A bibliometric analysis of the literature on entrepreneurial ecosystem

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Abstract

The concept Entrepreneurial Ecosystem (EE) is now gaining importance as it is giving more importance to the factors essential for generating employment opportunities and thereby reducing the rate of unemployment in any country. The main aim of the study is to understand the concept of Entrepreneurial Ecosystem, its importance, scope and to provide an overview of research on this concept. This purpose is fulfilled by finding, classifying, and synthesizing existing scholarly publications in the area of research. Bibliometric analysis and VOS viewer are used for analysing the data. One of the main contributors to the EE concept is Roundy P T, and United States leads the world in productivity of scholarly articles on this concept. The article "Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique" of Stam E has been identified as the most cited one in this regard. Every nation has realised that the young, talented youth are moving to places where they can pursue their dreams. This has resulted in increased brain drain occurring in the country. Therefore, it is high time to realise the fact and strengthen the Entrepreneurial Ecosystem by the Government themselves or through various agencies or institutions. These factors contribute or supplements entrepreneurial activities within a region and will ultimately leads to value creation in the society.

Keyword: *Entrepreneurial Ecosystem (EE), Bibliometric analysis, unemployment, regional policy, value creation*

1 Introduction

Entrepreneur is a person who contributes toward the intellectual power and capacity for organising and managing a business with skill and creativity for generation of employment and wealth to the nation. Each person has three alternatives for a career: (1) to work for another person, (2) to work for oneself as a professional (3) to start own business. Of the three, entrepreneurship has become the most popular due to many reasons. Among its many benefits are the abundance of chances for self-expression, chances for personal growth and development, greater financial rewards, and the ability to make decisions as an entrepreneur.

The concept Entrepreneurial Ecosystem is now gaining importance as it is giving more importance to the factors essential for generating employment opportunities and thereby reducing the rate of unemployment in any country. Entrepreneurship Ecosystem is defined as a collection of institutions designed to assist entrepreneurs in navigating each stage of the process of starting a new business (Isenberg 2010; Isenberg 2011). These factors contribute or supplements entrepreneurial activities within a region and will ultimately leads to value creation in the society. The actors or factors existing within a particular region has to be assessed to identify the domains of Entrepreneurial Ecosystem. In this study an attempt is made to identify the contributions made to the concept of entrepreneurial ecosystem through a bibliometric analysis. Even though bibliometric analysis is done on the concept of entrepreneurial ecosystem it is found that this concept is now gaining more importance than before. So, in this study the latest studies made to the concept is also added to find out the immense potential towards this concept.

Entrepreneurial process begins with identifying an opportunity and establishing a vision, then persuade others, gather various resources, create new venture, product or market and finally change or adapt with time. Through the bibliometric analysis on literature of EE it is evident that there are

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certain important elements or factors within each region which helps to contribute towards opportunities for employment. These factors differ from region-to-region even though there are certain common factors. The role of Government and other Organisations is to identify these factors and strengthen them so that they can create a conducive environment for entrepreneurship and helps business to nurture, grow and develop. Entrepreneurs can contribute to the development of a nation and thereby meeting the Sustainable Development Goals of no poverty, decent work and economic growth, industry innovation and infrastructure.

This study throws lights on to the statistics, philosophical underpinnings, and structural ideas in the EE domain and draws attention to the current state of the research. In order to examine and visualise the literature, we pull data from academic databases and use sophisticated tools. This multi-layered method offers a comprehensive picture of current research efforts, which is advantageous to both current and future scholars. The main aim of the study is to understand the concept of entrepreneurial ecosystem, its importance, scope and to provide an overview of research on this concept. This purpose is fulfilled by finding, classifying, and synthesizing existing scholarly publications in the area of research. This study seeks to address the following questions: (1) who are the main contributors to the concept of Entrepreneurial Ecosystem? (b) which are the predominant countries producing scholarly articles on the concept? (c) which are the most influential authors and journals on the concept?

2 Methodology

By studying the metadata obtained from academic research databases, bibliometric analysis gives a broad perspective of the current state of any research stream. Database Scopus is used for getting the literature since it is the most widely used database. Furthermore, web of science collections was also examined and it is found that it has only less data compared to Scopus on the topic and there is also a comprehensive overlap with

Scopus and hence literature from Scopus database alone is selected for this study.

The metadata consists of abstract title, abstracts and keywords. The keyword used for the query is (entrepreneurial* OR startup* OR start-up*) AND (ecosystem*) to get the entire literature on the concept entrepreneurial ecosystem. The study period selected from 1995 to 2022 and 82 documents where author name is undefined were excluded. The search query generated 3486 results. The subject area was confined to business, management and accounting; economics, econometrics and finance; and social sciences which generated 2773 results. Further the document type was filtered to Articles alone which resulted 1780 documents. Only those articles whose publication stage was final, source type-journal and language were selected only to English which resulted in 1548 documents. These 1548 documents formed the basis for this analysis. Bibliometric analysis and VOS viewer are used for analysing the data.

3 Discussion

3.1 Statement of research problem

The Entrepreneurial Ecosystem (EE) concept is widely accepted, but it has a number of flaws that make it difficult to use in both academic and policy circles. A precise analytical framework that defines cause and effect is still lacking in the EE literature. The main output of this literature is lengthy lists of variables that support entrepreneurship. The EE framework is also depicted as a network or system made up of numerous interdependent components with intricate interactions. Various definitions of networks with multiple components are used by EE experts. Moreover, research on EE frequently concentrates on a specific location or group in order to characterise the unique aspects of EE. While empirical studies have demonstrated significant regional variations in entrepreneurship rates, it is not totally evident how the EE can account for these regional variations. It is also criticised that the static framework used in the EE literature to

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characterise relations in EE without taking into account how they change over time. Though conceptually it has garnered a lot of interest, empirical examination of network dynamics in entrepreneurship studies is still uncommon overall. A dynamic EE framework of this kind must clearly state which relationships and elements are important at each stage and how they affect one another over time.

3.2 Contextual research

3.2.1 Concept of Entrepreneurial Ecosystem

The research conducted by James Moore and published in the Harvard Business Review in the 1990s is credited as one of the novel contributions towards the concept of entrepreneurial ecosystems. Many authors have contributed to visualize the concept and in this section an attempt is made to make clear the concept by pinpointing the definitions given by some of the eminent authors whose contributions are widely acknowledged through literature reviews. A group of interconnected entities and variables that are managed to support successful entrepreneurship in a specific area. (Stam. & Spigel, 2018). Entrepreneurial Ecosystems are a combination of social, political, economic, and cultural components in an area that foster the growth and development of creative start-ups and inspire aspiring business owners and other stakeholders to take on the risks of launching, financing, and otherwise supporting high-risk endeavours. (Spigel, 2017) A collection of interconnected entities and elements arranged in a manner that facilitates profitable entrepreneurship (Stam, 2015).

The local entrepreneurial environment is governed by a network of interconnected entrepreneurial actors, both existing and potential, as well as entrepreneurial organisations, banks, universities, public sector agencies, and business angels. Additionally, the entrepreneurial processes, such as the number of high growth firms, the degree of "blockbuster entrepreneurship," the number of serial entrepreneurs, the degree of sell-out mentality within firms, and levels of entrepreneurial ambition, are

gathered both formally and informally. (Mason & Brown, 2014) The entrepreneurial ecosystem is made up of a variety of discrete components that interact in intricate ways, including capital markets, culture, leadership, and receptive consumers. To include these components into a comprehensive system, nine principles are suggested: 1) Quit copying Silicon Valley; 2) mould the ecosystem around regional conditions; 3) involve the private sector early on; 4) give preference to high potentials; 5) secure the major victory; 6) confront cultural transformation head-on; 7) emphasise the foundation; 8) avoid over-engineering clusters and instead support their natural growth; 9) restructure the legal, administrative, and regulatory framework. (Isenberg, 2010).

As we can see, several authors have provided multiple definitions of EE. Every concept emphasises a distinct essential group of elements required to create an ecosystem. There seems to be some consensus regarding the factors that are crucial for entrepreneurial ecosystems to work, despite the fact that the chosen EE models range in terms of both the quantity and kind of ecosystem elements. They include people; a populace that possesses entrepreneurial attitudes, skills, and goals along with a policy and regulatory framework that supports them; finance; culture; infrastructure; human capital; networks; educational systems; the market; and platforms for innovation.

3.2.2 Elements of Entrepreneurial Ecosystem

In this context it is essential to discuss the elements or domains of Entrepreneurial Ecosystem since each region has to focus on these factors to contribute their regional development. From extensive literature review the following elements or domains were identified and presented.

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Table 1. Entrepreneurial Ecosystem Elements/Domains

Author, Year	**Theme**	**Major Elements**
Isenberg, 2011	Domains of EE	Conducive culture, Enabling policies and leadership, Availability of appropriate finance, Quality Human Capital, Venture friendly markets for products, Range of Institutional and Infrastructural supports
Feld, 2012	Attributes of successful startup community	Leadership, Intermediaries, Network density, Government, Talent, Support services, Engagement, Companies, Capital
World Economic Forum, 2013	EE Pillars	Accessible markets, Human Capital/workforce, Funding and Finance, Support systems/mentors, Regulatory framework and infrastructures, Education and training, Major Universities as Catalysts, Cultural support
Foster and Shimizu, 2013	Eight main Pillars	Accessible markets, Human Capital workforce, Financing, Mentors, Advisors and support systems, Regulatory model and infrastructure, Education and training, Large Universities as catalysts, Cultural support
Stam, 2015	EE Elements	Systematic Conditions: Networks, Leadership, Finance, Talent. Framework conditions: Formal Institutions, Culture, Physical Infrastructure, Demand.
Spigel,2017	Attributes of EE	Cultural: Cultural attitudes, Histories of entrepreneurship. Social: Networks, Investment Capital, Mentors and deal makers, work talent. Material: Universities, Support services and physical infrastructure, Policies and governance, Strong local markets.
Angelo, 2018	Five elements	Networks of entrepreneurs, Leadership, Finance, Taent, Knowledge and Support Services
Sachin & Rawani, 2018	EE Pillars	Market, Human Capital, Finance, Supports, Government policy, Education
Anil Kumar Aryal, 2019	Domains of EE	Policy, Finance, Culture, Supports, Human Capital, Markets
Elias G Carayannis et al, 2022	Elements of EE	Education and research, Human Capital, Finance, Customers, Supporting organisations, Infrastructure, Regulatory framework, Culture and leadership

3.2.3 Findings and Discussions based on Bibliometric Analysis

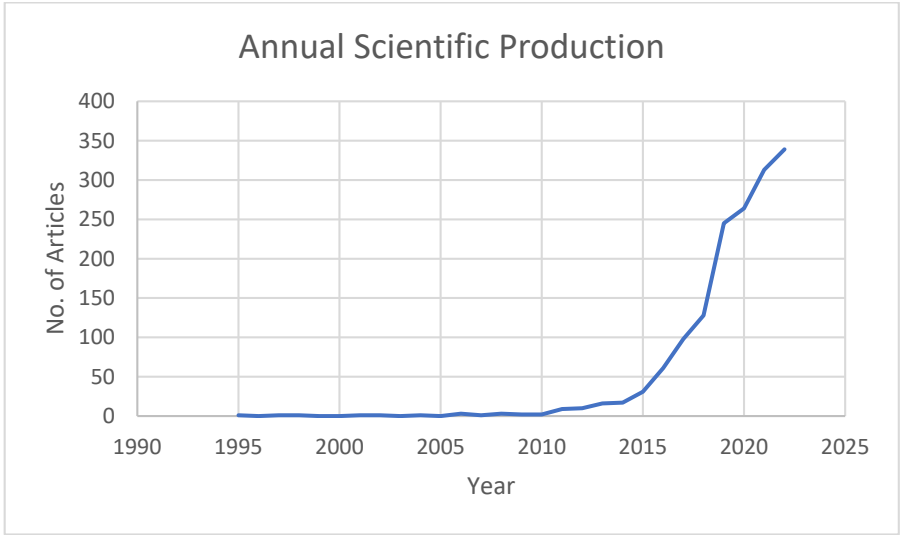

Figure 1. Annual Scientific Production

While going through the emergence and growth of the concept of EE it is reflected that much of the studies were done after 2013.16 articles were there during 2013, 232 articles in the year 2019 and in 2022, 228 articles were published. Even though the number of articles published during the year 2022 is more the citations per document is yet to increase. And more and more research is being carried on by eminent authors on the concept since it has gained importance in almost all countries as it provides a leverage for the economic growth and prosperity. The economic upliftment of citizens of any country can be done only through its journey starting from educational institutions to the growth and development of business organisations. The Entrepreneurship Development Clubs, Innovation and Entrepreneurship Development Centres (IEDC), Fab Labs, Incubation Centres and Government Organisations have got a predominant role to play in this regard. Scholars have realized the fact and has given importance to identify the domains of EE and to assess its influence on the growth of economic development.

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Table 2. Top ten Journal sources

Sources	Articles	h Index
Sustainability (Switzerland)	72	12
Small Business Economics	66	36
Journal of Technology Transfer	35	21
Technological Forecasting and Social Change	30	20
International Entrepreneurship and Management Journal	25	11
Entrepreneurship and Regional Development	24	15
International Journal of Entrepreneurial Behaviour and Research	23	12
Research Policy	23	10
Journal of Business Research	20	13
European Planning Studies	16	12

Source: Authors' Calculation

The evaluation of journal sources with regard to Entrepreneurial/startup ecosystem reveals that Sustainability (Switzerland) has 72 articles with h index 12 followed by Small Business Economics with 66 articles but with an h index of 36. The top ten sources of journals account for 24.96% of the total published articles.

Table 3. Top ten most relevant Authors

Authors	Articles	H index
Roundy P T	20	13
Guerrero M	15	10
Audretsch D B	10	10
Cunningham J A	9	7
Ratten V	9	8
Brown R	8	7
Fischer B	8	6
Maritz A	8	6
Carayannis E G	7	7
Costa J	7	4

Source: Authors' Calculation

Table 3 depicts the top ten most relevant authors. Philip Roundy is the most relevant author with 20 articles followed by Guerrero and Audretsch with 15 and 10 respectively. The table 4 shows the most cited articles in Entrepreneurial Ecosystem research, the authors, title of the document, the Journals in which it is published and how often they are cited and the year in which it is published. The most influential paper was published by Stam, E., published in European Planning Studies on the topic 'Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique with 177 citations. The other work was published by Spigel B titled The Relational Organization of Entrepreneurial Ecosystem in the Journal Entrepreneurship Theory and Practice in the year 2017 by 133 citations followed by Cohen B article Sustainable Valley Entrepreneurial Ecosystem published in the Journal Business Strategy and the Environment in the year 2006. This is followed by the article Entrepreneurial Innovation: The Importance of Context published in Research Policy with 80 citations.

Table 4: Top Ten most cited articles on Entrepreneurial Ecosystem/Startup Ecosystem

Year	**Authors**	**Title of the document**	**Journal**	**Citations**
2015	Stam, E.	Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique	European Planning Studies	177
2017	Spigel, B.	The Relational Organization of Entrepreneurial Ecosystem	Entrepreneurship Theory and Practice	133
2006	Cohen, B	Sustainable Valley Entrepreneurial Ecosystem	Business Strategy and the Environment	81
2014	Autio, E, Kenney, M, Mustar, P, Spigel, D, Wright M	Entrepreneurial Innovation: The Importance of Context	Research Policy	80

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Year	Authors	Title of the document	Journal	Citations
2010	Isenberg, D.J	How to Start an Entrepreneurial Revolution	Harvard Business Review	79
2017	Brown, R, Mason, C.	Looking inside the Spiky Bits: A Critical Review and Conceptualisation of Entrepreneurial Ecosystem	Small Business Economics	76
2017	Alvedalen, J., Boschma, R	A Critical Review of Entrepreneurial Ecosystems Research: Towards A Future Research Agenda	European Planning Studies	75
2016	Mack, E., Mayer, H.	The Evolutionary Dynamics of Entrepreneurial Ecosystems	Urban Studies	73
2018	Spigel, B., Harrison, R	Towards A Process Theory of Entrepreneurial Ecosystems	Strategic Entrepreneurship Journal	67
2014	Acs, Z.J., Autio, E., Szerb, L	National Systems of Entrepreneurship: Measurement Issues and Policy Implications	Research Policy	61

Source: Authors' Calculation

3.2.4 Countries Scientific Production

The chart given below depicts the top ten countries based on countries scientific production. The United States leads the world in productivity with 555 articles published on entrepreneurship and the entrepreneurial ecosystem. The United Kingdom comes second with 327 papers and Italy with 275.

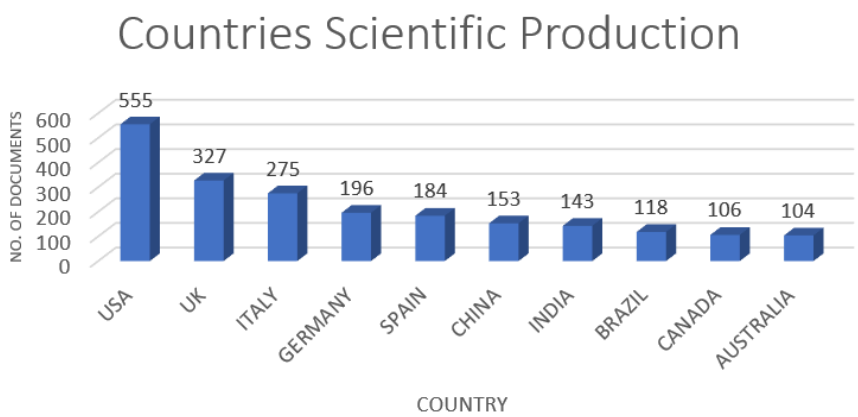

Figure 2. Top ten Countries based on Countries Scientific Production

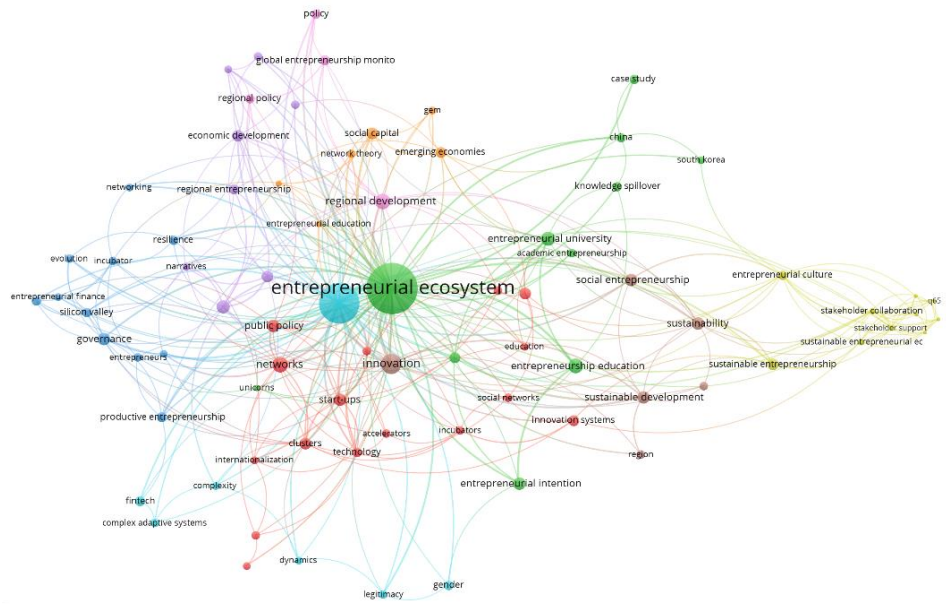

Figure 3. Visualisation of most frequently used Keywords

The figure3 depicts keywords used in this analysis. Innovation, sustainability, industrial development, regional development, technology, public policy, entrepreneurial culture, networking, entrepreneurial intention are some of the keywords found in the analysis.

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4 Conclusion

In this paper an attempt is made to review the existing literature on the concept Entrepreneurial Ecosystem or Startup ecosystem. The growth of any nation depends upon its employability and wealth generating factors and entrepreneurship has got an important role to play in this context. It is essential to identify the major factors or actors that are necessary for the regional development of any country. The elements that contribute to it is known as Entrepreneurial Ecosystem. One of the main contributors to the EE concept is Roundy P T, and United States leads the world in productivity of scholarly articles on this concept. The article "Entrepreneurial Ecosystems and Regional Policy: A Sympathetic Critique" of Stam E has been identified as the most cited one in this regard. This concept is now gaining importance since every nation has identified that the young, talented youth are moving to places where they can pursue their dreams. This has resulted in increased brain drain occurring in the country. Therefore, it is high time to realize the fact and strengthen the Entrepreneurial Ecosystem by the Government themselves or through various agencies or institutions.

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