
A Decade of Green Banking Research: A Bibliometric and Visualization Analysis

Cancio Andhika Irawan Magalhaes¹, Tussi Sulistyowati²

^{1,2}. Faculty of Economics and Business, Universitas 17 Agustus 1945
Surabaya, Indonesia

E-mail: andhikamagalhaes@gmail.com¹, mytussi@gmail.com²

Received: April, 2025; Accepted: April, 2025; Published: June, 2025

Permalink/DOI:

Abstract

This study, employing a quantitative research method, presents a comprehensive bibliometric analysis of green banking research published between 2015 and 2025. The objective is to uncover major trends, leading contributors, key thematic areas, and the evolution of the field's intellectual structure. Utilizing data extracted from the Scopus database and visualized through tools such as VOSviewer, the analysis reveals a significant growth in research output over the past decade, with a sharp increase beginning in 2021. China emerges as the most prolific country in terms of publication volume, while Toghzaideh-Hesary, F. stands out as the most productive author. Citation analysis identifies the most influential articles, many of which centre on green finance, innovation, and policy interventions—particularly within the Chinese context. The research encompasses various disciplines, with Environmental Science and Economics being the most dominant subject areas. Keyword co-occurrence mapping illustrates the intellectual development of the field, highlighting thematic clusters such as sustainable development, green credit, and carbon emissions, along with emerging topics like renewable energy and fintech. Overall, the findings indicate that green banking has transitioned from an emerging area to a structured, interdisciplinary field, underscoring its increasing significance in advancing global sustainability and green finance initiatives.

Keywords: *Green Economy, Green Banking, Bibliometric Study, Sustainable Development, Environmental, Social, and Governance (ESG)*

INTRODUCTION

The increasing urgency of climate change and global environmental degradation has placed sustainability at the forefront of economic development agendas (Ermolina et al., 2021). As a response, the concept of a green economy—defined by low-carbon, resource-efficient, and socially inclusive growth—has gained momentum in both academic and policy discourse (Shobande et al., 2024). Within this context, the financial sector, particularly banking institutions, plays a pivotal role in facilitating the transition toward sustainable economic systems (Aydin et al., 2024). By redirecting capital flows toward environmentally responsible projects and adopting sustainable internal practices, green banking has emerged as a vital instrument in aligning financial activities with environmental goals.

Over the past decade, academic interest in green banking has expanded rapidly. Scholars and practitioners alike have explored its role in financing green infrastructure, integrating environmental, social, and governance (ESG) criteria, and shaping sustainable banking models. Despite the growing body of literature, a comprehensive understanding of the intellectual landscape, research trends, and collaborative networks within this field remains limited.

To address this gap, this study conducts a bibliometric and visualization analysis (Sulistiyowati, 2024; Sulistiyowati et al., 2025) of green banking research from 2015 to 2025. Using data sourced from the Scopus database and analytical tools such as VOSviewer, the study maps out publication trends, influential authors, institutions, journals, and thematic evolution in the green banking domain. By doing so, it offers valuable insights into the development and structure of the academic discourse surrounding green banking and its relationship to the green economy.

This paper aims to contribute to the existing literature by identifying research hotspots, highlighting gaps for future exploration, and supporting scholars, policymakers, and practitioners in navigating this evolving field. Ultimately, the findings underscore the growing importance of sustainable finance and reinforce the role of banks as key actors in achieving environmental and economic sustainability.

Research Questions:

RQ1: What are the major trends, most productive authors, and key thematic areas in green banking research published between 2015 and 2025?

RQ2: How has the global research landscape on green banking evolved over the past decade in terms of collaboration networks, publication output, and intellectual structure?

METHOD

This study employs a quantitative research method, presenting a comprehensive bibliometric and visualization analysis to examine the development of green banking research from 2015 to 2025. Data were retrieved from the Scopus database using the keywords “green banking,” “sustainable banking,” “green finance,” and “environmental finance,” initially yielding 3,915 documents. The search was then refined to include only English-language journal articles within the subject areas of economics, econometrics and finance; environmental science; social sciences; and business, management and accounting. Filters were also applied for publication years (2015–2025), publication stage ("final"), and source type (journal). The specific search string used was: TITLE-ABS-KEY ("green banking" OR "sustainable banking" OR "green finance" OR "environmental finance") AND (LIMIT-TO (SUBJAREA, "ECON") OR LIMIT-TO (SUBJAREA, "ENVI") OR LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "BUSI")) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (PUBSTAGE, "final")) AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (LANGUAGE, "English")).

As a result, a total of 2,336 documents were selected for analysis. The analysis employed VOSviewer to construct co-authorship, co-citation, and keyword co-occurrence networks, while Microsoft Excel was used for analyzing publication trends. Key aspects examined include publication growth, prolific authors and institutions, leading journals, thematic clusters, and international collaboration patterns. This approach enables a comprehensive understanding of the intellectual structure, research dynamics, and evolving trends within the green banking literature.

RESULTS AND DISCUSSION

RQ1: What are the major trends, most productive authors, and key thematic areas in green banking research published between 2015 and 2025?

Major Trends in Green Banking Research Published Between 2015 and 2025

Figure 1 illustrates the publication trend in green banking research from 2015 to 2025. During the initial period, from 2015 to 2020, the number of published documents remained relatively low, with a gradual increase that indicates a slow but steady rise in scholarly interest in the field. A notable shift is observed in 2021, when the volume of publications begins to rise sharply, likely reflecting a surge in academic attention and growing global awareness of environmental and financial sustainability issues. This upward trend continues through 2024, reaching its peak that year, which may represent the height of research engagement in green banking topics. However, in 2025, the graph reveals a sudden and significant decline in publication output. This abrupt drop may be attributed to a data lag—such as incomplete indexing for the most recent year—or other external factors that temporarily impacted research dissemination. Overall, the pattern suggests a substantial increase in interest and activity over the decade, with the 2025 decline likely representing a technical anomaly rather than a true decrease in academic focus.

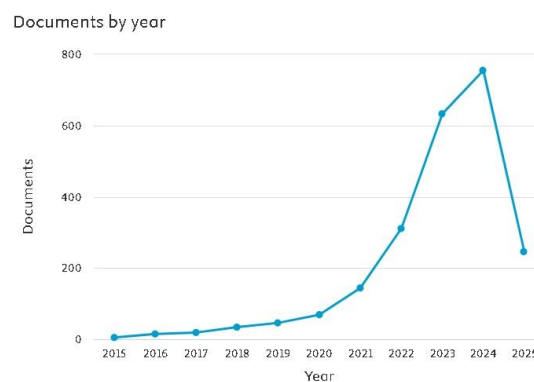


Figure 1. Major Trends in Green Banking Research Published Between 2015 and 2025

Source: Scopus database, as of April 6, 2025

Most Productive Authors in Green Banking Research Published Between 2015 and 2025

Figure 2 illustrates the number of documents published by various authors in the field of green banking, providing a clear comparison of their research productivity. Among the authors, Toghazadeh-Hesary, F. emerges as the most prolific contributor, with a publication count that significantly surpasses those of other authors in the dataset. The graph reveals a notable range in productivity levels, with Toghazadeh-Hesary, F. at the top and Zhang, D. at the lower end of the scale. The lengths of the bars visually emphasize the relative differences in output, enabling a quick and intuitive comparison of each author's contributions. Although the primary focus of the graph is on visual representation, the inclusion of a numerical scale also allows for approximate estimations of publication counts. Overall, the figure underscores the varying degrees of scholarly activity among leading authors in green banking research, highlighting Toghazadeh-Hesary, F. as the most active researcher within the observed period.

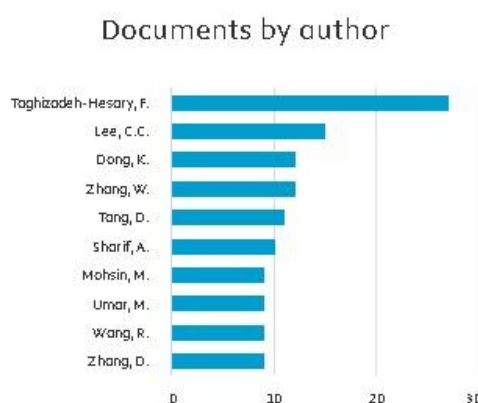


Figure 2. Most Productive Authors in Green Banking Research Published Between 2015 and 2025

Source: Scopus database, as of April 6, 2025

Most Cited Articles in Green Banking Research Between 2015 and 2025

Figure 3 highlights the ten most cited articles in green banking research published between 2015 and 2025, offering insight into the field's most influential scholarly contributions. The top-cited article, "How does green finance affect green total factor productivity? Evidence from China"(Lee & Lee, 2022), leads significantly with 754 citations, reflecting its strong impact on the academic community. Closely following is "Demand for Green Finance: Resolving Financing Constraints on Green Innovation in China" (Yu et al., 2021) with 737 citations, further emphasizing the prominence of green finance and innovation as core research themes. Other highly cited works explore topics such as public spending (D. Zhang et al., 2021), private sector involvement (Taghizadeh-Hesary & Yoshino, 2019), green credit policy (S. Zhang et al., 2021), and fintech's role in environmental protection (Muganyi et al., 2021), indicating a wide scope of interest across financial mechanisms and policy interventions. Notably, a large portion of these studies focus on empirical evidence from China, suggesting the country's central role in advancing green finance research. Overall, this figure underscores

the growing academic attention to green finance over the past decade and helps identify seminal works that have significantly shaped the discourse in this evolving field.

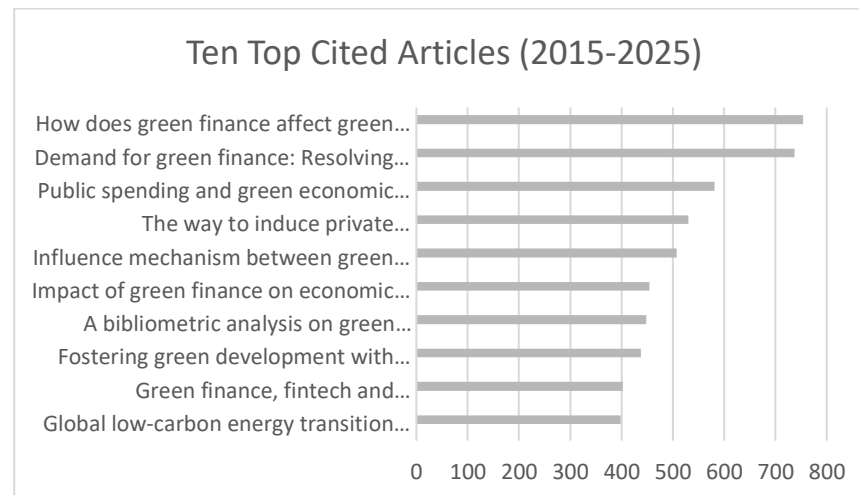


Figure 3. Top 10 Most Cited Articles in Green Banking Research (2015–2025)
Source: Elaborated from Scopus database, as of April 6, 2025.

Thematic Areas in Green Banking Research Published Between 2015 and 2025

Figure 4 shows the distribution of green banking research across subject areas. Environmental Science (24.8%) and Economics, Econometrics and Finance (21.1%) dominate, together accounting for nearly half of the total output. Other key contributors include Social Sciences (16.5%), Energy (11.9%), and Business, Management and Accounting (10.6%), reflecting a multidisciplinary focus. Smaller areas like Computer Science, Engineering, and Psychology also appear, indicating broad academic interest. Overall, the figure highlights the interdisciplinary nature of green banking research, led by environmental and economic perspectives.

Documents by subject area

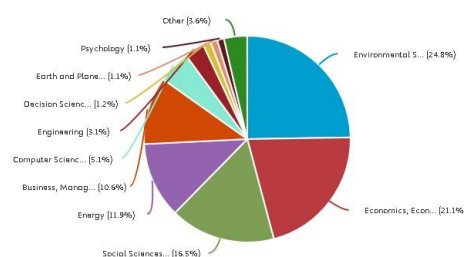


Figure 4. Most Productive Authors in Green Banking Research Published Between 2015 and 2025

Source: Scopus database, as of April 6, 2025

Country-wise Distribution of Publications in Green Banking Research (2015–2025)

Figure 5 illustrates the distribution of research output on green banking by country or territory, measured by the number of published documents. The visual representation identifies China as the leading contributor, with a significantly higher publication count compared to other nations. This dominance indicates China's strong academic engagement and policy interest in green banking and sustainable finance. The graph enables a straightforward visual comparison, where the varying lengths of the bars reflect the disparities in productivity across countries. Following China, countries such as the United Kingdom, Malaysia, India, Pakistan, and the United States show notable but comparatively lower levels of output, marking them as key players in the field, albeit at a smaller scale. In contrast, countries like Australia, Saudi Arabia, France, and Vietnam exhibit more modest contributions, situated at the lower end of the publication spectrum. Overall, the graph provides valuable insight into the global landscape of green banking research, emphasizing the regional concentrations of academic interest and the leading role of certain nations in advancing the field.

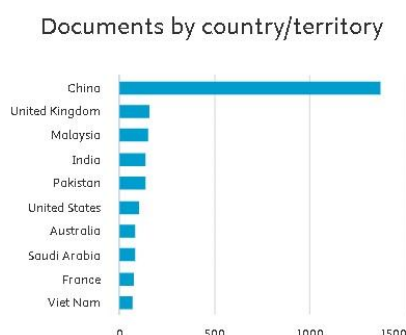


Figure 5. Country-wise Distribution of Publications in Green Banking Research (2015–2025)

Source: Scopus database, as of April 6, 2025

RQ2: How has the global research landscape on green banking evolved over the past decade in terms of collaboration networks, publication output, and intellectual structure?

Figure 6 presents an overlay visualization generated using VOSviewer, illustrating the network of co-occurring keywords in green finance research between 2015 and 2025. Each node in the network represents a keyword, with larger nodes indicating higher frequency in the dataset. The lines connecting the nodes show the relationships between terms—thicker lines suggest stronger co-occurrence. Keywords are organized into colour-coded clusters that reflect thematic groupings within the research, such as sustainable development, carbon emissions, or green investment. Additionally, the overlay colour gradient—from blue to yellow—indicates the average year of publication, allowing readers to identify how

themes have evolved. For instance, keywords shaded in yellow, such as "alternative energy" and "energy utilization," suggest these are emerging topics that gained traction in recent years. At the centre of the network, "green finance" appears as the most prominent term, highlighting its role as the central focus of the research domain. Overall, this visualization provides valuable insights into the intellectual structure, thematic connections, and evolving research trends in green finance literature.

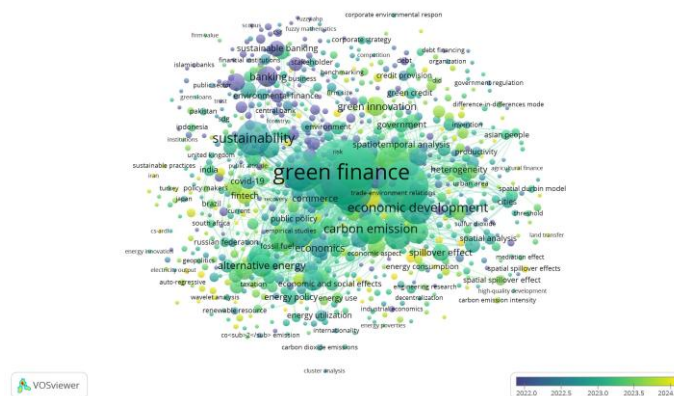


Figure 6. Overlay Visualization of Keyword Co-Occurrence in Green Banking Research (2015–2025)

Source: VOSviewer output based on Scopus database, as of April 6, 2025

Over the past decade, the global research landscape on green banking has undergone a significant transformation, marked by substantial growth in publication output, increasingly interconnected collaboration networks, and the emergence of a more structured intellectual foundation. From 2015 to 2025, scholarly interest in green banking has steadily increased, with a notable surge in publications observed after 2020—likely influenced by global sustainability commitments such as the Paris Agreement and the growing urgency around climate change and sustainable finance. This rising trend reflects a shift in academic and institutional focus toward integrating environmental considerations into financial systems.

In terms of collaboration, co-authorship and institutional network analyses reveal a growing trend of international cooperation, particularly among researchers and institutions in Asia, Europe, and to some extent, North America. Countries such as China, India, and the United Kingdom have emerged as key hubs of green banking research, contributing significantly to the volume and influence of published work. The expanding network of global collaborations suggests a recognition of the cross-border nature of environmental challenges and the need for collective action through financial innovation.

Intellectually, the field has evolved from fragmented early-stage studies into a more coherent body of literature with defined thematic clusters. Bibliometric mapping shows that research topics have expanded from general discussions of green finance and sustainability to more specialized areas such as green bonds, ESG

(Environmental, Social, and Governance) integration, climate risk assessment, and the role of fintech in promoting sustainable banking practices. Emerging themes—identified through keyword analysis—indicate a growing focus on topics such as carbon neutrality, renewable energy financing, and regulatory frameworks for green financial instruments.

Overall, the global research landscape on green banking has matured significantly, evolving from scattered exploratory work into a rich, diverse, and interconnected field. This development not only reflects the academic response to global environmental challenges but also underscores the crucial role of the banking sector in driving the transition toward a sustainable and inclusive green economy.

CONCLUSION

Between 2015 and 2025, green banking research experienced notable growth in terms of publication trends, author productivity, and thematic focus. Initially characterized by modest output, scholarly interest in the field began to rise steadily around 2020 and surged significantly by 2021, reflecting global attention to sustainability and climate finance. Toghzaadeh-Hesary, F. emerged as the most prolific author, with a clear lead in publication output, while citation analysis revealed key high-impact studies primarily centred around green finance, innovation, and policy evaluation—many of which were based on data from China, the leading country in publication volume. Thematic analysis showed a strong interdisciplinary orientation, with dominant contributions from Environmental Science and Economics, followed by inputs from Energy, Business, and Social Sciences. A keyword co-occurrence analysis further revealed evolving intellectual structures, highlighting emerging research trends such as alternative energy, ESG integration, and climate-related financial policies. Overall, the landscape of green banking research matured significantly over the decade, becoming more collaborative, diversified, and thematically structured, reflecting its growing importance in addressing global environmental and financial challenges.

REFERENCES

- Aydin, M., Guney, E., Yigit, B., Acikgoz, F., & Cakmak, B. Y. (2024). Regulatory pathways to green energy transition for sustainable environment: The fostering role of human rights, banking sector development, economic complexity, and economic freedom. *Journal of Environmental Management*, 366, 121739. <https://doi.org/10.1016/j.jenvman.2024.121739>
- Ermolina, M., Matveevskaya, A., & Baranuk, M. (2021). *Climate Change and the UN 2030 Agenda for Sustainable Development* (pp. 226–237). https://doi.org/10.1007/978-3-030-78690-8_20
- Kustiwi, I. A., Hwihanus, H. 2023. Sistem Informasi Akuntansi Dari Sisi Audit Internal. *JPEKBM (Jurnal Pendidikan Ekonomi, Kewirausahaan, Bisnis, dan Manajemen*, Vol 7, No 2.

-
- Lee, C.-C., & Lee, C.-C. (2022). How does green finance affect green total factor productivity? Evidence from China. *Energy Economics*, 107, 105863. <https://doi.org/10.1016/j.eneco.2022.105863>
- Muganyi, T., Yan, L., & Sun, H. (2021). Green finance, fintech and environmental protection: Evidence from China. *Environmental Science and Ecotechnology*, 7, 100107. <https://doi.org/10.1016/j.esse.2021.100107>
- Shobande, O. A., Tiwari, A. K., Ogbeifun, L., & Trabelsi, N. (2024). Demystifying circular economy and inclusive green growth for promoting energy transition and carbon neutrality in Europe. *Structural Change and Economic Dynamics*, 70, 666–681. <https://doi.org/10.1016/j.strueco.2024.05.016>
- Sulistyowati, T. (2024). Trends And Patterns In Online Purchase Decision Research: A Literature Review And Bibliometric Analysis. *Ecobisma*, 11(2), 1–11. <https://doi.org/https://doi.org/10.36987/ecobi.v11i2.4328>
- Sulistyowati, T., Nisak, S., Mujanah, S., & Halik, A. (2025). Tourist Shopping Trends_ A Bibliometric Study of Influential Literature and Leading Scholars (1957-2024). *Pancasila International Journal of Applied Social Science*, 3(1), 76–91. <https://doi.org/https://doi.org/10.59653/pancasila.v3i01.1265>
- Taghizadeh-Hesary, F., & Yoshino, N. (2019). The way to induce private participation in green finance and investment. *Finance Research Letters*, 31, 98–103. <https://doi.org/10.1016/j.frl.2019.04.016>
- Yu, C.-H., Wu, X., Zhang, D., Chen, S., & Zhao, J. (2021). Demand for green finance: Resolving financing constraints on green innovation in China. *Energy Policy*, 153, 112255. <https://doi.org/10.1016/j.enpol.2021.112255>
- Zhang, D., Mohsin, M., Rasheed, A. K., Chang, Y., & Taghizadeh-Hesary, F. (2021). Public spending and green economic growth in BRI region: Mediating role of green finance. *Energy Policy*, 153, 112256. <https://doi.org/10.1016/j.enpol.2021.112256>
- Zhang, S., Wu, Z., Wang, Y., & Hao, Y. (2021). Fostering green development with green finance: An empirical study on the environmental effect of green credit policy in China. *Journal of Environmental Management*, 296, 113159. <https://doi.org/10.1016/j.jenvman.2021.113159>