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Business Incubation: A Bibliometric Analysis of Global Literature

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ABSTRACT

Business incubation has become an important mechanism for supporting entrepreneurship, fostering innovation, and strengthening entrepreneurial ecosystems. However, the rapid growth of research in this field has resulted in diverse perspectives and fragmented knowledge development. This study aims to examine the intellectual structure, publication trends, influential contributions, collaboration patterns, and emerging research themes in global business incubation literature through a bibliometric analysis approach. Data were collected from the Scopus database using relevant keywords related to business incubation and business incubators. The collected publications were analyzed using bibliometric techniques, including performance analysis, citation analysis, co-authorship analysis, country collaboration analysis, keyword co-occurrence analysis, and thematic evolution mapping with the support of VOSviewer. The findings reveal that business incubation research has developed from a traditional focus on startup support toward broader perspectives involving entrepreneurship ecosystems, innovation development, technology transfer, and sustainable economic growth. The most influential studies emphasize the evolution of incubator models, technology business incubation, social capital, and incubation outcomes. The analysis also indicates that the United States, the United Kingdom, and China represent the most active contributors in shaping global research collaboration. Furthermore, keyword analysis highlights entrepreneurship, innovation, business incubators, SMEs, and technology commercialization as the dominant research themes, while recent studies increasingly explore incubation networks, digital transformation, and ecosystem-based approaches. This study contributes to the existing literature by providing a comprehensive mapping of global business incubation research and identifying future research opportunities related to digital incubation, artificial intelligence-supported entrepreneurship, and sustainable innovation ecosystems.

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1. INTRODUCTION

The rising complexity in global economic competition, technological

disruption, and market dynamics has underscored the significance of entrepreneurship as a vehicle for economic growth, innovation generation, and job creation [1], [2]. New firms, especially smaller and newer firms, play a great role in transforming the economy. However, most startups experience some difficulties during the initial stages of their development due to the lack of financial, managerial, marketing, technology, and strategic resources. These factors have contributed to the failure rate of many new ventures. Entrepreneurial support systems have therefore been necessary to alleviate uncertainties and improve the chances of survival. Of the several entrepreneurial support systems, business incubators have become one of the leading tools used in developing startups through resource provision [3].

Business incubation refers to an intervention that aims at the growth of entrepreneurial ventures by offering them facilities, professional services, and the transfer of knowledge through access to entrepreneurial ecosystems. Unlike other business assistance initiatives that are characterized by isolated support, business incubators provide a conducive environment for entrepreneurs to build capacity, validate their business models, and form linkages with investors, industries, government, and academia. The concept of incubation has transformed from being a model that focuses on physical infrastructure to one that revolves around innovation and knowledge exchange as well as venture acceleration [4]. This transformation is consistent with the overall evolution of entrepreneurship support systems whereby business incubators act as intermediaries between startups and external innovations.

Innovation and regional development ecosystems have seen a growing role of business incubation. Incubators have been set up across the globe by governments, universities, firms, and development institutions with the intention of promoting entrepreneurship, technology commercialization, and fostering innovation capability. Incubators in universities, for instance, have drawn much attention due to their capacity to convert academic knowledge into commercial potential through researchers, students, and entrepreneurs [5]. Technology incubators have helped in the establishment of innovation-driven enterprises by making available sophisticated infrastructure, research capabilities, and industry collaborations. In the case of developing nations, business incubators have been seen as tools that address entrepreneurial capability deficits and promote inclusive economic growth [6], [7]. Business incubation has, therefore, become a multi-disciplinary field of study.

However, with the increasing significance of business incubation in practice, the scientific literature devoted to the issue has grown in multiple directions, resulting in an inconsistent body of knowledge. Various aspects of business incubation have been studied in previous works, such as the efficiency of incubators, factors of success for start-ups, learning among entrepreneurs, development of ecosystems, transfer of technology, and institutionally based business incubation. For instance, some authors tend to focus on the importance of incubators in ensuring venture survival and success, while others pay attention to their importance as knowledge brokers and networking facilitators in entrepreneurial ecosystems [8]–[10]. This fact proves the multidimensionality of business incubation that can be studied only through the prism of various theoretical approaches. Given the rapid growth of this field of research, there is a need for a systematic review of current academic trends.

The use of bibliometric analysis is a suitable methodology for analyzing the progress of research on business incubation. Unlike traditional literature review, which depends solely on qualitative analysis of the chosen papers, bibliometric analysis utilizes quantitative approaches in studying publications, citation structures, collaborations, and intellectual relations in a field of research [11]. With the help of bibliometric approaches, it is possible to discover important publications, key authors,

productive countries, journals, conceptual themes, and new issues that contribute to the development of scientific knowledge in a certain field. The growing accessibility of academic databases and visualization software like VOSviewer and Bibliometrix makes the use of bibliometric approaches even more efficient in management and entrepreneurship studies [12]. Thus, the use of bibliometric analysis in business incubation literature can reveal valuable information about the development of this field of research.

2. METHODS

In order to analyze the development and intellectual structure of global business incubation research, the bibliometric analysis technique was applied in this study. The application of bibliometric analysis was appropriate as it provided the opportunity for scientists to perform analyses of vast amounts of scientific publications by means of such quantitative methods as publication performance analysis, citation analysis, and science mapping [11]. Moreover, bibliometric analysis allowed scientists to identify research trends, contributions to the field, conceptual connections, and emerging themes in a certain knowledge area. Within the framework of the current study, standard procedures of bibliometric analysis were used. First of all, the scope of the research was determined. Secondly, publications on the topic were collected. Then, the bibliographic analysis was performed, and the intellectual structure of business incubation research was visualized.

The data collection was done via the Scopus database because of its large database of academic peer-reviewed articles and suitability for bibliometric analysis. The search string used in the study comprised the keyword "business incubation" in the fields of title, abstract, and keywords in order to find articles pertaining directly to the subject matter under discussion. It was decided to limit the search to scientific articles published only in English in order to guarantee consistency during the analysis of the literature. The retrieved articles were reviewed according to the relevance of each of them to the research goals and excluded incomplete records, non-research papers, and publications having no relation to business incubation whatsoever. The selected literature constituted the global development of business incubation research. Information was collected regarding the bibliography of the articles under consideration.

The collected data set was subjected to bibliometric performance analysis and science mapping approaches. Performance analysis was carried out in order to examine publication growth patterns, influential scholars, highly cited publications, major journals, and productive countries in business incubation literature. In addition, science mapping was used to investigate the intellectual and conceptual structure of the area by means of keyword co-occurrence, co-authorship, and citation network analysis. The visualization and network analysis was done using the VOSviewer tool, which helps in uncovering research clusters and relations among bibliographic units [12]. Through the aforementioned methods of analysis, this study offers a thorough view of the global research scenario of business incubation and possible future directions for research development.

3. RESULTS AND DISCUSSION

3.1 Co-Authorship Analysis

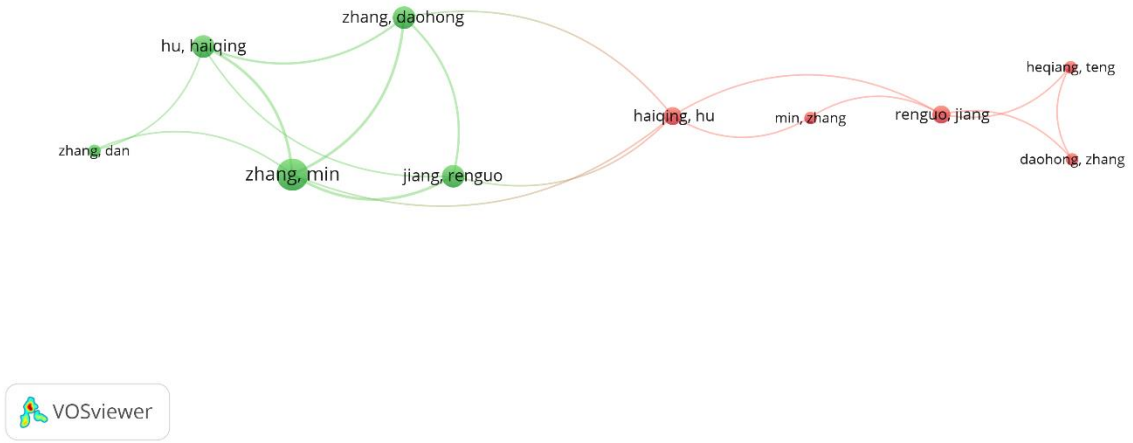

Figure 1. Author Visualization
Source: Data Analysis

The collaboration networks among the authors in the global literature on business incubation are shown in Figure 1 below. It can be seen that the network is relatively small, which means that few authors have formed any repeated collaboration in this particular area of research. The figure shows that there are two distinct collaborative clusters within the network. First, the green cluster includes the authors such as Zhang, Min, Hu, Haiqing, Zhang, Daohong, and Jiang, Renguo. These authors form a collaborative cluster based on their collaborative studies about business incubation development, entrepreneurial support systems, and innovation ecosystem. Second, the red cluster contains the authors including Renguo Jiang, Haijing Hu, Min Zhang, Heqiang Teng, and Daohong Zhang. This is another cluster of authors collaborating in the area of research, but connected to other streams of research on incubation and entrepreneurship. However, the fact that there are connecting links between the two clusters indicates knowledge sharing and collaboration among different disciplines. The density of the network is relatively low, which means that research on business incubation does not have any highly consolidated network of author collaboration.

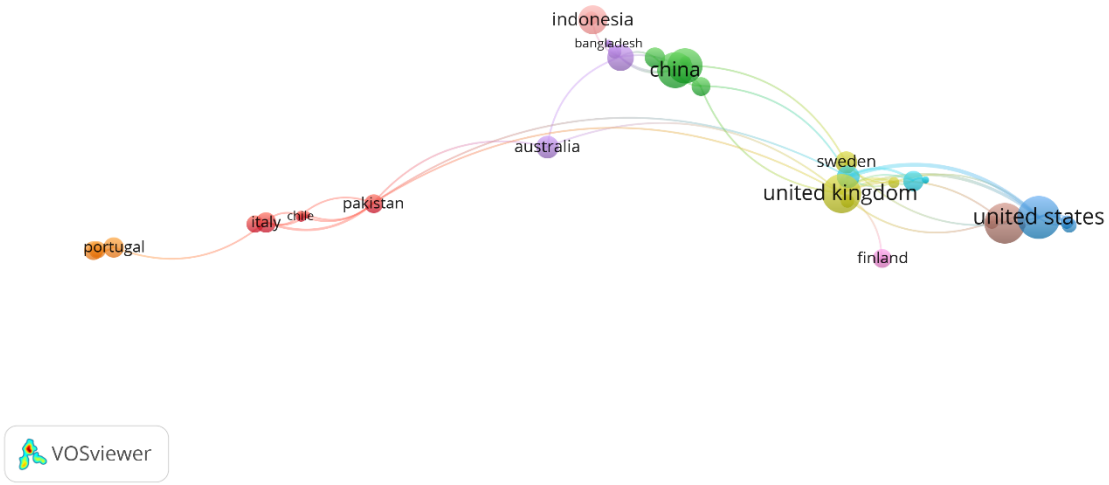

Figure 2. Country Visualization
Source: Data Analysis

The figure below shows the network analysis of the geographical location and cooperation among nations that have been instrumental in carrying out research in business incubation. From the above figure, it can be clearly seen that the nations of the USA, UK and China are the major contributors and are also the most central in the network as shown by their big nodes and large number of connections with other nations. USA is one of the major contributors in the network where it maintains strong collaboration links with the UK and some other nations from Europe, thus showing its significance in international research on business incubation. On the other hand, the UK plays a significant bridging role in the network linking researchers from North America, Europe and Asia. China, which is the main contributor from Asia, also has connections with other nations like Indonesia, Bangladesh and UK.

3.2 Keyword Co-Occurrence Analysis

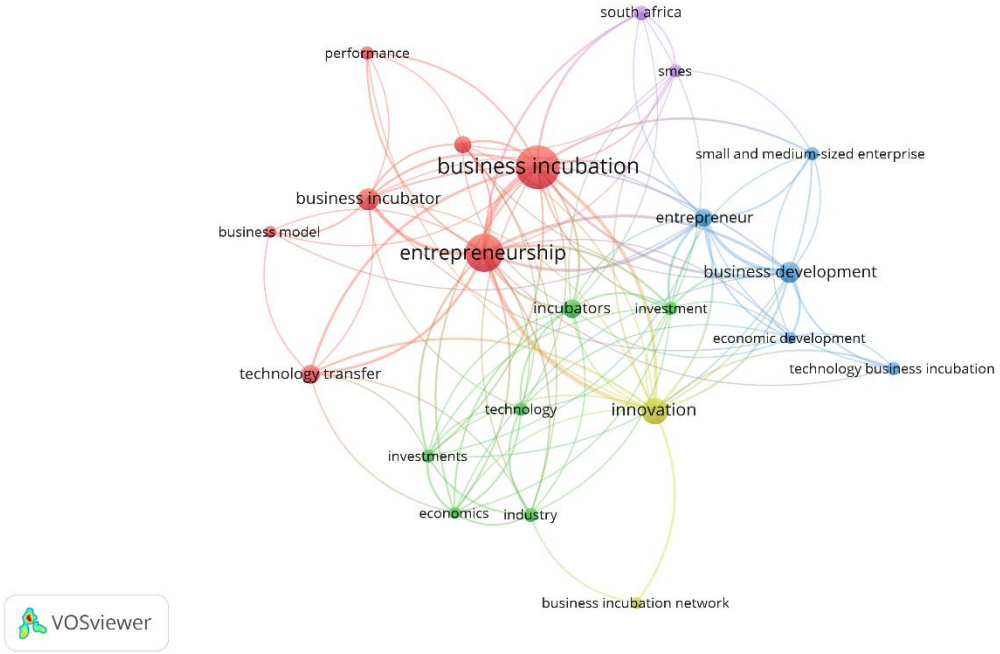

Figure 3. Network Visualization
Source: Data Analysis

The diagram illustrated in Figure 3 shows the intellectual structure and research themes in the global literature on business incubation. It can be seen from the network that "business incubation," "entrepreneurship," and "innovation" are the dominant and core concepts, judging by their big size and connections with other keywords. These keywords denote the core research themes of the field, and reveal that business incubation research is closely linked to entrepreneurial development, innovation generation, and means of facilitating the emergence of start-ups. Dense connections between the core keywords show that business incubation has become a multidisciplinary field of research.

Red cluster is associated with the entrepreneurship and incubation research theme. Keywords like business incubation, entrepreneurship, business incubator, business model, performance, and technology transfer have a close connection within the red cluster. This means that the early and primary research discussions have been around how business incubation helps in supporting entrepreneurship activities, improving the performance of start-ups, transferring knowledge, and providing organizational resources to emerging firms. The close connection between business incubation and entrepreneurship reveals that business incubation is considered a strategic tool for reducing uncertainties and venture development.

The green cluster is an indicator of the innovation, technology, and economic development approach to business incubation. Usage of such keywords as innovation, technology, investments, economy, industry, and incubators shows that current studies pay more attention to the analysis of incubators not only as centers for supporting start-up business but also in their functions to ensure technological innovations, processes of commercialization, and attracting investments and economic development of regions. Innovation and business incubation relationship shows that modern incubators play an increasingly significant role in innovation systems.

Blue clusters highlight the connection between incubation and small business development. The keywords like

entrepreneur, small and medium-sized enterprise, business development, economic development, and technology business incubation show that studies have been conducted on the impact of incubation services on SME development and sustainability. This cluster clearly shows the applied nature of incubation studies, especially in terms of entrepreneurship support and improvement of competitive advantage among small and medium businesses. The existence of SME-based keywords also indicates that there is considerable significance of incubation studies for developing countries where entrepreneurship and SME development play key roles in economic development.

The yellow and purple clusters signify the emergence of research in the field of business incubation. The yellow cluster is based on innovation and business incubation network and implies growing research focus on an eco-system perspective wherein the incubators function in a network form rather than as stand-alone institutions. On the other hand, the purple cluster in relation to South Africa and SMEs refers to research that is contextual in nature.

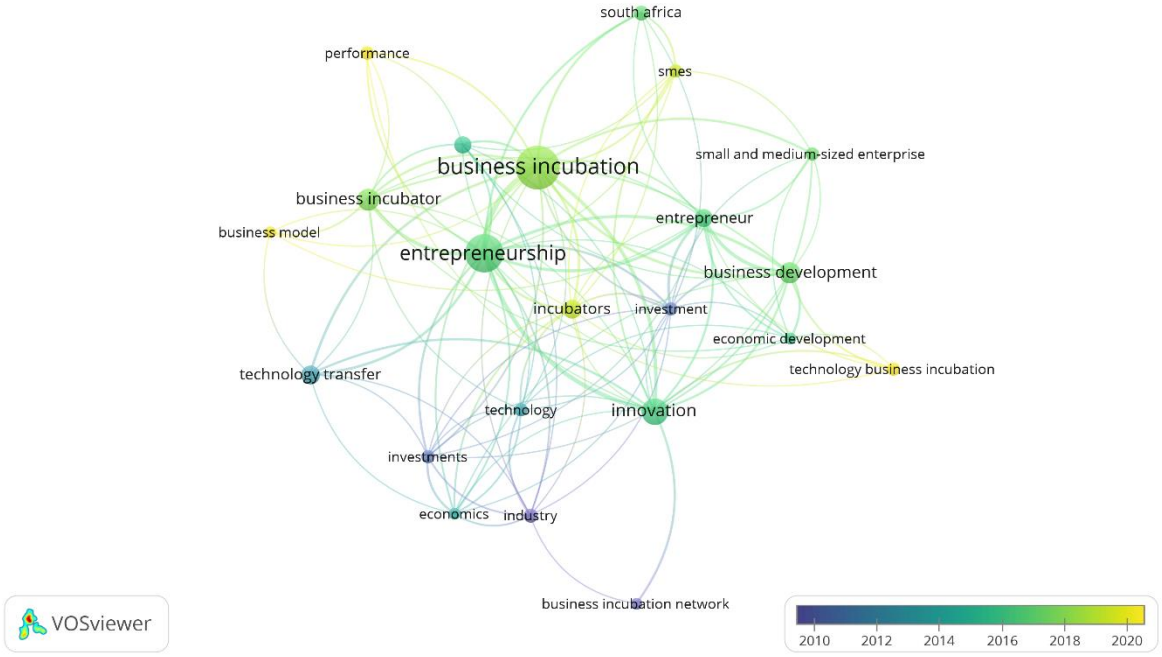

Figure 4. Overlay Visualization
Source: Data Analysis.

Figure 4 illustrates the change in keywords over time in the field of global business incubation research, whereby different colors symbolize the average number of years for which these keywords have been published. This figure demonstrates that business incubation, entrepreneurship, and business incubator are some of the best-known and most widely used keywords in the field, occurring in the central zone of the network and having connections with other themes. Such keywords can be regarded as the basic research direction of the field, especially in relation to the examination of the impact of incubators on entrepreneurial activities.

Color distribution shows that there has been an evolution in research interest over time. In earlier years, research work, as identified through blue and light-green colored keywords, was related to issues of technology transfer, investment, economics, and industry, which focused on the involvement of business incubators in technological commercialization and economic development. On the other hand,

newer research trends, as identified through yellow colored keywords like performance, business model, and SME-related concerns, show the evolution of research interests towards assessing the success of business incubators and their impact on business organizations and the development of small and medium enterprises.

However, from the point of view of temporal mapping, it is possible to identify new trends related to innovations, networks of business incubation, ecosystems of entrepreneurship, and sustainable SME development. New trends in the literature indicate that business incubators are increasingly being analyzed not only as physical places for start-ups but also as networks connecting entrepreneurs, investors, organizations, and suppliers of technologies. It should be noted that innovations and business incubation are closely connected, which indicates the shift towards ecosystems and knowledge management within the context of business incubation.

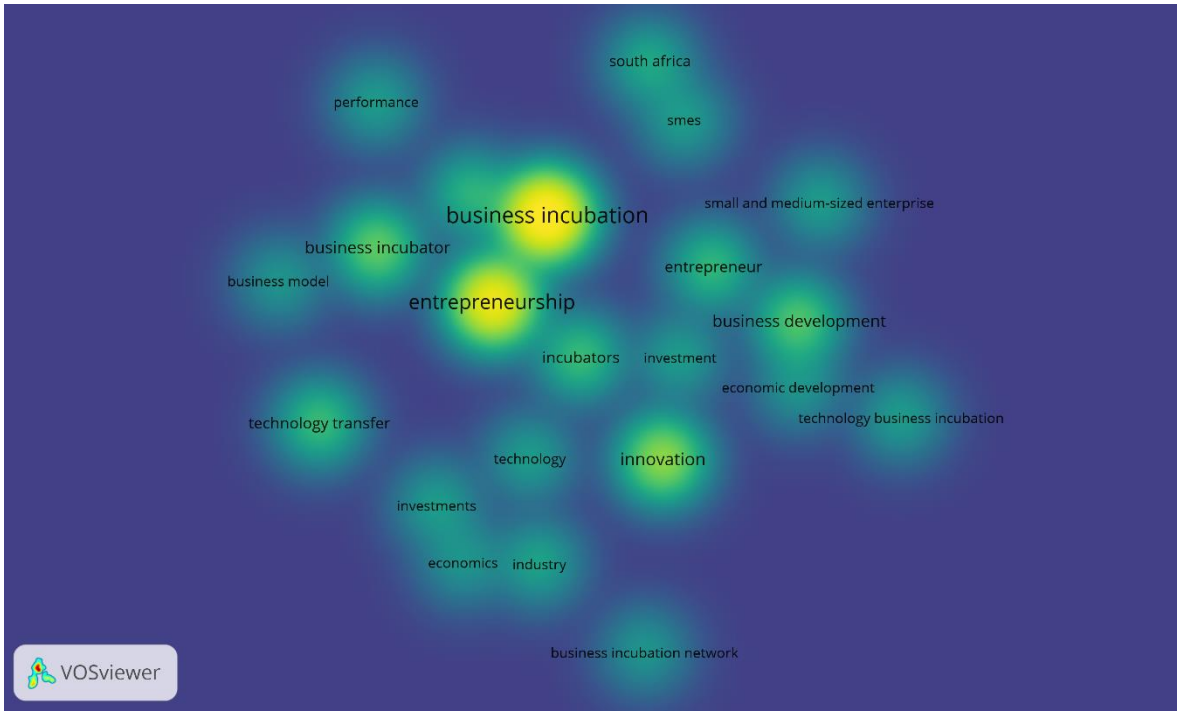

Figure 5. Density Visualization
Source: Data Analysis

Figure 5 shows the clustering and strength of the research themes in the literature on global business incubation. The highest concentration of research themes has been found near the keywords "business incubation," "entrepreneurship," and "innovation," which have been clustered in the brightest parts of the map. These findings suggest that these topics are at the heart of the body of knowledge in this field as they have attracted the most research interest. The clustering and concentration of these keywords indicate that the main focus of business incubation research is the incubation of entrepreneurship and innovation.

In addition to the key themes, the visual analysis shows that there are some other related, yet not intensively researched fields, which include technology transfer, business development, SMEs, investment, economic development, and business incubation networks. Thus, from this perspective, one can see that the wider application of business incubation research involves such things as technological commercialization, improvement of SME competitiveness, and regional economic

development. In turn, the rather low connectivity of such topics as business incubation networks, technology business incubation, and performance implies that these are some areas where further research can be done.

3.3 Citation Analysis

Table 1. Top Cited Literature

Citations	Authors and Year	Title
531	[13]	The evolution of Business incubators: Comparing demand and supply of business incubation services across different incubator generations
430	[14]	Technology Business Incubation: An overview of the state of knowledge
269	[15]	Incubation or Induction? Gendered Identity Work in the Context of Technology Business Incubation
267	[3]	Architecting gloCal (global-local), real-virtual incubator networks (G-RVINs) as catalysts and accelerators of entrepreneurship in transitioning and developing economies: Lessons learned and best practices from current development and business incubation practices
259	[16]	Analyzing the Influence of Gender Upon High-Technology Venturing Within the Context of Business Incubation
231	[17]	Start-ups: Business incubation and social capital
194	[18]	A real options-driven theory of business incubation
186	[19]	Stimulating Dynamic Value: Social Capital and Business Incubation as a Pathway to Competitive Success
151	[20]	Business incubation centers and new firm growth in the Basque country
139	[21]	Inside the black box of business incubation: Study B - Scale assessment, model refinement, and incubation outcomes

Source: Scopus 2026

Table 1 below depicts the most influential works published in the field of global business incubation by using the number of citations as a benchmark. The results show that this discipline has undergone development due to several pioneering papers, which developed seminal concepts, theoretical frameworks, and empirical insights into the phenomenon of business incubation. The paper receiving the most citations is [13] with 531 citations; this paper analyzed the development of business incubators through the comparison of the demand and supply of incubation services in different generations of incubators. This work is highly influential since it offered a comprehensive framework for explaining how incubators have changed from being infrastructure-oriented organizations to being more advanced in their knowledge, network, and value-added services approach. Another influential work with 430 citations is [22] paper about technology business incubation as it described the importance of technology business incubators for technology commercialization and innovation and entrepreneurial activities. Some other highly cited works like [3] and, [18] provided important theoretical framework about global-local incubator networks, real options theory, incubation processes and performance. Moreover, some influential papers by [16] are dedicated to social and gender aspects of technology-based entrepreneurship.

4. CONCLUSION

This bibliometric study offers an in-depth insight into the development, knowledge structure, and trends in global business incubation research. As it turns out,

business incubation has undergone a transformation process from being a classic form of assistance for start-ups to becoming a holistic approach to entrepreneurship which encompasses innovation, technology transfer, financing, and economic development at the regional level. The performance analysis demonstrates that seminal articles have been concerned with the evolution of incubator models, technology business incubation, entrepreneurial assistance system, and social capital in venture growth. The collaboration analysis suggests that research efforts have been predominantly made by several leading nations and institutions, namely the United States, the United Kingdom, and China, while international collaboration between emerging nations is steadily increasing. According to the keyword analysis, the main topics of interest for researchers have been such as entrepreneurship, innovation, business incubators, SMEs, and technology commercialization.

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