

Evolution of Green Finance: A Bibliometric Review by Using Scopus Database

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Abstract

Green Finance plays an important role in the financial industry as an initiative that links financial performance to environmental impact. Its development is in line with global economic aspirations and climate change mitigation efforts. At this moment, academics and policymakers are highlighting Green Finance as an innovative strategy for financial system sustainability. This study aims to conduct a bibliometric analysis to trace the academic growth and evolution of the Green Finance concept. A total of 668 papers from the Scopus database for the period 2005-2024 were analysed using VOSviewer software to explore the evolving research network. The study focused on six main questions, which were analysed through network mapping as well as clustering keywords into categories. In addition to identifying the latest trends in Green Finance, the study also discusses the current challenges and issues faced in its development.

Keyword: Green Finance; Bibliometrics; Sustainability; Climate Finance

1. Introduction

Sustainable development is development that is considered wise by society. Economic development can have both positive and negative impacts on human life. Economic development has the potential to make a positive contribution to economy growth, such as increasing national income, creating new jobs, and improving the quality of human resources. However, it often happens that economic development is not aligned with environmental sustainability, which can have unrecognized negative impacts. These negative impacts include environmental issues, global warming, and climate change. Therefore, sustainability and climate change issues are now at the centre of global attention (Zhang, Zhang, & Managi, 2019).

The transition to green economic development requires increased investment in low-carbon production, energy efficient, and strengthened infrastructure. Green Finance now serves as key enabler in dealing with the threats of climate change and environmental damage, as well as solid foundation for prolonged growth and sustainable development (Zadek, 2019). According to Trukhachev & Dzhikiya (2023), Green Finance can be defined as the set of innovation solving in the area of financial economics, of which growing because in 2015 the Sustainable Development Goals (SDGs) were adopted by the United Nations (UN). The goal of Green Finance is to promote green activities, such as buying green goods and services or building green infrastructure that can provide economic and environmental benefits for everyone. Therefore, Green Finance is considered important because it is the first systematic initiative in financial sector in order to bridge financial performance that has a good impact on the environment.

Green Finance plays an important role in addressing environmental issues and enhancing the transition to a more environmentally sustainability future (Cuiyun & Chazhong, 2020). By financing projects with a positive contribution to the environmental impact, Green Finance can make a significant contribution for mitigating climate changes, decreasing pollutions, and protects the ecosystems. Furthermore, it also supports development or implementations on renewable energies, energy-saving technology, sustainable agriculture practises, and eco-friendly mobility system. Green Finance ensures efficient resource allocation and promotes responsibility and sustainability in the use of nature's resources. This could also be viewed as an obvious signs that the economy systems are starting adapt to general environmental issues (Berrou et al., 2019).

Research on Green Finance has been conducted by several studies, including by (Hussain et al., 2023); (Ronaldo & Suryanto, 2022); (Wang et al., 2022); (Udeagha & Muchapondwa, 2023). Green Finance is an important topic to research due to several conditions that require collective solutions. The development of science and technology requires mapping of article distribution information, especially related to Green Finance. This is done so that it can be mapped properly and can be known what is the latest development. Thus, it is necessary to conduct research by mapping articles on Green Finance concepts through a databases of article that have been collected. Therefore, a bibliometric review study can serve as a platform to summarize Green Finance literature over the years and help find avenues of research.

Previous research used as a reference is research conducted by (Muchiri et al., 2022). There are differences between previous research and current research, which lies in the year of research and the database used. Previous research conducted research from 2015-2022 with

the Web of Science database. While this research uses 2005-2024 with the Scopus database. This research aims to provides an outlook about Green Finance through bibliometric analysis. These research questions addressed by the research is as follows:

1. What are the trends of current study findings on Green Finance?
2. Which are the publications and papers that have most impacted Green Finance research?
3. Which nations and authors most frequently contributes to the area of Green Finance?
4. Which are the most frequently occurring variables associated with Green Finance?

2. Literature Review

Green Finance represented all those financial instrument exclusively created for financing environmental, social, and economy friendly activity for a better sustainability of economic development (Falcone, 2020). According to Bhatnagar & Sharma (2022), the aims of Green Finance are to redirect the capital flows to projects linked to the environment and improve the sustainability of the financial system as a whole. This includes the development of new and innovative financial products aimed at development and the transition to a green and sustainable economy (Falcone & Sica, 2019). Green Finance is defined as a strategic approach to incorporate the financial system towards a low-carbon and resource-efficient economy. In addition, there are 3 categories of financing institutions, including Domestic Public Finance, International Public Finance, and Private Sector Finance (Soundarrajan & Vivek, 2016). Theoretically, this research discusses the challenges and opportunities that exist for the future in emerging markets (Bhatnagar & Sharma, 2022).

Empirical analysis has been conducted by several researchers for determining opportunity of Green Finance in a country. The connection between reducing poverty and Green Finance have been carried out by (Jiang et al., 2020). The research provides results that Green Finance could effective mitigate poverty in this country. Liu et al. (2020) conducted a study that evaluating the connection between Green Finance and Green Economy in 30 China provinces by implementing a complex index system. The conclusion of the studies are that there is the powerful spacial interdependency between Green Finance and the Green Economy. As an addition, the connections between Green Finance and Green Economy at China are able to influence overall development of the country.

Bibliometric researchs related to Green Finance has been conducted by (Zhang et al., 2019). The summary of this paper is that Green Finance is an important and fast growing area of enquiry. The paper also suggests that there are a lack of a comprehensive review and relevant literature. Against this background, the aims of this research are to perform a bibliometric analyses and attempt to resolve the research gap in the literatures by present a more comprehensive reviews on the concept of Green Finance. The years of research taken are 2005-2024.

3. Material and Method

This study use a bibliometric close to provide an overview of Green Accounting. According to Gutiérrez-Salcedo et al. (2018), Bibliometric analyses engage the analyses and the investigation of the chosen literatures by using mathematics and statistics techniques. Since the creation of the Science Citation Index (SCI) on 1963, this has gained much popular as a strong method to conduct meta-analysis reviews of the literatures (Gallegos et al., 2020). This

method also includes quantitative research on physically published articles, bibliographies, or a combination of both (Broadus, 1987).

Scopus database is considered suitable for bibliometric analysis based on several research articles. For exporting data, the Scopus database is considered easier than the WoS database. According to (Aksnes et al., 2019), exporting more than 500 articles through WoS requires manual operation. The main difference between Scopus and WoS is that Scopus provides access to all their content through one subscription with no modulation and provide the full scope which WoS cannot (Pranckutė, 2021).

There are several factors that need to be considered at the identification stage. Some of these factors include the type of source, search engines, categories, languages, periods, and keywords (Tautiva et al., 2022). Due to the limited contribution to discussion and empirics, this research only focuses on articles, not other types of publications (Harsanto & Firmansyah, 2023). The analysis that were used in this study only Scopus database. In the search category section, this research focuses on the domains of Business, Management and Accounting, Economics, Econometrics, and Finance. In addition, the language used in the research is English. According to Alatawi et al. (2023), this was chosen to avoid language bias. Furthermore, the keywords used in this research are “Green Finance”, “Climate Finance”, “Financial Sustainability”.

This study uses two bibliometric techniques, which are co-occurrence and co-authorship. According to Zupic & Čater (2015), the close relationship between selected words is shown through words that appear frequently. Callon et al. (1983) explained that, co-occurrence analysis is a technique that highlights the occurrence of two or several keywords simultaneously at this article. This technique aims to identify relationships between keywords in the literature and facilitate the visualization of conceptual linkages through bibliometric networks. Meanwhile, the second method applied in this research is co-authorship analysis. This method aims to explore the collaboration between two or more authors in article creation. This analysis aims to reveal patterns of collaboration between authors, providing an understanding of the network of cooperation involving individuals and institutions in the academic world. In addition, this method also complete the approach used for answering this research questions.

Bibliometric analysis methods are widely used in various academic fields to examine quantitative data contained in books, journals, and other written publications (Heersmink et al., 2011). There are four parts to the bibliometric analysis steps, including the following: selection of search terms, showing preliminary search results, collecting baseline statistics, and data analysis. To do this, follow these four steps, this research utilizes VOSviewer to build a network visualization of Green Finance literature. VOSviewer serves to assist in understanding the structure of literature that has an influence.

The last search query used was as follows (November 09, 2024): TITLE-ABS-KEY (“green finance” OR “climate finance” OR “financial sustainability”) AND PUBYEAR > 2004 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA , “BUSI”) OR LIMIT-TO (SUBJAREA , “ECON”)) AND (LIMIT-TO (DOCTYPE , ‘ar’)) AND (LIMIT-TO (LANGUAGE , ‘English’)) AND (LIMIT-TO (SRCTYPE , ‘j’)) AND (LIMIT-TO (PUBSTAGE , ‘final’)) AND (LIMIT-TO (OA , ‘all’)).

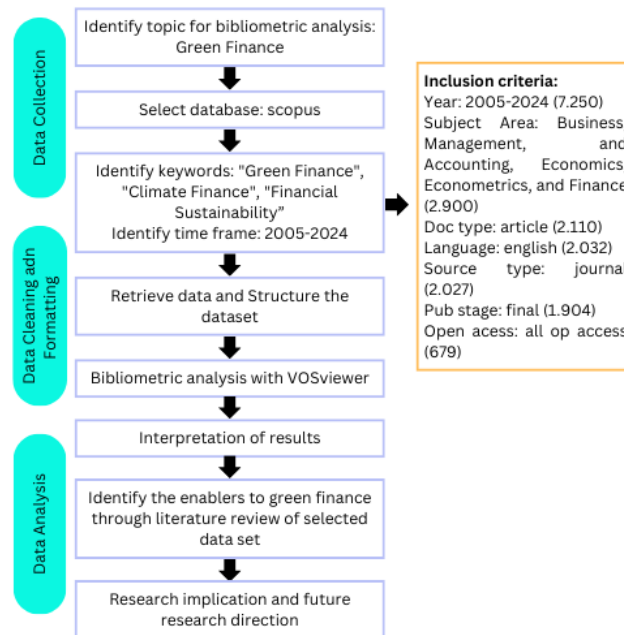


Figure 1. Article Processed

This study analyzed 679 articles. The data was then analyzed bibliometrically using the VOSviewer application, with the co-occurrence analyze method, that aims to statistically identified research topics or variables. In addition, this research also uses the co-authorship analysis method, which is used to map the relationship between researchers based on the documents that have been produced.

4. Result

Figure 2 represents the number of publication by the year of issue. The development of publications generated from research on Green Finance in the years 2005 to 2024 shows a very fluctuating movement. This study collected a total of 679 articles from the Scopus platform based on the filtering results and predetermined topics. Based on the analyze of documents by year, it can be seen that the number of highest publications was recorded on 2023 with 176 documents, follows by 2024 and 2022 which recorded 132 and 176 documents respectively. Based on the existing trend, the number of publications related to Green Finance is increasing rapidly and is expected to continue to grow in the near future.

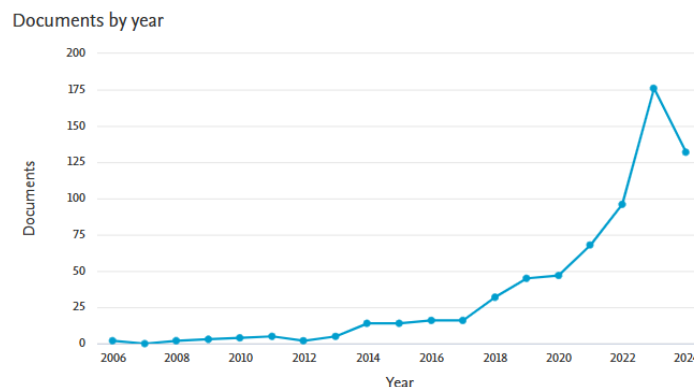


Figure 2. Document by year

Figure 3 shows that publications related to the topic of Green Finance are evenly distributed, without the dominance of any particular publisher. The publisher that most frequently publishes works on this topic is the Financial University under the Government of the Russian Federation, which has produced 10 journals. This shows that the topic of Green Finance in economics is widely accepted by various publishers, making it a topic worth considering for publication.

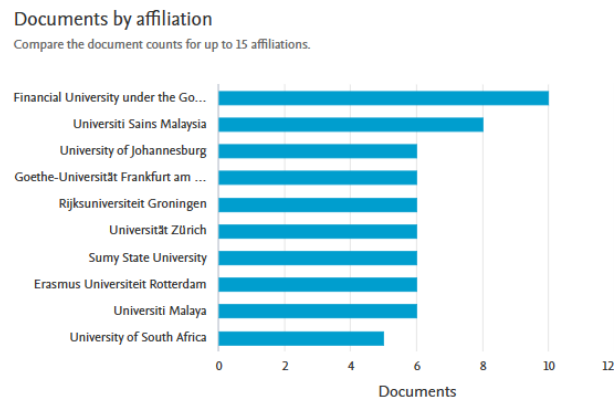


Figure 3. Publication Diagrams

Figure 4 shows that China is the country with the highest number of studies on Green Finance. This indicates that the topic of Green Finance is developing more rapidly in China, before spreading to other countries. The development of this topic in China may be influenced by the increasing complexity of the problems faced or by the increased rigor of researchers in exploring issues that will be used as research material.

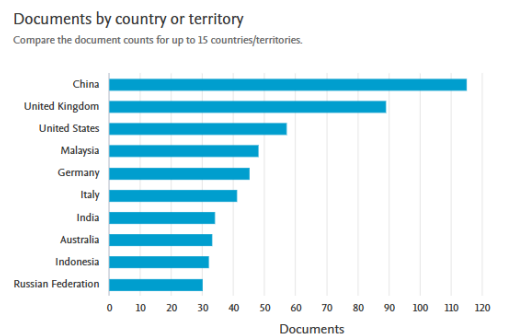


Figure 4. The country object of research

Figure 5 shows that some authors collaborate with other authors on publications. Larger circles around each author's name indicate a higher frequency of publications, as seen with dong and taghizadeh-hesary. If an author frequently appears in publications on the same topic, this indicates that the author has a deeper understanding of the topic. Therefore, authors who are increasingly mastering their topics are worthy of being used as references for further research related to the topic.

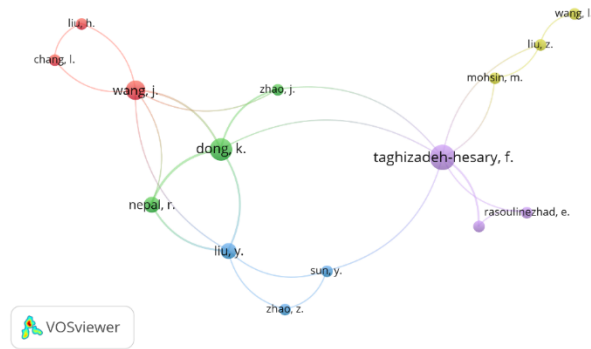


Figure 5. Co-authorship

Figure 6 shows the variables that are frequently associated with Green Finance. The size of the circle on each variable reflects how often the variable is used or appears. From the figure, it can be concluded that Green Finance is the most frequently used or most frequently occurring variable. Although many variables have been associated with the topic of Green Finance, there are still many other variables that have not been recorded. This shows that there are still many unresearched variables related to this topic, providing an opportunity for the authors to explore the unlisted variables.

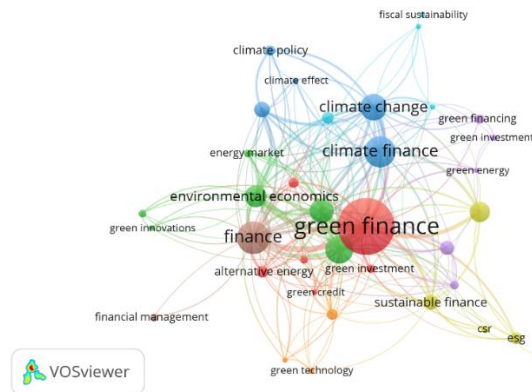


Figure 6. Co-occurrence

5. Conclusion, Implication, and Recommendation

Over the past few years, research on Green Finance has fluctuated significantly. This phenomenon is likely due to the real problems faced by the world, which sometimes cause Green Finance topics to trend in research. This study collected a total of 679 articles from the Scopus platform based on the filtering results and predefined topics. Based on the analyze of documents by year, it can be seen that the number of highest publications was recorded on 2023 with 176 documents. This study shows that the publisher that most frequently publishes works on this topic is the Financial University under the Government of the Russian Federation, which has produced 10 journals. Meanwhile, the country that most often makes Green Finance as research is China. The author names that show high publication frequency are dong and taghizadeh-hesary. In addition, Green Finance is a variable that is often used or most often appears in research.

This study has limitations, namely the results of the VOSviewer analysis do not show a clear relationship due to very small values, so it cannot provide a comprehensive picture of the latest research developments in field of Green Finance. Nevertheless, the results of this study are expected to contribute to facilitate and direct future Green Finance research. Future research should not only repeat variables that have been widely explored, but also explore new variables that are relevant to the current situation and conditions, so as to enrich knowledge related to Green Finance.

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