persons and organisations) linked by a set of social relationships (for example, friendship, transfer of funds, overlapping membership) of a specific type, while Spigel (2015) refers to the network as a presence of social networks that connect entrepreneurs, advisors, investors, and workers, and that allow the free flow of knowledge and skills.

The nature of relationships within the network can be explained in terms of proximity to investigate how types of bonds, in addition to individual characteristics (such as education and work experience (Cooper et al., 1991), enhance entrepreneurship (Boschma & Frenken, 2010). Network literature has referred to the fact that network structures might hamper entrepreneurial processes when they become too inward-looking, too deep and too socially close (Boschma, 2015). Crespo et al. (2014) states that the core that is tightly bound in local networks and the high ties between network partners can negatively affect radical entrepreneurship, because such networks tend to have closed social circles and a lack of recombination possibilities. The local network structure can also become too fragmented, with multiple connections between nodes/actors and lack of ties. These networks provide access to new knowledge but also reduce regional cohesiveness that undermines the ability to pursue collective action, interact and learn from others (Boschma, 2015). Implementing a bonding approach on a network can contribute to the development of an analytical framework in an entrepreneurial ecosystem that takes a systemic perspective on entrepreneurship (Borissenko & Boschma, 2016)

Well-developed networks among members of the entrepreneurial ecosystem are beneficial because they facilitate the free flow of information, knowledge and skills both between ecosystem members and from outside the system (Spigel, 2017; Ter Wal et al., 2016; Roudy, 2017). Ter Wal et al. (2016) explain that the entrepreneurial ecosystem consists of different networks, such as knowledge networks, political networks, entrepreneur networks and financial networks (Borissenko & Boschma, 2016). In addition to creating relationships among ecosystem participants, events are also important because they help generate local issues' the sense of enthusiasm and anticipation of what happens in ecosystems that attract people (Bathelt et al., 2004; Roudy, 2017).

Several arguments have been made as to why entrepreneurial ecosystems can be studied through a network theory perspective. Among them were made by Evans & Boguchwal (2015), who stated that several progress studies have been conducted to understand complexity in the context of network theory. This definition is certainly relevant to the entrepreneurial ecosystem, as mentioned earlier, as a complex system. In addition, Jennen & Tina (2016) explains that entrepreneurial ecosystems have an operational network effect so that having more people in the network ensures improved practices, allows inspirations and talents to be shared, and makes co-location more valuable. Another opinion reveals that thinking about entrepreneurial ecosystems refers to heterodox literature, including studies on clusters, innovation systems and geographical and networking economies (Spigel, 2015). A dynamic entrepreneurial ecosystem typically has a strong informal and formal network that helps alleviate the shortage of new business resources and facilitates the process of tacit knowledge (Ferrary & Granovetter, 2009; Sullivan & Ford, 2014; Brown & Mason, 2017).

## METHODOLOGY

This study uses a Systematic Mapping Study (SMS) which is rooted from Study Literature Review (SLR) (Kitchenham, 2004). SLRs are applied to identify, evaluate and interpret all available and relevant literature related to interesting research questions or domains (Kitchenham, 2004:2007; Petersen et al., 2008). The most common reasons for performing SLRs are as follows: to summarise existing evidence on the topic, to identify gaps in current research, to provide guidance for future research and to provide the background for positioning new research activities (Kitchenham, 2004).

Unlike SLRs, SMS describes high-level research and mapping research rather than investigates detailed research questions (Brereton et al., 2007; Budgen et al., 2007; Petersen et al., 2008). SMS is applied to describe the types of research that have been involved in previous research. In other words, SMS can be considered a method to obtain an overview of a particular research area (Kitchenham et al., 2011), because, it narrates the studies rather than extracting detailed information (Brereton et al., 2007; Banaeianjahromi & Smolander, 2016). The aim of the researcher is to prepare an overview of entrepreneurial ecosystem topics, which still tends to be a broad concept. Thus, SMS seems to be a viable approach to acquire an overview of the research gaps in entrepreneurial ecosystems and network theory.

## Research Questions

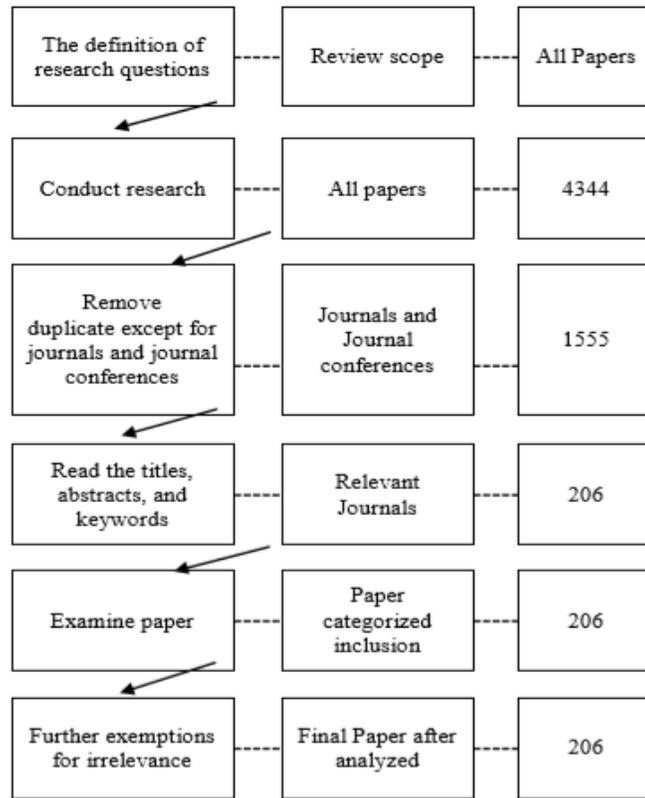
Research questions in SMS are much broader than in SLR to address the wider scope of study (Kitchenham, 2007; Banaeianjahromi & Smolander, 2016). The research questions of this study concentrate on categorizing entrepreneurial ecosystem research and network theory position as a research focus in entrepreneurial ecosystem research. Table 1 shows all the research questions of this study.

<b>Research Question</b>	<b>Description</b>
RQ1: What are research focuses of current entrepreneurial ecosystem research? What is the position of network theory as a research focus in entrepreneurial ecosystem research?	The answer provides an overview of main fields and research focuses in entrepreneurial ecosystem research. It also provides the position of network theory as a research focus in entrepreneurial ecosystem research.
RQ2: What methodologies and paper types are utilized?	Investigations on types of paper and applied methods and reveal gaps in the previous studies.
RQ3: How has the number of publications changed over time?	This question reveals study trends and publications timeline.

(Sources: Modified by Author Based on Banaeianjahromi & Smolander, 2016)

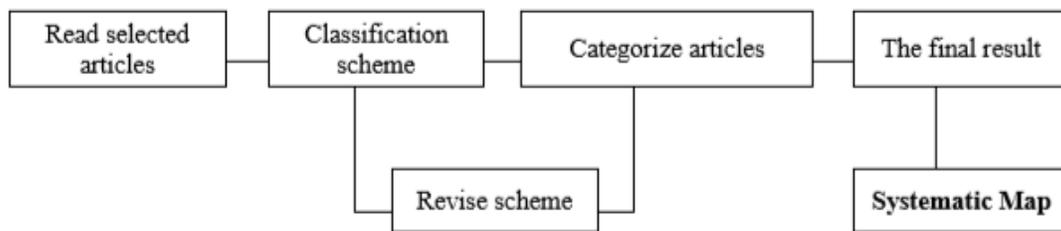
## Search Steps

This study adopted a search process from Petersen et al. (2008). In this process, each step has a systematic result, and a map (systematic mapping) is the end result of the mapping process. Figures 1 and 2 illustrates the complete SMS process used in this study, referring to research conducted and in accordance with instructions by Kitchenham (2004) and Petersen et al. (2008). In the SMS process, the researchers collected, analysed and classified 206 articles to find the focus of research, methods and types of papers based on a classification scheme referring to Petersen et al. (2008).



**FIGURE 1  
SMS PROCESS**

(Source: Kitchenham, 2004; Petersen et al., 2008)



**FIGURE 2  
CLASSIFICATION PROCESS**

(Source: Petersen et al., 2008)

## Data Sources

Table 2 shows the study did electronic searches in the following databases.

<b>Source Name</b>	<b>All EE Papers</b>	<b>Journal and Journal Conferences</b>	<b>Relevant Journals</b>
Doaj	10	10	6
Ebscohost	25	25	6
Emerald	38	38	15
Gale cengage	23	23	3
Jstor	10	10	3
proquest	15	15	7
Sage	36	36	11
Scencedirect	291	291	16
Scopus	125	125	43
Springer	116	116	30
Google scholar	3771	982	66
<b>Total</b>	<b>4344</b>	<b>1555</b>	<b>206</b>

(Source: Author's, 2018)

The researchers used an online search on electronic database with the search string entrepreneurial ecosystem and entrepreneurship ecosystem to find articles that discuss the entrepreneurial ecosystem. This search string was applied to search within the all article parts, such as title, abstract, keywords, and main body. The search process began in September 2017.

## Exclusion and Inclusion Criteria

The inclusion and exclusion criteria step is one of the activities of a mapping study to exclude irrelevant and include relevant studies (Petersen et al., 2008). In other words, it ensures that only appropriate articles will be analysed (Banaeianjahromi & Smolander, 2016). In this study, the authors minimized search scope to only journal and conference papers because original scientific research is usually published in scientific journals and conferences for the first time. In case there was a duplicate article, we checked the original publisher then we deleted the article from others. This study used Mendeley as the reference management software application to manage the references and to assist us to remove the duplicates. To minimize the risk of excluding relevant articles, the articles that were not clear cases to exclude were read in detail at the last step of the SMS process.

## Classification Scheme

This study developed a classification scheme to analyse and classify the articles from Petersen et al. (2008). The process of classifying the articles is illustrated in Table 3.

<b>Paper Type</b>	<b>Description</b>
Validation Research	The method of investigation is new and has not been applied in practice (experiment/observation).
Evaluation Research	The investigative method is implemented in practice and presented in the evaluation method.
Solution Proposal	The solution to the problem is raised; the proposed solution may be a new or applicable approach and an existing approach.
Philosophical Paper	This study introduces a new perspective on something that exists by using a taxonomy or conceptual framework.
Experience Paper	This study is based on the author's personal experience of what and how something has been done in practice.
<b>Methods</b>	<b>Description</b>
Qualitative Method	Qualitative methods presented rapid assessment process, secondary data, ethnographic, focus group discussions, in-depth interviews, diaries and language analysis.
Quantitative Methods	Quantitative methods presented sample design, hypothesis and testing, all of which are statistical formulations.

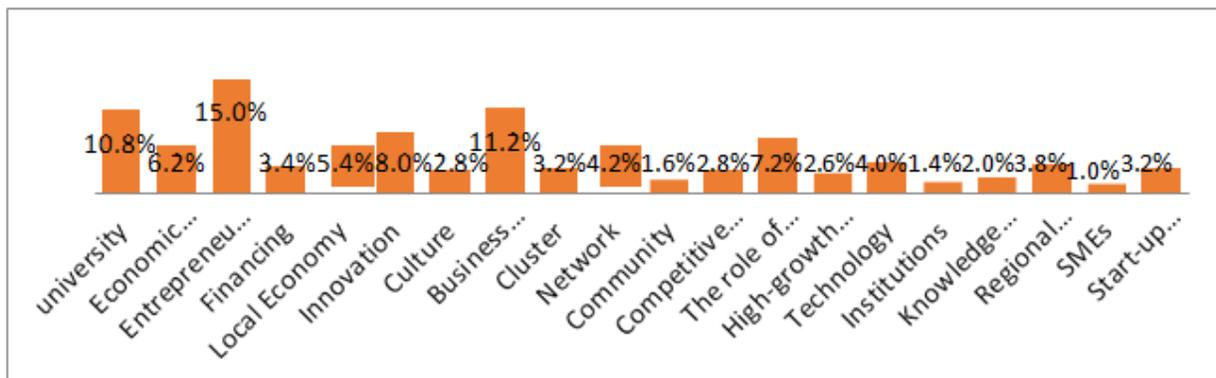
(Source: Musianto, 2002; Wieringa et al., 2006; Petersen et al., 2008).

## RESULTS AND DISCUSSION

In the following sections based on the mapping results, the research questions are answered. The results are based on the 206 selected articles.

### RQ1: Research Focus

In determining the research focus of each paper, conducted through a discussion process among researchers. The research focus is selected and determined from the title, abstract, keyword and core content of the study. Thus, from one paper it can be found more than one research focus. Furthermore, all research focus is categorized into a broader general concept. The percentage of the topic is shown in Figure 3.



**FIGURE 3**  
**RESEARCH FOCUS**

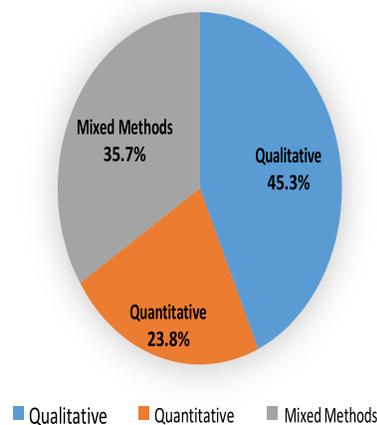
From the result, entrepreneurship topics become the most dominant because entrepreneurial ecosystem is closely related to entrepreneurship so it is always an inseparable study material. As revealed by Stam & Spigel (2016) that an entrepreneurial ecosystem as a set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory. While SMEs, Institutions, Community, and Knowledge Transfer are being the least studied. This is because most of the research is done in developed countries, where SMEs and Community have less role in the economy so they have not taken much attention. Unlike developing countries, especially in Indonesia and Malaysia, SMEs is a very interesting object because it has a big role in the national economy, further SMEs in the Creative Industry sector. While no research has raised the issue of creative industry, it provides a broad opportunity for further researchers to explore.

Based on that result and related to the main idea of this paper, the SMS results indicate that only 21 articles (4.2%) were written on entrepreneurial ecosystem with focus on network theory, which is part of network focus, among 206 published journals from a total of 11 online databases. This finding shows that the topic of network theory is still limited. As revealed by Alvedalen & Boschma (2017) that as a systemic concept, the entrepreneurial ecosystem has not yet fully exploited the insights of network theory, and the means by which the elements are connected within the entrepreneurial ecosystem are still unclear.

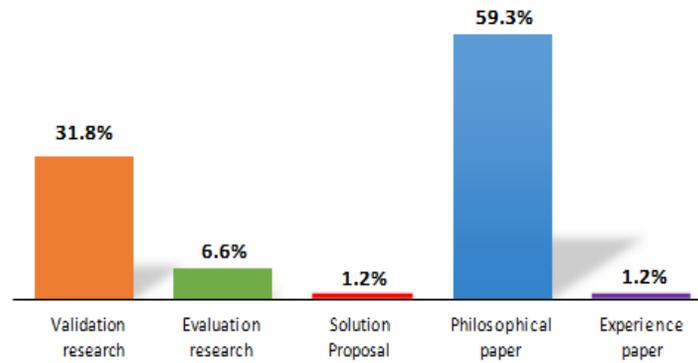
The SMS results indicate that the research focus on entrepreneurial ecosystems remains extensive. Some research focuses that can be a reference for succeeding research on entrepreneurial ecosystem, aside from network theory, include competitiveness (with 14 articles (2.8%)), high-growth firms (with as many as 13 articles (2.6%)), knowledge transfer (with 10 articles (2%)), community (with as many as 8 articles (1.6%)), institutions (with as many as 7 articles (1.4%)) and SMEs (with as many as 5 articles (1%)).

## RQ2: Research Methods and Paper Types

Figure 4 shows that among 206 studies, 117 studies (45.3%) used the qualitative method, 49 studies (23.8%) used the quantitative methods and 92 studies (35.7%) used mixed methods. These findings indicate that quantitative methods are the least used method in the study on entrepreneurial ecosystems.



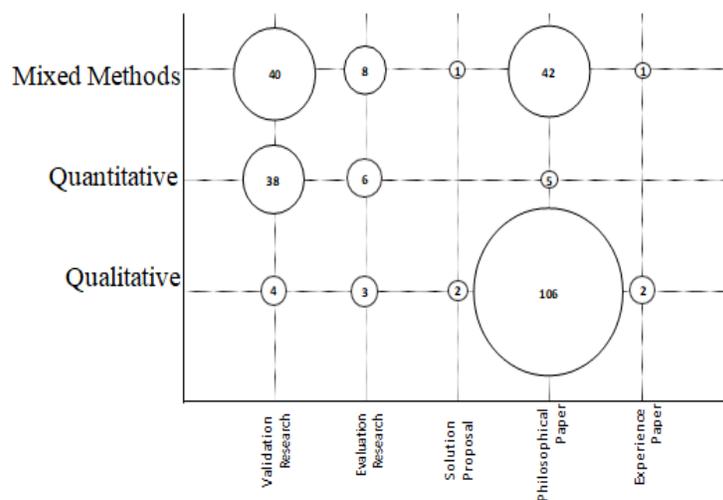
**FIGURE 4**  
**RESEARCH METHODS**



**FIGURE 5  
PAPER TYPES**

Figure 5 illustrates the distribution of paper type based on the classification category according to Wieringa et al. (2006). On the basis of SMS, the most frequently used paper type is philosophical paper, with a total of 153 studies (59.3%). The other most frequently used paper type is validation research, with a total of 82 studies (31.8%). Evaluation research and are 17 studies (6.6%), respectively. However, only 3 studies (1.2%) provided experience paper and solution proposals, which are paper types that offer new or existing approaches to problems that have occurred or will occur.

In SMS, the researcher analysed the relationship of paper types to the research approach (methods) to find patterns of research methods that are widely used in the study of entrepreneurial ecosystems, as shown in Figure 6.



**FIGURE 6  
BUBBLE CHART (RESEARCH METHODS AND PAPER TYPES)**

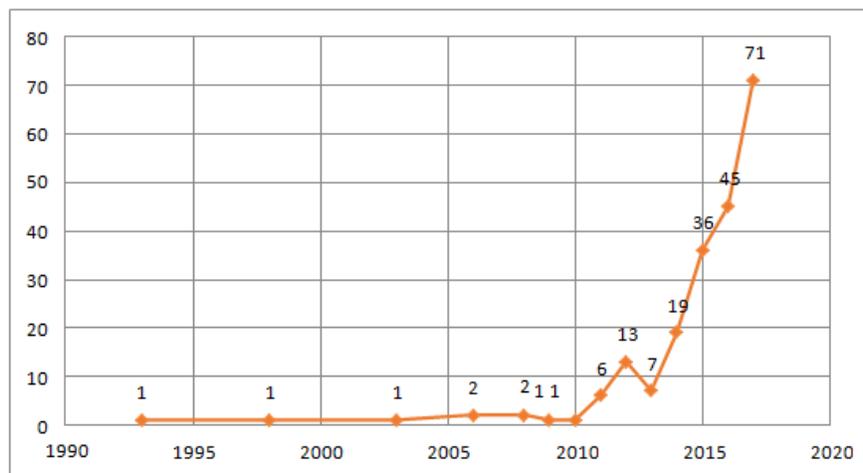
Qualitative research is the main research method for philosophical research; as many as 106 studies used this method. For instance, Mack & Mayer (2016) proposed to develop an evolutionary framework of entrepreneurial ecosystem. The second most common research approach in the study of entrepreneurial ecosystem is mixed methods; 42

philosophical researches and 40 validation researches used mixed methods. For instance, offers an in-depth synthesis of eclectic literature examining the critical success factors of entrepreneurship education ecosystem. As for the validation researches, 38 papers used the quantitative approach. For instance, proposed an ecosystem model that assists in the planning and designing of regional sustainable development.

Based on results, the most commonly used methodology and type of paper are qualitative research and philosophical papers, while mixed methods for solution papers remain limited and can be a reference for future researchers.

### RQ3: Research Trends

Figure 7 illustrates the research trends published in electronic databases, namely, DOAJ, EBSCOhost, Emerald, Gale Cengage, Jstor, ProQuest, SAGE, ScienceDirect, Scopus, Springer and Google Scholar, starting from 1993. However, the researchers found that the number of studies did not continue to increase until 2013. However, by 2014, the number of publications on entrepreneurial ecosystems increased until 2017, reaching 71 studies. The development of entrepreneurial ecosystem research, as seen in the trend in Figure 7, shows that the concept of entrepreneurial ecosystem is new, and research interest in the subject grew in 2011 up to the present, thus providing many opportunities to find relevant new issues.



**FIGURE 7**  
**RESEARCH TRENDS OF ENTREPRENEURIAL ECOSYSTEM**

The gaps in this research area were discovered and highlighted the current emphases in this research. It showed that Qualitative research was the main research method for philosophical research; as many as 106 studies used this method. The second most common research approach in the study of entrepreneurial ecosystems was mixed methods; 42 philosophical researches and 40 validation researches used mixed methods. As for the validation researches, 38 papers used the quantitative approach. This means that the articles proposed new framework or conceptual model and they implemented and evaluated the novel proposal in practice. Philosophical paper were the most common paper type between 1993 and 2017, which means that during these years new ideas than frameworks were developed but most of them have not been validated yet in practice. However, from 2008 to beginning of 2017 number of-Validation research and

Evaluation research papers has increased significantly, which means that during these years new frameworks and models have already begun to be developed, validated and evaluated in practice. The number of solution proposal papers have also noticeably emerged, which can imply the importance of the role of entrepreneurial ecosystem as a solution to develop entrepreneurship.

A systematic approach needs to be established from the entrepreneurship level to better understand the context of entrepreneurship. Such an approach provides guidance for identifying the weakest link that largely limits the performance of entrepreneurial ecosystems (Acs et al., 2014). Stam (2015) stated that the causal relationships in the system and effects on entrepreneurship and value creation have not been studied adequately. The approach of entrepreneurial ecosystems offers a valuable element for a better understanding of regional economic performance.

The entrepreneurial ecosystem literature combines systemic dimensions for entrepreneurship, but little or no reference is made to network theory. In addition, network analysis is hardly utilised as an analytics tool, while its relevance has proved useful in cluster research when focusing on the structure of knowledge networks in groups (Ter Wal & Boschma, 2008). Giuliani (2007) showed that group locations did not necessarily improve the company's performance (as claimed by cluster literature) but rather the position within the local network within the group. Thus, knowledge is not only in the air in groups but also circulates in structured networks. This micro-level network analysis can be applied to entrepreneurial ecosystems (Borissenko & Boschma, 2016).

Potential exists for conducting comparative research on network structures on an entrepreneurial ecosystem that can provide answers to issues, such as how solid networks in entrepreneurial ecosystems can improve entrepreneurship, how an entrepreneurial ecosystem with different nodes can perform better (Auerswald, 2015). Borissenko & Boschma (2016) stated that the research challenge is to explore what types of important relationships in entrepreneurial ecosystem, and whether the entrepreneurial ecosystem with non-local relationships exhibit more entrepreneurial dynamics? how different subnetworks in entrepreneurial ecosystems are interconnected with each other, to what extent there is an overlap between the networks, what are the implications of different levels of overlap between networks for the performance of individual entrepreneurs and the entrepreneurial ecosystem as a whole, and which agents act as a true boundary spanners connecting various subnetworks and therefore making a difference? (Borissenko & Boschma, 2016).

Based on the SMS results and all that arguments, it can be a state of the art of entrepreneurial ecosystem research from network perspective which is still limited and needed to be explored.

## CONCLUSION

The main purpose of the presented study was to provide an overview of existing literature that have investigated the role and position of network in entrepreneurial ecosystems and find its the state of the art. SMS method was used in order to determine what issues have been studied in entrepreneurial ecosystems. This study had 206 relevant and unique articles to analyse through a classification scheme based on their research method, paper type, research focus research trend and the distribution of paper types over the years. Regarding to the result, entrepreneurial ecosystem has 20 main topics as research focus, which entrepreneurship (54 articles (10.8%)) became the dominant research focus and SMEs became the least (5 articles (1%)). Regarding the paper type, Philosophical research was the most frequently employed paper type. Authors also

identified only three papers that could be categorized in the Experience papers and Solution Proposal, which was the least used. Qualitative method respectively with 45.3% of the papers were the most used research methods in this area. While quantitative method was the least used.

This study has implications for both researchers and practitioners. For researchers, this study indicated the gaps in this area of research. For instance, the need for having more research with network theory perspective to understand the relationship between components within entrepreneurial ecosystems which is still limited. Otherwise it can also using an evaluation, solution and experience as type of papers. Primary implications for future research it can employ empirical research methods, such as surveys and ethnographies to collect data and experience about integration challenges. Based of the result, practitioners can realize which entrepreneurial ecosystems methods are implemented and evaluated in practice. With that understanding, practitioners can provide solutions by creating a business strategy or public policy designs of how an effective and efficient entrepreneurial ecosystem that can help entrepreneurs and other stakeholders to develop a strong network that can link all components within entrepreneurial ecosystems in order to build local or regional economy and competitiveness that have always been challenges in globalization and digital age today.

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