

# Mapping Green Financial Management Research Trends with a Global Bibliometric Study

Loso Judijanto<sup>1</sup>, Nanang Qosim<sup>2</sup>, Erfendi Regar<sup>3</sup>, Hasmia Melati Arifin<sup>4</sup>, Muhammad Faisal<sup>5</sup>

<sup>1</sup> IPOSS Jakarta

<sup>2</sup> Universitas Alkhairaat

<sup>3</sup> Universitas Pattimura

<sup>4</sup> Universitas Pattimura

<sup>5</sup> Universitas Pattimura

## Article Info

### Article history:

Received Jan, 2025

Revised Jan, 2025

Accepted Jan, 2025

### Keywords:

Bibliometric Analysis

Climate Change

Green Bonds

Green Finance

Sustainable Development

## ABSTRACT

This bibliometric study analyzes the dynamic landscape of green finance research from 2000 to 2023, revealing the evolution of key themes, geographic and collaboration patterns, and shifts in research focus over time. Utilizing data from Scopus and VOSviewer, the study highlights significant growth in publications, particularly post-2015, aligned with increased global attention towards sustainable development. The research maps out central themes including "green bonds," "sustainable development," and "climate finance," and identifies China as a predominant contributor, reflecting its strategic initiatives towards environmental sustainability. Collaboration networks indicate robust partnerships within and across regions, particularly Asia and Europe, emphasizing the global scope of green finance. The study discusses challenges like standardization and greenwashing and suggests future directions including the integration of technology in green finance. This comprehensive overview provides valuable insights into the trends and transformations within green finance research, highlighting its increasing importance in achieving global sustainability goals.

This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



## Corresponding Author:

Name: Loso Judijanto

Institution: IPOSS Jakarta

Email: [losojudijantobumn@gmail.com](mailto:losojudijantobumn@gmail.com)

## 1. INTRODUCTION

Green finance has increasingly been recognized as a crucial driver for sustainable development and environmental conservation efforts. The concept involves a strategic allocation of financial resources toward projects that are environmentally friendly and support long-term ecological balance [1]. The global urgency to address climate change and environmental degradation has heightened the significance

of green financial practices, which are essential for supporting renewable energy projects, conservation efforts, and innovative eco-friendly technologies.

In the past decade, the integration of environmental, social, and governance (ESG) criteria into investment decisions has gained momentum, reflecting a transformative shift in how capital markets are responding to the environmental challenges [2]. This shift is not only evident in developed economies but is

also increasingly prevalent in emerging markets, where green finance is viewed as a pathway to sustainable economic growth and resilience against environmental risks [3]. The proliferation of green bonds, sustainable asset management, and green banking practices are indicative of this trend.

Despite the growing interest and the critical role of green finance, academic research in this field has been diverse and fragmented. Studies range from examining the financial performance of green investments to their impact on environmental outcomes, with significant variations in methodologies and findings across different regions and sectors [4]. This fragmentation highlights the need for a systematic understanding of the research landscape to identify prevailing trends, gaps, and future directions.

Furthermore, the policy landscape around green finance is rapidly evolving, with governments and international bodies shaping the regulatory and incentive structures to promote green investments [5]. These changes underscore the importance of academic research in guiding policymakers and practitioners towards effective strategies for fostering a green economy. As such, analyzing the existing research through bibliometric methods offers a comprehensive overview of the knowledge base, key themes, and scholarly networks, providing valuable insights into the evolution of this vital field.

While there is a consensus on the importance of green finance for achieving sustainability goals, the body of research remains scattered, with diverse focuses and inconsistent findings. This dispersion poses challenges for academics, policymakers, and practitioners striving to understand the impacts and effectiveness of green financial practices. A fragmented research landscape makes it difficult to synthesize knowledge, draw generalizable conclusions, and identify research priorities that align with global sustainability objectives. Moreover, the rapid evolution of the green finance sector necessitates a continual update on emerging trends and shifts in focus, which are not readily apparent from the existing literature.

The objective of this study is to map the research trends in green financial management globally using a bibliometric analysis approach. This study aims to identify the most influential works, key themes, and research gaps within the green finance literature. By doing so, it seeks to provide a structured overview of how academic research has evolved in this area and suggest directions for future research that could support policymakers, investors, and financial institutions in making informed decisions that align with sustainable development goals.

## 2. LITERATURE REVIEW

### 2.1 *Evolution of Green Finance*

Green finance has emerged as a transformative approach to integrate environmental considerations into financial decision-making processes. Initially focused on environmental risk assessments in investment portfolios, the concept has expanded to encompass a wide range of financial instruments aimed at promoting sustainable development. [6] describes green finance as encompassing green bonds, green funds, and financial products that specifically allocate capital for sustainable projects. The growth of the green bond market exemplifies this trend, with the World Bank being one of the pioneers in issuing bonds that are explicitly used for climate change mitigation projects since 2008 [7].

### 2.2 *The Role of Green Bonds*

Green bonds have become a pivotal tool for raising capital for projects with environmental benefits. According to the Climate Bonds Initiative, the global green bond issuance reached new heights in recent years, reflecting robust market appetite for sustainable investment options [8]. Studies by [9] indicate that green bonds not only help in channeling funds towards sustainability projects but also tend to offer lower yields compared to conventional bonds, suggesting a 'greenium' or a premium for investors

willing to invest in green projects. This shift indicates the increasing acceptance of green bonds in mainstream investment vehicles.

### **2.3 *Impact of Green Finance on Financial Markets***

The integration of green finance into mainstream financial markets has been analyzed extensively. Research by [3] highlights that investments in green assets often result in comparable or superior returns relative to traditional investments. This counters earlier skepticism about the profitability of green investments. Moreover, empirical studies like those by [10] find that green investments do not just achieve financial returns but also contribute to risk reduction, by diversifying portfolios and mitigating the impact of environmental risks on investment portfolios.

### **2.4 *Green Finance and Corporate Sustainability***

Corporate adoption of green finance practices is closely linked to sustainability strategies that incorporate ESG criteria into their operations and reporting standards. Studies by [4] demonstrate that companies actively engaging in green finance practices tend to have higher ESG ratings, which correlate with improved financial performance and lower risk profiles. Furthermore, research by [11] suggests that ESG-focused funds consistently outperform their benchmarks, providing empirical support for the financial viability of sustainable investing.

### **2.5 *Green Banking***

In the banking sector, green banking practices have been developed as part of broader efforts to support environmental sustainability. As [12] outline, green banking involves offering loans, credits, and other banking services specifically designed to promote environmental and sustainable development. Banks are increasingly adopting green banking standards, driven by both regulatory changes and growing consumer demand for ethical

and sustainable financial services. For example, studies by [13] highlight how green banking not only aligns with global sustainability goals but also attracts new customer segments interested in ethical banking options.

### **2.6 *Challenges and Opportunities in Green Finance***

Despite the growth in green finance, several challenges remain. One major issue is the lack of standardization in what defines a 'green' project or investment, which can lead to greenwashing—where claims of environmental friendliness are misleading. Research by [14] emphasizes the need for clearer standards and verification processes to ensure that green finance genuinely contributes to environmental sustainability. Additionally, there are opportunities in enhancing the effectiveness of green finance through technological innovations like blockchain and artificial intelligence, which can improve transparency and efficiency in green finance transactions [15].

## **3. METHOD**

This study employs a bibliometric analysis to systematically map and analyze the research trends in green financial management using data exclusively sourced from the Scopus database. Scopus is chosen for its extensive coverage of peer-reviewed journals, ensuring a comprehensive capture of relevant literature in the field of green finance. The search strategy involves the use of keywords such as "green finance," "sustainable finance," and "environmental finance," targeting publications from the year 2008 to 2024. Only articles published in English were considered to maintain consistency in data analysis. To analyze the retrieved data, VOSviewer software is employed, which specializes in constructing and visualizing bibliometric networks. These networks include co-authorship, co-citation, and keyword co-occurrence networks, enabling the identification of key authors,

foundational papers, and prevalent research themes within the domain.

#### 4. RESULT AND DISCUSSION

##### 4.1 Results

##### a. Documents by Year

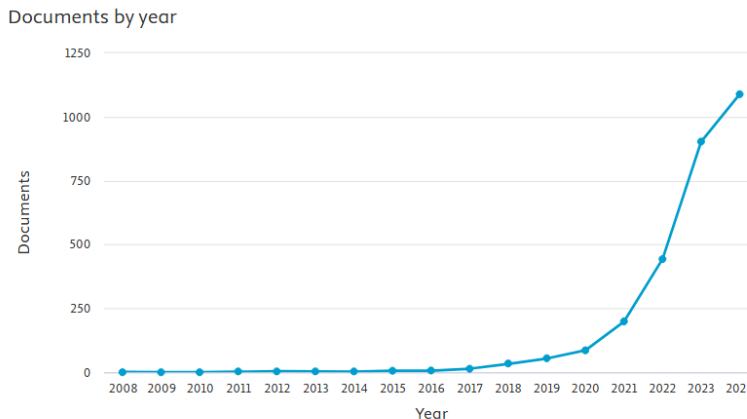


Figure 1. Documents by Year  
Source: Scopus, 2025

The graph illustrates a significant trend in the volume of documents published per year concerning a field of green finance, from 2008 to 2024. The data shows a relatively stable and minimal number of publications from 2008 until about 2015, with fewer than 250 documents per year. After 2015, there is a gradual increase in document production, which becomes notably more pronounced starting in 2020. The years 2020 through 2024 show a sharp

upward trajectory, with document counts rising dramatically each year. By 2024, the number of documents published exceeds 1200, indicating a burgeoning interest or critical developments in the field during this period. This surge could be attributed to factors such as increased global emphasis on sustainability, regulatory changes, or technological advancements driving new research and publications.

##### b. Documents by Affiliation

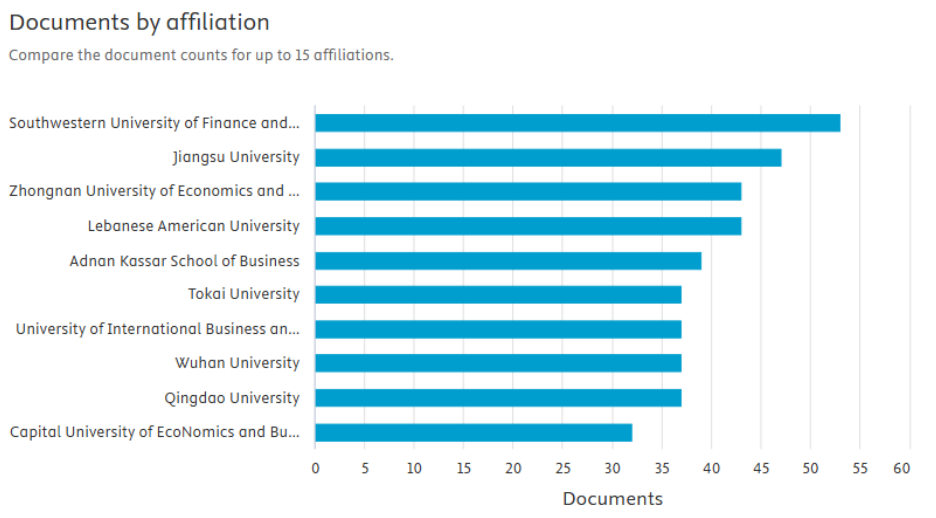


Figure 2. Documents by Affiliation  
Source: Scopus, 2025

The graph presents the number of documents published by various academic institutions, illustrating their respective contributions to a specific field of study, possibly within the domain of economics or finance, given the nature of the affiliations. Southwestern University of Finance and Economics leads with close to 60 documents, indicating a robust focus and significant research output in this area. This is followed by Jiangsu University and Zhongnan University of Economics and Law, each contributing between 40 to 50 documents. The Lebanese American

University, Adnan Kassar School of Business, and Tokai University show a moderate level of contributions, with about 30 to 40 documents each. Other institutions like the University of International Business and Economics, Wuhan University, Qingdao University, and Capital University of Economics and Business exhibit similar output, ranging from 15 to 30 documents. The distribution suggests a wide interest and varying levels of research activity in the field across these institutions, highlighting the global and diverse academic engagement with the topic.

### c. Co-Word Visualization Analysis

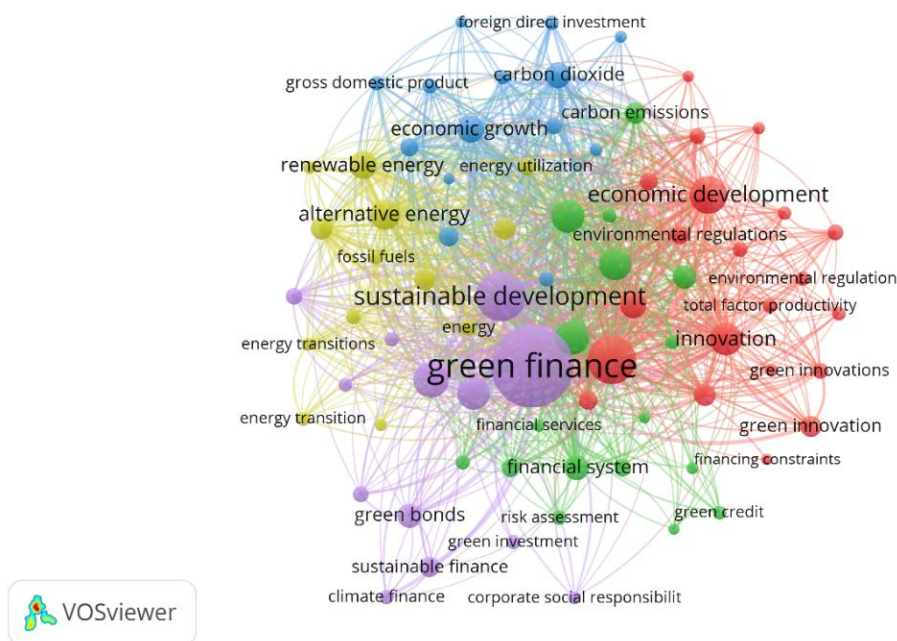


Figure 3. Network Visualization

Source: Data Analysis, 2025

This VOSviewer visualization represents a keyword co-occurrence network derived from academic literature on green finance management. The network is structured around several central themes, indicated by different colors and node sizes. The size of each node correlates with the frequency of the keyword's occurrence in the literature, while the lines between

nodes indicate the strength of the relationship, with thicker lines representing more frequent co-occurrences. The purple cluster at the center prominently features "green finance" surrounded by related concepts such as "green bonds," "sustainable finance," "climate finance," and "green investment." This cluster highlights the financial instruments and strategies that are

tailored to support environmental sustainability. The proximity of these terms suggests a strong interconnection, focusing on the financial aspects of environmental stewardship, including how investments can be directed towards renewable energy and low-carbon technologies.

Adjacent to the purple finance core, the red cluster focuses on broader economic and regulatory aspects, including "economic development," "economic growth," "environmental regulations," and "carbon emissions." This cluster reflects discussions on how economic policies and growth trajectories align with environmental goals. The presence of "carbon emissions" and "environmental regulations" indicates

a strong focus on policy-driven approaches to managing economic development in a way that accounts for carbon reduction and environmental protection. The yellow cluster includes terms like "energy transition," "renewable energy," and "alternative energy," which bridge the gap between the economic, regulatory, and practical applications of sustainability principles. This cluster suggests a significant emphasis on the transition to renewable energy sources as a key aspect of achieving broader sustainable development goals. The blue cluster consist of terms like "economic growth", "carbon dioxide", "gross domestic product", and "foreign direct investment".

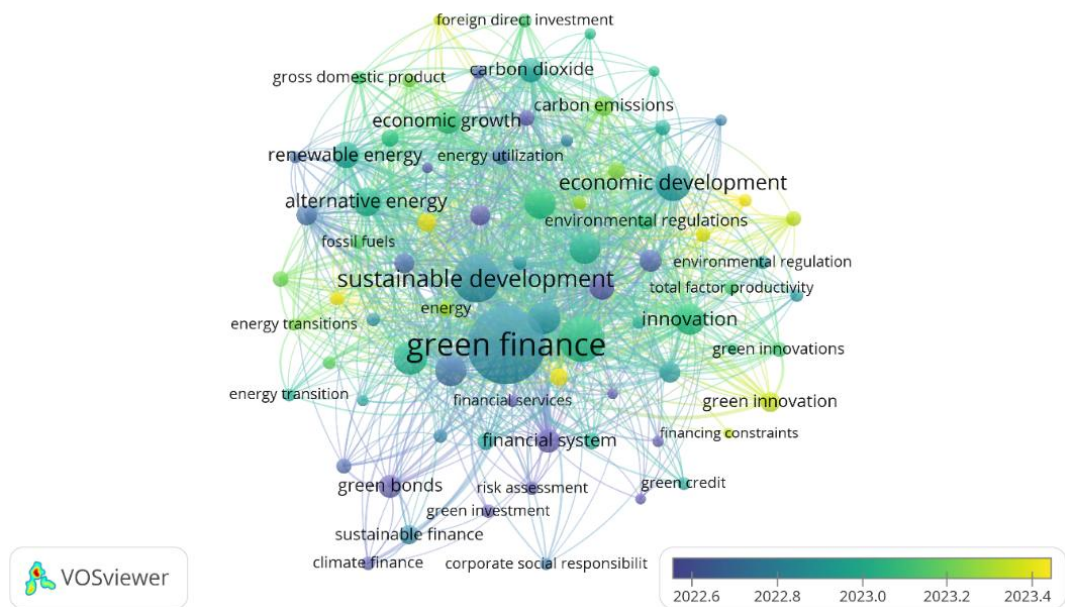


Figure 4. Overlay Visualization  
Source: Data Analysis, 2025

This VOSviewer visualization presents a keyword co-occurrence network from academic literature on green finance and emphasizing the temporal dynamics within the field from mid-2022 to early 2023. The graphical layout demonstrates the interconnected

relationships between keywords, where the proximity and link thickness illustrate the degree of association between terms. The varying sizes of nodes indicate the relative frequency of each keyword's appearance in the literature, underscoring which concepts have



been most prevalent during this specific timeframe.

The timeline, displayed at the bottom of the visualization, adds a temporal layer to the analysis, indicating shifts or focuses in research themes over the specified period. Notably, the color gradient from blue to yellow along the timeline suggests a progression or shift in focus within the field. For instance, earlier keywords may be colored in cooler tones, transitioning into warmer tones as new themes emerge or gain prominence. This could be indicative of evolving research priorities or emerging trends that have captured scholarly attention in recent months, such as increased emphasis on specific aspects of green finance like

"green bonds" and "sustainable investment."

Analyzing the clusters and their development over time can provide insights into how research in green finance is responding to global economic, environmental, and policy changes. For instance, the sustained focus on "green finance," "sustainable development," and "renewable energy" suggests a consistent academic interest aligned with global sustainability goals. Meanwhile, the emergence or increased prominence of terms related to "economic growth" and "carbon emissions" might reflect heightened scholarly attention to the economic impacts of environmental policies or innovations in green technology.

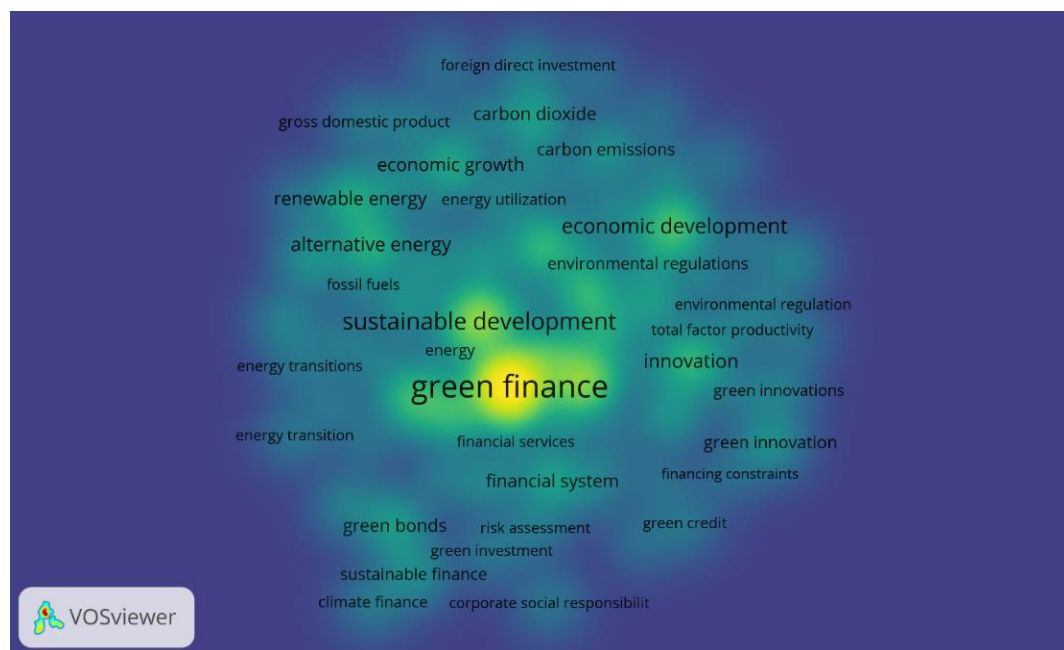


Figure 5. Density Visualization

Source: Data Analysis, 2025

This VOSviewer heatmap visualization depicts the concentration and interconnection of key research topics within the domain of green finance, as indicated by keyword density and proximity in the scholarly literature. Central to the heatmap is the term "green finance,"

which appears as the most prominent and saturated node, suggesting it is the most frequently discussed topic within the field. Surrounding it are related terms such as "sustainable development," "green bonds," "climate finance," and "sustainable finance," which also show high levels

of density. This central clustering signifies a strong thematic focus on financial strategies that support environmental sustainability goals.

The visualization also shows how green finance is connected to broader economic and environmental themes. Keywords like "economic growth," "carbon emissions," "renewable energy," and "environmental regulations" are strategically positioned around the core area, illustrating their relevance and interlinkages with green finance.

The placement of these terms indicates overlapping research areas where economic policies intersect with sustainable energy use and carbon management strategies. The gradient of colors from darker to lighter shades around these keywords indicates varying degrees of emphasis, with darker areas representing higher occurrences and thus greater focus within the academic discourse.

**d. Co-Authorship Visualization Analysis**

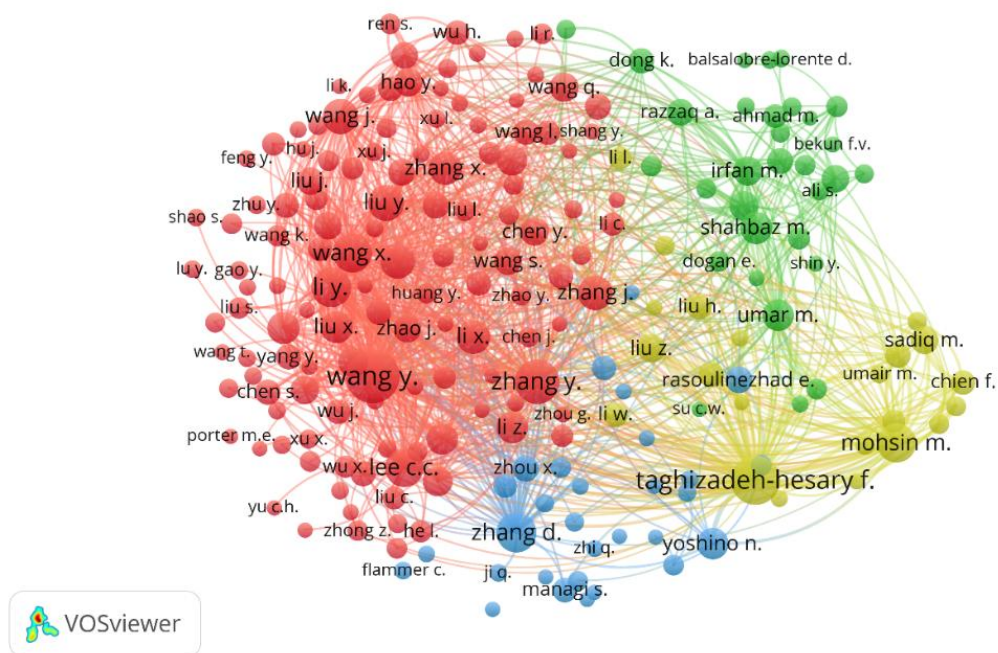


Figure 6. Author Visualization  
Source: Data Analysis, 2025

This VOSviewer visualization represents a co-authorship network among researchers in a particular academic field, likely related to green finance or a similar area, given the clustering and connections. The graph uses node size and color to denote the volume of publications and collaborations: larger and more intensely colored nodes indicate authors with a higher number of publications and more frequent collaborations. The red

cluster predominantly consists of researchers with Chinese names, suggesting a strong research community in China focused on this field. The green cluster, smaller and less dense, includes authors with a variety of non-Chinese names, indicating international contributors who are also significantly involved but perhaps with a wider geographical distribution or from different academic institutions.



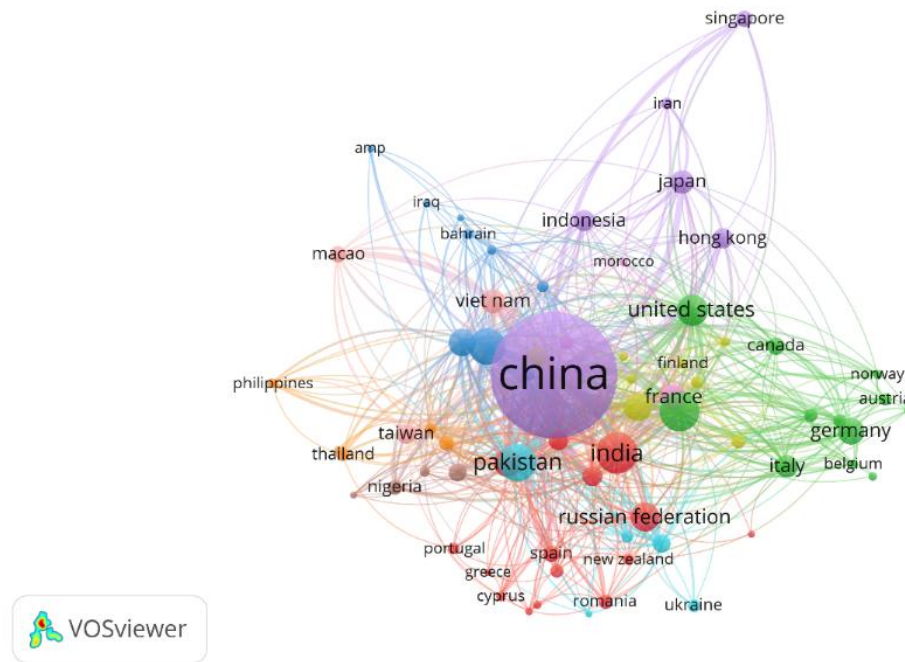


Figure 7. Country Visualization  
Source: Data Analysis, 2025

This VOSviewer visualization represents a country collaboration network in a specific academic field, possibly related to global research dynamics. The node sizes indicate the volume of research output or participation by each country, with China prominently positioned as the largest node, suggesting it has the highest level of research activity or the most significant number of publications in this field. The various colors represent different clusters or

regional groupings, illustrating how countries are interconnected in their research collaborations. For instance, the close connections between China, India, and Pakistan, highlighted by the intensity of lines and their proximity, suggest strong collaborative ties within Asia. Similarly, European countries such as Germany, France, and Italy form another cluster, indicating a high degree of collaboration within Europe.

**e. Citation Analysis**

Table 1. Most Cited Article

Citations	Author and Year	Title
1663	[16]	Does It Pay to Be Green? A Systematic Overview
925	[17]	Does it Really Pay to Be Green? Determinants and Consequences of Proactive Environmental Strategies
804	[18]	An Empirical Study of Environmental Awareness and Practices in SMEs
574	[19]	Green management and financial performance: a literature review
537	[20]	Green Human Resource Management: Policies and practices
534	[21]	Does Environmental Management Improve Financial Performance? A Meta-Analytical Review
503	[22]	Greening Project Management Practices for Sustainable Construction

Citations	Author and Year	Title
452	[23]	Climate capitalism: global warming and the transformation of the global economy
450	[24]	An Empirical Study of The Implementation of Green Supply Chain Management Practices in The Lectrical and Electronic Industry and Their Relation to Organizational Performances
403	[25]	Energy Management Handbook

Source: Output Publish or Perish, 2024

## 4.2 Discussion

### a. Global Research Trends in Green Finance

The bibliometric analysis conducted in this study provides a comprehensive overview of the research landscape in green finance. As evidenced by the significant increase in publications from 2015 onwards, it is apparent that green finance has gained substantial traction among researchers, policymakers, and practitioners alike. This surge correlates with global economic trends and increasing awareness of sustainable practices, aligning with the Paris Agreement's implementation phase aimed at combating climate change through financial channels. The geographical distribution of research output, with China at the forefront, highlights the country's commitment to green finance as part of its broader strategy to achieve environmental sustainability and economic growth.

### b. Key Themes and Evolution of Research

The keyword analysis revealed core themes such as "green bonds," "sustainable development," and "climate finance," which have become central to discussions in green finance. The proximity of terms like "economic growth" and "carbon emissions" to "green finance" in the keyword co-occurrence network underscores the dual focus on environmental and economic outcomes. This reflects a growing scholarly consensus that sustainable finance is not only a pathway to

environmental preservation but also a mechanism for ensuring economic resilience and growth. The thematic evolution illustrated by the heatmap highlights the dynamic nature of the field, with newer terms like "green innovation" and "corporate social responsibility" gaining prominence. This shift suggests that the scope of green finance research is expanding beyond traditional financing models to include innovative financial products and strategies that integrate corporate social responsibility (CSR) into their core operations.

### c. Collaboration Patterns and Intellectual Contributions

The co-authorship networks provide insights into the collaborative dynamics within the green finance research community. The predominance of Chinese scholars and institutions indicates a concentrated effort within China to lead research in this area, likely driven by the country's significant environmental challenges and its global leadership aspirations in renewable energy technologies. However, the international collaboration patterns depicted in the network maps show that green finance is a globally relevant issue, with active contributions from countries like the United States, India, and members of the European Union. The different clusters observed in the country collaboration network map, with dense connections within Asia and Europe, suggest regional hubs of expertise and collaborative research efforts. These hubs likely reflect

regional policy priorities and funding streams that support green finance research. Moreover, the bridging of these clusters by countries like China and the United States points to a significant exchange of knowledge and collaborative potential that spans continents.

#### d. Challenges in Green Finance Research

Despite the robust growth and enthusiasm in green finance research, several challenges persist. The field suffers from definitional ambiguities and inconsistencies, as evidenced by the diverse use of terms and their interpretations across different studies. This can lead to challenges in synthesizing research findings and applying them to policy and practice. Additionally, the risk of greenwashing, where the environmental benefits of financial products are overstated, remains a critical concern that research must continue to address to maintain credibility and effectiveness. The lack of standardized metrics for assessing the environmental impact of green finance initiatives is another significant challenge. This complicates efforts to measure and compare the efficacy of different financial instruments and strategies across geographic and economic contexts. Developing comprehensive and universally accepted metrics would aid in more accurately assessing the contributions of green finance to sustainable development goals.

#### 4.3 Future Directions

Looking forward, the research agenda in green finance should aim to resolve the challenges of standardization and measurement. More empirical studies are needed to establish clear

correlations between green finance practices and environmental outcomes. Additionally, longitudinal studies could provide deeper insights into the long-term impacts of green finance on sustainable development. The growing intersection of technology and finance presents new opportunities for research, especially in the areas of fintech and blockchain, which could revolutionize how green finance is practiced and scaled globally. Investigating these technological innovations and their potential to enhance transparency, efficiency, and inclusivity in green finance would be a fruitful area for future research.

## 5. CONCLUSION

This bibliometric study on green finance has effectively mapped the evolution, major themes, and collaboration patterns within the field, demonstrating a significant increase in research output, particularly from 2015 onwards. Central to the discourse in green finance are themes such as sustainable development, green bonds, and climate finance, which reflect the field's alignment with global sustainability goals. The analysis revealed a strong geographic focus with China leading in research output, alongside significant international collaborations that span continents and encapsulate a diverse range of economies and academic institutions. These findings underscore the global relevance and interdisciplinary nature of green finance research. Looking ahead, addressing challenges such as standardization and the risks of greenwashing, and leveraging emerging technologies like fintech and blockchain, are imperative for advancing the field. This study not only highlights the current state of green finance research but also points to future directions that can potentially enhance the efficacy and scope of green financial practices globally.

## REFERENCES

- [1] S. Beck and M. Mahony, "The IPCC and the new map of science and politics," *Wiley Interdiscip. Rev. Clim. Chang.*, vol. 9, no. 6, p. e547, 2018.
- [2] V. Galaz, B. Crona, A. Dauriach, B. Scholtens, and W. Steffen, "Finance and the Earth system—Exploring the links between financial actors and non-linear changes in the climate system," *Glob. Environ. Chang.*, vol. 53, pp. 296–302, 2018.
- [3] H. Lee, C. Tang, S. A. Yang, and Y. Zhang, "Dynamic trade finance in the presence of information frictions and fintech," *Manuf. Serv. Oper. Manag.*, vol. 25, no. 6, pp. 2038–2055, 2023.
- [4] R. Clark, J. Reed, and T. Sunderland, "Bridging funding gaps for climate and sustainable development: Pitfalls, progress and potential of private finance," *Land use policy*, vol. 71, pp. 335–346, 2018.
- [5] A. Atkinson and F.-A. Messy, "Promoting financial inclusion through financial education: OECD/INFE evidence, policies and practice," 2013.
- [6] B. Scholtens, "Why finance should care about ecology," *Trends Ecol. Evol.*, vol. 32, no. 7, pp. 500–505, 2017.
- [7] C. Flammer, "Corporate green bonds," *J. financ. econ.*, vol. 142, no. 2, pp. 499–516, 2021.
- [8] S. Fatica, R. Panzica, and M. Rancan, "The pricing of green bonds: are financial institutions special?," *J. Financ. Stab.*, vol. 54, p. 100873, 2021.
- [9] T. E. Baker, A. S. Epiney, C. Rabiti, and E. Shittu, "Optimal sizing of flexible nuclear hybrid energy system components considering wind volatility," *Appl. Energy*, vol. 212, pp. 498–508, 2018.
- [10] A. Kempf and P. Osthoff, "The effect of socially responsible investing on portfolio performance," *Eur. Financ. Manag.*, vol. 13, no. 5, pp. 908–922, 2007.
- [11] S. Rathner, "The relative performance of socially responsible investment funds: New evidence from Austria," Working Papers in Economics and Finance, 2013.
- [12] S. Dikau and U. Volz, "Central bank mandates, sustainability objectives and the promotion of green finance," *Ecol. Econ.*, vol. 184, p. 107022, 2021.
- [13] O. Weber and G. Saunders-Hogberg, "Corporate social responsibility, water management, and financial performance in the food and beverage industry," *Corp. Soc. Responsib. Environ. Manag.*, vol. 27, no. 4, pp. 1937–1946, 2020.
- [14] G. Maxwell, K. A. Lyon, L. S. Bhenderu, G. Schuchart, and R. Desai, "Sacral dysmorphism increases the risk of superior gluteal artery injury in percutaneous sacroiliac joint fusion: case report and literature review," *Cureus*, vol. 13, no. 11, 2021.
- [15] W. Huang, "What is the impact of tourism infrastructure development on the international tourism inflow in Thailand during 2008 to 2019?," 2020.
- [16] S. Ambec and P. Lanoie, "Does it pay to be green? A systematic overview," *Acad. Manag. Perspect.*, pp. 45–62, 2008.
- [17] P. M. Clarkson, Y. Li, G. D. Richardson, and F. P. Vasvari, "Does it really pay to be green? Determinants and consequences of proactive environmental strategies," *J. Account. public policy*, vol. 30, no. 2, pp. 122–144, 2011.
- [18] D. L. Gadenne, J. Kennedy, and C. McKeiver, "An empirical study of environmental awareness and practices in SMEs," *J. Bus. Ethics*, vol. 84, pp. 45–63, 2009.
- [19] J. F. Molina-Azorín, E. Claver-Cortés, M. D. López-Gamero, and J. J. Tari, "Green management and financial performance: a literature review," *Manag. Decis.*, vol. 47, no. 7, pp. 1080–1100, 2009.
- [20] S. Ahmad, "Green human resource management: Policies and practices," *Cogent Bus. Manag.*, vol. 2, no. 1, p. 1030817, 2015.
- [21] E. Albertini, "Does environmental management improve financial performance? A meta-analytical review," *Organ. Environ.*, vol. 26, no. 4, pp. 431–457, 2013.
- [22] L. B. Robichaud and V. S. Anantatmula, "Greening project management practices for sustainable construction," *J. Manag. Eng.*, vol. 27, no. 1, pp. 48–57, 2011.
- [23] P. Newell and M. Paterson, *Climate capitalism: global warming and the transformation of the global economy*. Cambridge University Press, 2010.
- [24] M. K. Chien and L.-H. Shih, "An empirical study of the implementation of green supply chain management practices in the lectrical and electronic industry and their relation to organizational performances," 2007.
- [25] S. Doty and W. C. Turner, *Energy management handbook*. Crc Press, 2004.