

Bibliometric Analysis Using R Package on Sustainable Entrepreneurship Studies

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ABSTRACT

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Entrepreneurship is widely acknowledged as a driver of long-term development and prosperity. Entrepreneurship research has made major contributions in a variety of fields. It has investigated the determinants of entrepreneurship from the individual to the national level. In this study, a quantitative approach is used to provide valuable insights into citation patterns, co-citation analysis, and the intellectual structure of a research domain to gain an understanding of the existing literature, aiding in furthering knowledge and identifying gaps for future research. Scopus is the database used, and the bibliometric application used is Biblioshiny, a bibliometrics analysis R package. The search was restricted to items published in English between 1997 and 2023. The program detected 501 documents from 237 sources, with an annual growth rate of 11.99 percent, an average of 4.67 publications per year, 778 keywords-plus (ID), 1248 author keywords (DE), and 1190 authors. Furthermore, there are 82 authors of single-authored documents, 2.8 co-authors per document, and a 26.35 rate of international collaboration. In addition, the topic growth rate was 11.99, the highest scientific output was 2022, the top publication is a Sustainability publication, the most relevant author is Zhang Y, and the highest cited country is Germany. With this information, future studies can be used to identify which perspective of sustainable entrepreneurship will be explored.

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1. INTRODUCTION

Entrepreneurship is critical to economic growth and employment creation in both developed and emerging economies (Remund et al., 2017). This is supported also by Diallo (2023); entrepreneurship has been a significant contributor to economic development and sustainable growth in recent years. Entrepreneurship is a gendered phenomenon, and there is an increasing number of studies on gender and entrepreneurship (Dohse et al., 2018). Longitudinal data from 2010 to 2014 show an increase in entrepreneurship, reflecting the global economy's recovery from the recession (Kim, 2022). Entrepreneurship is often seen as a driver of long-term development and progress (OECD and European Commission, 2019 Preface). In economics and management, Ph.D. entrepreneurship is a largely unstudied phenomenon (Muscio & Ramaciotti, 2018). Individual predictors of entrepreneurship were examined using the most recent microdata available (Fairlie, 2013).

In recent years, entrepreneurship research has made substantial contributions as well. Social entrepreneurship has also been important in both social and economic growth (Engüllendi, 2022). A recent study has demonstrated the value of entrepreneurial education programs in supporting economic growth and development (Liguori et al., 2019; Jaafar, R., 2017). Furthermore, entrepreneurship has been found to boost the national economy (Gartanti et al., 2020). Entrepreneurship in the Islamic context is dedicated to, or founded on divine principles and Qur'anic ideals (Muslimin et al., 2022). There is a connection between social capital, innovation, and entrepreneurship, according to studies (Gejam, 2023). The importance of historical antecedents in the contemporary growth of entrepreneurship has been studied (Chepurensko, 2019). There has also been an emphasis on entrepreneurship in emerging nations, which has made significant contributions to theory development (Lin & Lasserre, 2015). Digital entrepreneurship has recently sparked interest, with studies examining the eras of digital entrepreneurship and the evolution of digital entrepreneurship (Kollmann et al., 2021). The contribution of entrepreneurial studies to the economy cannot be emphasized. Immigrant entrepreneurship has been identified as a key contribution to the global economy, resulting in increased study interest in this field (Brzozowski, 2015).

Growing interest in sustainability across various fields, bibliometric analysis has been used in many studies such as tourism Niñerola et al. (2019), ecology (Belz & Binder, 2015), Small and Medium-Sized Enterprises (SMEs) (Choongo et al., 2016), strategy (Machado et al., 2021), family business (Bağış et al., 2022), digital entrepreneurship (Fernandes et al., 2022) (Zhai et al., 2022), innovation management (Shams et al., 2020), and international new ventures (Rodríguez-Ruiz et al., 2019). The existing literature on sustainable entrepreneurship remains fragmented and lacks a comprehensive analysis; and there is a crucial gap in understanding the broader trends, influential authors, leading journals, and emerging research areas within this domain.

Therefore, to address this gap, this study aims to conduct a bibliometric analysis using R, to analyze and assess scientific publications statistically. It entails using statistical and analytical tools to analyze the bibliographic content of articles, such as citation patterns, co-citation analysis, and intellectual structure mapping. The primary goal of bibliometric analysis is to give a systematic and thorough examination of literature, which is necessary for understanding the current state of research on a specific topic.

2. LITERATURE REVIEW

Schaltegger and Wagner (2011) define sustainable entrepreneurship as a business approach that attempts to produce long-term value by taking into consideration environmental, social, and economic aspects. It entails the creation of novel products and services that address environmental and social issues while simultaneously creating economic benefits. A focus on sustainability, innovation, and social responsibility characterizes sustainable entrepreneurship (Muoz & Cohen, 2017). It is a company model that tries to strike a balance between profit and social and environmental responsibility. Sustainable entrepreneurship can result in a variety of advantages, including increased competitiveness, improved reputation, and increased employee engagement (Schaltegger & Wagner, 2011). Sustainable entrepreneurship, as defined by (Rosário et al., 2022), is defined as sustainable company practices that align social, economic, and environmental objectives. Entrepreneurship is critical in transitioning to a more sustainable future, and ecological entrepreneurs have a role in connecting social, economic, and ecological objectives (Rosário et al., 2022). (Schaltegger & Wagner, 2011) developed a framework for situating sustainable entrepreneurship within the context of sustainability innovation. The framework is based on a typology of sustainable entrepreneurship, expands it by integrating social and institutional entrepreneurship, and connects it to sustainability innovation. Managers can use the framework as a guide to introduce sustainability. In essence, sustainable entrepreneurship is a business approach that tries to produce long-term value by balancing economic, social, and environmental issues. It entails the creation of creative products and services that address environmental and social issues while simultaneously creating economic benefits. Sustainable entrepreneurship is distinguished by a focus on sustainability, innovation, and social responsibility, and it can result in a variety of benefits for organizations that take this strategy (Rosário et al., 2022; Schaltegger & Wagner, 2011).

Sustainable entrepreneurship is a company strategy that aims to create long-term value by balancing economic, social, and environmental factors. This technique is critical for several reasons. To begin, sustainable entrepreneurship can aid in the resolution of environmental and social issues by developing innovative products and services that provide economic value while limiting the negative effects of company activities on the environment and society. According to one study (Schaltegger & Wagner, 2011), sustainable entrepreneurship can lead to the development of environmentally and socially responsible products and services. Second, sustainable entrepreneurship strives for a "triple bottom line" that benefits people, the environment, and profit. This means that corporations can generate profits while also promoting social and environmental sustainability. Sustainable entrepreneurship, according to (Muoz & Cohen, 2017), can lead to the generation of economic, social, and environmental value. Third, by appealing to consumers who are increasingly concerned about environmental and social issues, sustainable businesses can improve competitiveness. According to (Thananusak, 2019), businesses that practice sustainable entrepreneurship can boost their competitiveness. Fourth, by demonstrating a commitment to sustainability, sustainable entrepreneurship can increase a company's brand image. According to (Schaltegger & Wagner, 2011), sustainable entrepreneurship can lead to a better reputation and enhanced consumer loyalty. Finally, sustainable entrepreneurship can help to promote sustainable development and prevent environmental degradation by supporting societal transformation in favour of more sustainable products and services. According to (Apostu, 2023), sustainable entrepreneurship can help social transformation by promoting sustainable development and preventing environmental damage. In conclusion, sustainable entrepreneurship is a significant business method that can assist in addressing environmental and social concerns, achieving the triple bottom line, increasing competitiveness, improving reputation, and encouraging social transformation. According to research, sustainable entrepreneurship can result in the development of

sustainable products and services, the creation of economic, social, and environmental value, greater competitiveness, improved reputation, and societal transformation. These findings emphasize the need for sustainable entrepreneurship for businesses seeking to reconcile economic, social, and environmental factors.

3. MATERIALS AND METHODS

Bibliometric analysis is a quantitative method used to analyze and evaluate scientific literature. Bibliometric analysis is a reliable tool for assessing scientific output, focusing on the number of papers and citations published on a particular subject, presenting trend analyses, and identifying productive countries. The method is frequently used in exploring and analyzing large-scale scientific research data, evaluating the scientific research trend of a specific subject or concept, examining the impact values of publications, or mapping bibliometric networks in various ways (Kocyigit, 2023; METN, 2023; Sreylak et al., 2022). Researchers can use bibliometric analysis to highlight the theoretical foundations of a specific research subject, identify the important findings of prior studies, and predict future research ideas (Ellili, 2022). Overall, bibliometric analysis is a valuable method for understanding the current state of research in a particular field, identifying research gaps, and informing policy and practice.

The process of bibliometric analysis was guided by a search strategy diagram (Figure 1). This study analyzes all articles published and indexed in the Scopus where it uniquely combines a comprehensive, expertly curated abstract and citation database with enriched data and linked scholarly literature across a wide variety of disciplines. An advanced search in Scopus was performed in the search field of the topic, referring to the title, abstract, or keywords of the documents.

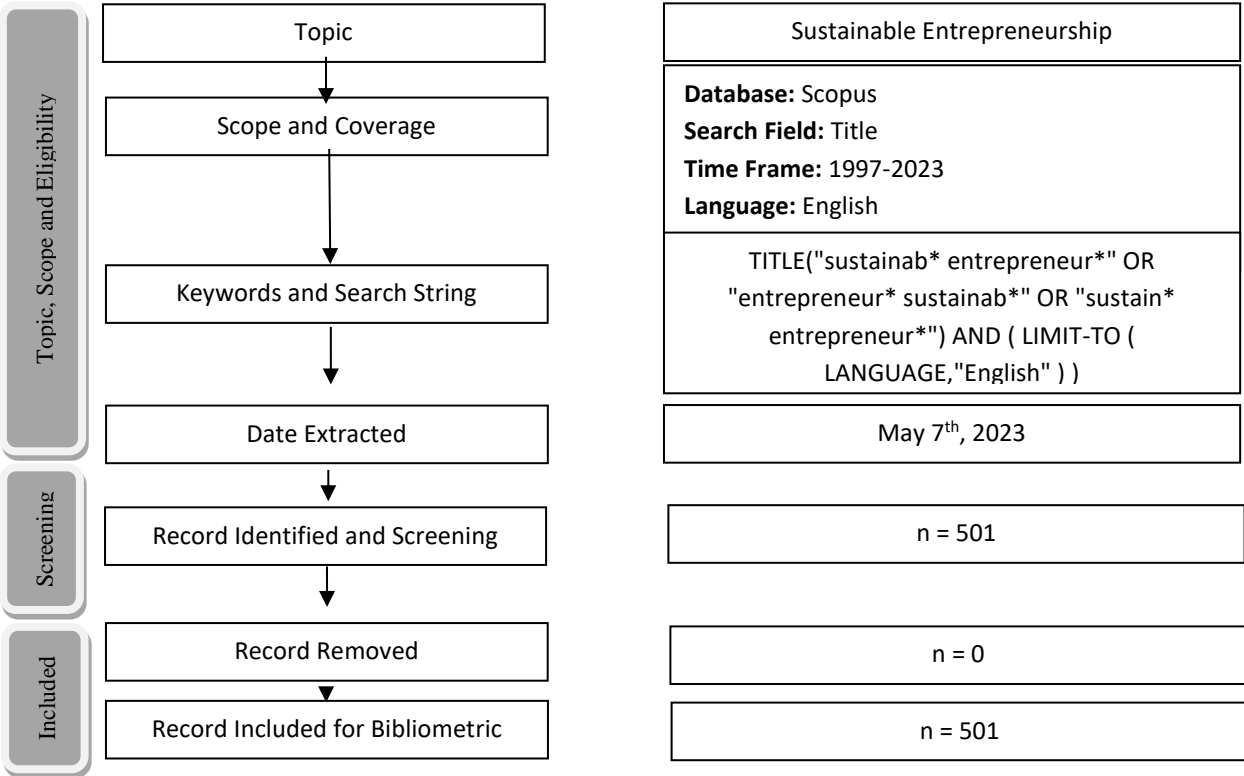


Figure 1: Flow Diagram of the Search Strategy

Sustainable Entrepreneurship was queried on the Scopus database using Biblioshiny, a bibliometrics analysis R package. The query was limited to articles published in English from 1997 to 2023. Figure 1 shows the results of the search string TITLE TITLE("sustainab* entrepreneur*" OR "entrepreneur* sustainab*" OR "sustain* entrepreneur*") AND (LIMIT-TO (LANGUAGE,"English")). The Boolean operator ‘OR’ was used to find the best document that matched both topics. The authors only focused on Sustainable Entrepreneurship to achieve the objective of this paper. Thus, only these two words were used as the search query. The search on the Scopus database returned 501 publications related to Sustainable Entrepreneurship in various contexts. The following section then delved deeper into specific data on both keywords. Following that, bibliometric analysis was performed using Biblioshiny, a web-based software (Aria & Cuccu-rullo, 2017). It is part of the Bibliometrix-R package, which is statistical software for analyzing bibliographic data. Biblioshiny is used for descriptive analysis, citation analysis, co-citation analysis, thematic analysis, network analysis, and data visualization (Sawhney et al., 2022).

4. RESULTS

Table 1 presents critical information such as data, document type, document content, author, and author combination. The data extracted from the Scopus database included timespan information, sources from journals, documents, annual growth rate (%), document average age, average citations per doc, and references. The table displays important information on the selected articles that were analyzed using the Biblioshiny web interface. The authors included documents published between 1997 and May 7th, 2023. The application discovered 501 documents from 237 sources. The annual growth rate of publication is 11.99 percent, on average, there are 4.67 publications per year.

Table 1: Main Information about Data in SCOPUS Database

Description	Results
Main Information About Data	
Timespan	1997:2023
Sources (Journals, Books, etc)	237
Documents	501
Annual Growth Rate %	11.99
Document Average Age	4.67
Average citations per doc	25.93
References	29257
Document Contents	
Keywords Plus (ID)	778
Author's Keywords (DE)	1248

From the collected and exported data, Biblioshiny recognize 778 keywords-plus (ID) and 1248 author keywords (DE). There are 1190 authors in the category. This bibliometric analysis also yielded 82 authors of single-authored documents. In terms of author collaboration, there were 87 single-authored documents. Biblioshiny also shows that the number of co-authors per document was 2.8. The international collaboration percentage was computed to be 26.35.

Figure 1 depicts the trend of annual scientific production for documents on Sustainable Entrepreneurship. The annual growth rate was 11.99. The highest scientific output was in 2022 with 100 articles, while the lowest was in 1999, 2001, 2002, and 2003 with no article produced.

Then, average citations per year ranged from the lowest (0) in 1999, 2001, 2002, and 2003 to the highest (21.64) in 2007 as displayed in Figure 3 based on data filtered from the Biblioshiny web interface.

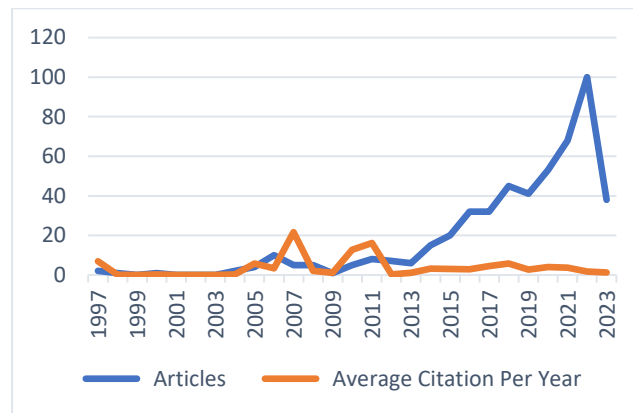


Figure 1: Total Publication and Average Citations per Year

Figure 2 shows a list of the top ten most relevant sources in the SCOPUS database. The first top journal in the list, Sustainability Journal is relevant to this analysis which specializes in Sustainable Entrepreneurship with 92 sources. The second highest is Science of the Total Environment Journal with 42 sources and the third highest is Marine Policy Journal with 22 sources.

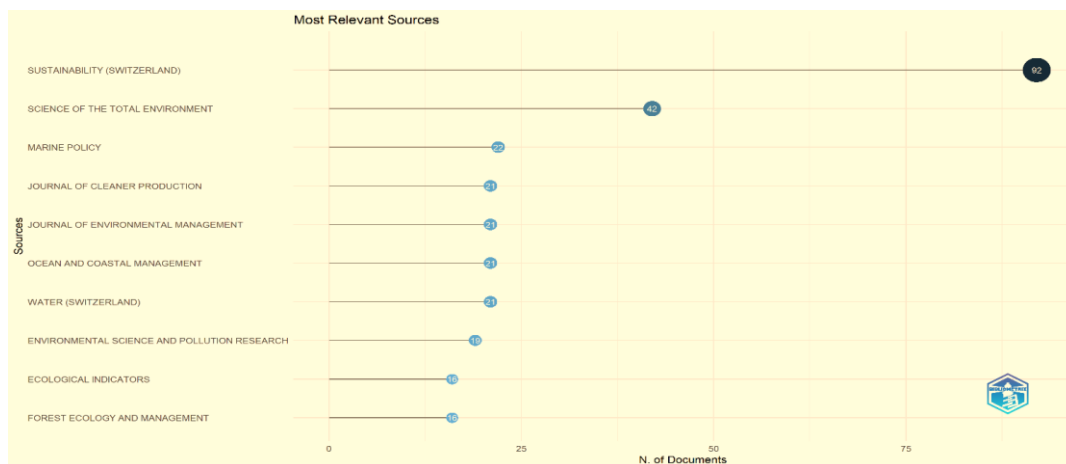


Figure 2: Most Relevant Sources

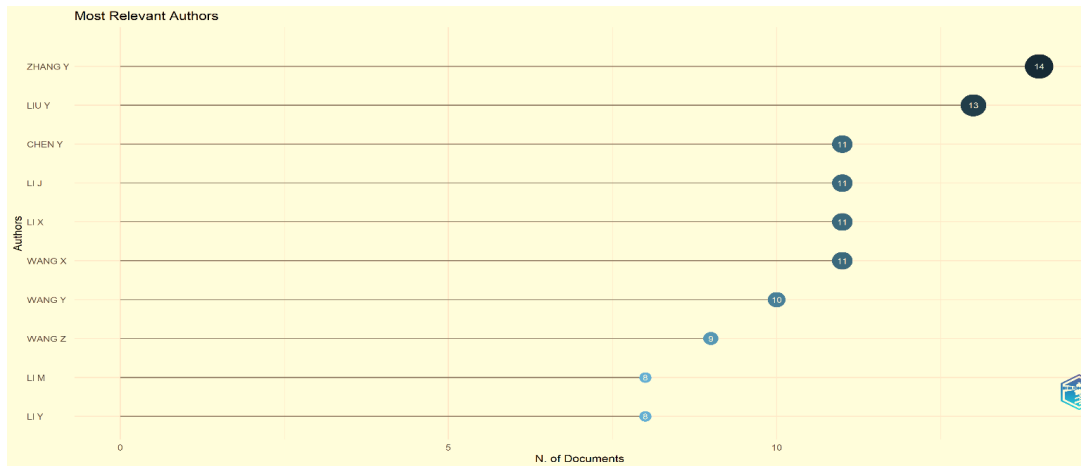


Figure 3: Most Relevant Authors

From Figure 3 above, the most relevant authors from this SCOPUS database are Zhang Y (14), Liu Y (13), Chen Y, Li J, Li X, and Wang X with 2 each on discussed topics. Further on, the most frequent words used in 501 documents on Sustainable Entrepreneurship are as follows: sustainable development (103), entrepreneur (96), sustainability (80), sustainable entrepreneurship (53), innovation (22), entrepreneurship (21), student (17), business development (16), business (14) and economic development (13). On the most cited countries, Germany (2222), United States of America (2049), United Kingdom (1166), and Canada (972) were reported to be the most cited countries in the articles according to Figure 4.

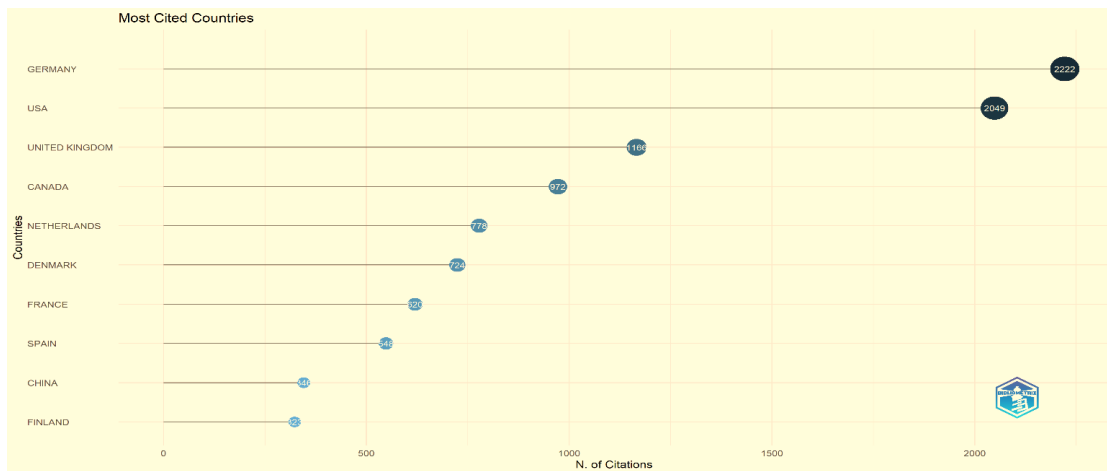


Figure 3: Most Cited Countries

5. CONCLUSION

Based on the bibliometric analysis, it is evident that research on sustainable entrepreneurship has been steadily increasing over the years. The annual growth rate of publication indicates a growing interest in the field. The analysis also shows the top journal in the Scopus database contributing to the literature on sustainable entrepreneurship. These journals have published a significant number of articles, indicating their relevance and specialization in this field. A

perspective can be drawn when most of the top authors are mostly from Asia. This shows that the issue of sustainable entrepreneurship becomes their main interest as it is related to their environment. Their frequent publication suggests their expertise and influence in shaping the research landscape in this area. Examining the most frequent words used in the documents reveals key themes and concepts associated with sustainable entrepreneurship, important keywords include innovation, student, business development, and economic development, indicating the multidimensional nature of sustainable entrepreneurship and its impact on various aspects of society and the economy. On the other side, most countries that are most cited from are from the Europe region and the United States. This suggests their active involvement and leadership in the research on sustainable entrepreneurship.

This analysis seeks to provide valuable insights for researchers, policymakers, and practitioners, aiding in the comprehensive understanding of the current state of knowledge, identification of research gaps, and guidance for future research directions in the field of sustainable entrepreneurship.

Future research in sustainable entrepreneurship could explore emerging trends and challenges, such as the role of technology and digital entrepreneurship in achieving sustainability goals, the impact of social entrepreneurship on addressing environmental issues, and the examination of policy frameworks and initiatives that promote sustainable entrepreneurial practices. Additionally, interdisciplinary studies that integrate concepts from environmental science, economics, and social sciences could provide valuable insights into the complex dynamics of sustainable entrepreneurship and its implications for global sustainable development.

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AUTHORS' CONTRIBUTION

MAA carried out the bibliometric analysis using R, MABAK has done the introduction and literature review and BEA carried out the conclusion and proofread. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

None declared.

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