Green Bonds and Financial Sustainability: A Bibliometric Analysis

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Abstract. The Green bonds are now not just a trend, but an important part of the global financial transformation towards sustainability. However, the discussion of the scientific literature on the relationship between green bonds and financial sustainability is still not fully defined. This study uses a bibliometric approach to Scopus articles in the 2014–2024-time frame to map the development of research in the field. The results show a surge in publications since 2020, with the dominance of contributions from China, the United Kingdom, while the main keywords form three major clusters: sustainable finance, impact on the market, and carbon emission risk. These findings point to the direction of global research and open up opportunities for scientific collaboration and new research agendas, especially in developing countries. This study is expected to strengthen the role of academics and policymakers in the development of adaptive and data-driven green finance strategies.

Keywords: Bibliometric Analysis, ESG, Green Bond, Sustainable Finance.

1 Introduction

In recent years, the global financial landscape has undergone a significant transformation through the presence of green financial instruments, especially green bonds. Green bonds are fixed-income bonds specifically intended to finance projects related to climate change mitigation and environmental protection. Green bonds were first issued in 2008 by the World Bank (IBRD) in collaboration with SEB (Skandinaviska Enskilda Banken), in response to increasing investor demand for environmentally friendly investment instruments [1].

The initial purpose of the issuance of green bonds is to raise funds in order to support projects oriented towards low-carbon development, energy efficiency, the use of renewable energy, and environmental resilience. In its development, the role of green bonds extends to support the sustainable development agenda that is in line with the Sustainable Development Goals (SDGs), especially in the goals of clean energy, sustainable cities, and responsible consumption and production [2].

Since its first issuance, green bonds have had a tangible impact, such as financing large-scale solar and wind energy projects, building green transportation infrastructure, green buildings, and climate-based water resilience systems. According to a report by

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the Climate Bonds Initiative (CBI), the accumulated global green bond issuance has exceeded USD 2.5 trillion in 2023, with significant contributions from state issuers and corporations [3].

Although the growth of green bonds is very rapid, the academic literature shows that assessments of their impact on financial sustainability are still diverse and have not been systematically mapped. To date, very few studies have comprehensively examined the intellectual linkages between countries, the main sources of academic influence, and the dynamics of themes that develop in the green bond literature. There have not been many studies that explicitly map the thematic evolution and networks of institutional collaboration within the framework of green bonds longitudinally. Therefore, this study aims to present a bibliometric analysis of the development of the scientific literature in the last ten years to identify the main trends, regional contributions, and dominant research agendas.

2 Research Methods

This study uses a descriptive quantitative approach with the bibliometric method, which is a quantitative analysis method of scientific publications to evaluate the dynamics, trends, and maps of knowledge in a certain field of study [4]. In this context, the analysis focuses on the literature that discusses the relationship between green bonds and financial sustainability in the last ten years (2014–2023). The main data source in this study comes from the Scopus database. The data collection process is carried out using the following keyword combinations:
("Green Bond" OR "Green Bonds" OR "Environmental Bond" OR "Sustainable Bond" OR "Ecological Bond" OR "ESG Bond" OR "Low-Carbon Bond" OR "Renewable Energy Bond") AND ("Company Finance Sustainability" OR "Corporate Financial Sustainability" OR "Financial Sustainability" OR "Financial Resilience" OR "Sustainable Finance")

The first search was conducted with a limit of the year of publication from 2014 to 2024, resulting 200 articles in the journal Scopus. Then a limit on the type of document was applied, namely eliminating documents in the form of books, book chapters, and reviews until 130 documents were obtained. Furthermore, a systematic selection process was carried out on the content of the abstract summary to ensure the suitability of the topic with the focus of the research, the relationship between green bonds and the company's financial sustainability, so that the final result was obtained amounting to 80 articles. The search and filtering results are then exported for further analysis using the software for bibliometric analysis.

3 Result and Discussion

3.1 Publication Trends in a Decade

The beginning of the search process is actually set to bring up publications from 2014-2024 that have keywords related to Green Bond and Financial Sustainability, up to 200

documents. However, after going through three stages of selecting the topic, the results of 80 suitable articles were obtained, with the first publication recorded in April 2020. Since the first publication, there has been an increasing trend of publications until 2024. The highest number of publications will occur in 2024 with 32 articles published as shown in Figure 1. This data reflects the increasing attention of academics to the role of green bonds in the financial sustainability of issuing companies.

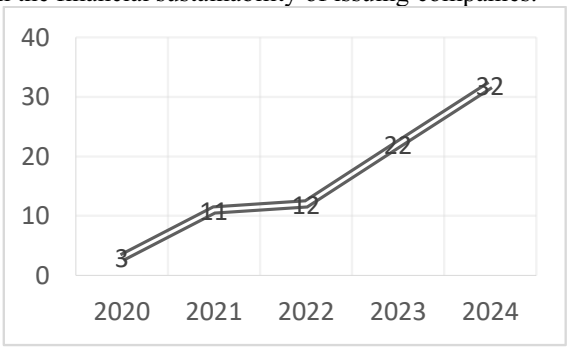

Fig. 1. Annual Scientific Production Per Year

3.2 Countries With the Highest Productivity Levels

The five countries with the highest article productivity are India, China, Ukraine, Italy, and Spain. Most other countries already publish a small number of articles, about 1-2 articles. In this amount of productivity, the opportunity to create research with novelty in this field is enormous. This inequality may reflect differences in national policy priorities on sustainability issues, limited research infrastructure, or access to research funding. Therefore, there needs to be a cross-border collaborative strategy to encourage research contributions from regions that are not yet active, especially from Global South countries that are directly affected by climate change issues.

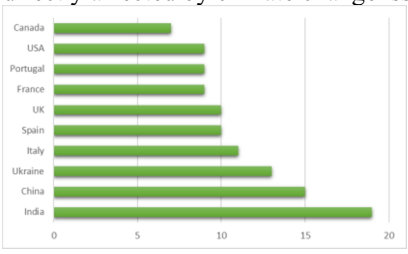

Fig. 2. Most Productive Countries

3.3 Countries as the Subject of the Most Research

The EU is preparing to achieve a European Green Deal that includes policies and decarbonization of the energy, transport and industrial sectors. Apart from these two most countries, of course there are still other countries that are also the subject of research.

However, data in table 1 shows the great opportunity to conduct research on the relationship between Green Bonds and Financial Sustainability specifically in almost all countries in the world.

Table 1. Number of Research done on Countries

Country/Region	Articles
China	8
European	6
United States	3
India	3
France	3
South Africa	2
Saudi Arabia	2
Netherlands	2
Belgium	2
Brazil	2
Indonesia	2
Italy	2
Canada	2
Norway	2
Sweden	2
Switzerland	2

3.4 Intellectual Linkages Between Countries

Bibliographic coupling analysis at the country level pictured on Figure 3 shows that China is among the countries with the highest publication contribution in the field of Green Bond and Financial Sustainability. Not only in the number of publications, China also shows the highest level of bibliometric linkage with other countries which indicates intellectual closeness in the use of the same references. The strong bibliographic relationship between China, UK, and India demonstrates their central role as a center for knowledge production and scientific collaboration in the study of green bonds and financial sustainability globally. In other words, the literature developed in these three countries is the dominant and influential reference for other countries researching similar topics.

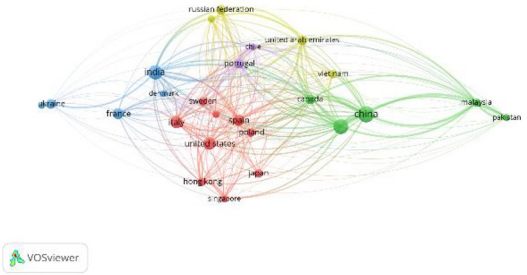

Fig. 3. Network Visualization of Bibliographic Coupling of Countries

3.5 Keyword Analysis

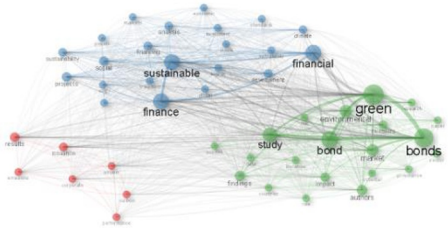

Fig. 4. Co-occurrence Analysis of Keywords

Based on the visualization of the keyword network on the Figure 4, the words are distributed into three main clusters:

Cluster 1: Sustainable Finance and Economic Transition. The words in this cluster reflect an approach that places green bonds as part of a broader economic strategy, including sustainable development and the energy transition. The focus is on the linkages between sustainable investment, social policies, and financing systems that support green economic growth.

Cluster 2: The Impact of Green Bonds on Finance and the Market. This cluster focuses on analyzing the consequences and real impact of green bonds on financial markets and investment strategies. This suggests that the literature is starting to lead to data-driven evaluations.

Cluster 3: Issuance, Issuance, and Corporate Risk. This cluster is more focused on the technical and operational aspects of green bond issuance, including its impact on carbon emissions and corporate performance. Topics such as issuance efficiency, yields, and assessments of carbon emissions show a focus on direct measurement of the environmental impact of green bonds.

This thematic structure indicates that the literature on Green Bonds and financial sustainability is developing in a multidimensional direction: from macroeconomic aspects (financing and development), microeconomics (markets and investor behavior), to technical dimensions (emissions and issuance performance). This evolution reflects the maturity of academic discourse in the field of green bonds and its potential integration into mainstream financial analysis frameworks.

4 Conclusion

The results of bibliometric studies on the development of the literature on green bonds and financial sustainability that have been carried out shows that this topic has experienced rapid growth in scientific publications and has become a multidisciplinary issue involving financial, environmental, and governance dimensions. The findings of this bibliometric analysis confirm that the study of Green Bond and Financial Sustainability is not only growing quantitatively, but has also built a global intellectual network involving various countries and institutions. The strength of bibliographic relations between countries and the concentration of productive institutions in various regions show that the issue of green finance has become a cross-border research agenda and discipline. In addition, the dominance of developed countries in the issuance of green bonds indicates an imbalance in the contribution of knowledge and policies from developing countries. Therefore, more research is needed from developing countries that is contextual and reflective of their national needs and capacities.

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