Green Finance Research and Institutional Gap in Indonesia

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Abstract

This study aims to analyze in depth the breadth and depth of green finance research in Indonesia, as an effort to strengthen references for policy formulation and green finance execution. The research method is a bibliometric study using VOSviewer to visualize the data analysis results. Data collection considers research techniques, research objects, keywords, and outputs. The data source is obtained from Garuda, the official journal website of the Ministry of Research, Technology, and Higher Education (Kemenristekdikti). The results show that from the keyword search "green finance," 431 data entries were found out of a database of more than 15,000,000 articles in Garuda. An in-depth study of this research sample indicates that the majority of research in Indonesia focuses on the application of green finance in corporations and the design of green finance as investment instruments. The analysis results demonstrate that there is still a massive opportunity to deepen green finance research in Indonesia as an effort to design implementation regulations for green finance distribution in the micro-sector, given that these businesses dominate labor absorption in Indonesia and contribute to 60% of the country's GDP.

Studi ini bertujuan untuk menganalisa secara mendalam keluasan dan kedalaman riset tentang green finance di Indonesia, sebagai upaya penguatan rujukan perumusan kebijakan dan eksekusi green finance. Metode penelitian ialah studi bibliography menggunakan Vosviewer dalam memvisualisasikan hasil analisis data. Pengumpulan data mempertimbangkan teknik riset, objek riset, keywords, dan output. Sumber data berasal dari website jurnal resmi kemenristekdikti yaitu Garuda. Hasil menunjukkan dari pencarian keyword green finance, ditemukan 431 data dari lebih dari 15.000.000 lebih database artikel di Garuda. Studi mendalam dari sampel riset ini menunjukkan mayoritas riset di Indonesia berfokus pada penerapan green finance pada korporasi dan rancangan instrumen green finance sebagai alat investasi. Hasil analisis menunjukkan masih ada peluang besar dalam mendalami riset green finance di Indonesia sebagai upaya merancang aturan implementasi distribusi green finance pada sektor mikro selaku bisnis yang mendominasi keterserapan tenaga kerja di Indonesia serta berkontribusi pada 60% PDB negara.

Keywords: Green finance, Green Economy, MSMEs, Bibliography study, Indonesia.

INTRODUCTION

Global attention is growing on environmental issues and efforts to achieve sustainability goals. This has given rise to the emergence of green finance, a funding or investment scheme for programs or businesses that prioritize environmental sustainability (Akomea-Frimpong et al., 2022; Desalegn & Tangl, 2022; Priya et al.,

2025). This action is also a response to the Paris Agreement and the United Nations Sustainable Development Goals in 2015 (J. K. Debrah, 2021).

The primary objective of green finance is to boost investment in sustainable development initiatives while simultaneously reducing social and environmental risks (Ali et al., 2024). The green finance program explicitly encourages financial service providers to stimulate activities related to environmental protection, energy conservation, clean energy, green transportation, and green construction. This incentive is provided through the distribution of funds or operational capital for activities, as well as strict risk management oversight (Zhang et al., 2024).

The green finance scheme is considered more ethical because green financing imposes low capital costs because the company receiving the funds has provided direct benefits to the environment and society (Rohma, 2023). Green finance is also believed to be able to encourage industries in the real sector to engage in business practices that are in line with sustainable development goals (*sustainability*) (Fu et al., 2023; Zhang et al., 2024). For example, companies can align their business plans with long-term environmental and social goals, directing investments to projects that address climate change, improve energy efficiency, and support sustainable resource management (Priya et al., 2025), which can ultimately realize environmentally friendly sustainable economic growth (Fu et al., 2023).

As an important financial instrument in the future (C. Debrah et al., 2023), developing countries like Indonesia need to grasp this global trend. Besides encouraging the implementation of programs or businesses that are harmless and broadly beneficial for the Indonesian people and the planet, the government's focus on providing green businesses can increase foreign investment in the form of green finance. As stated by (Desalegn & Tangl, 2022), the mobilization of green financing and capital contributions must consider the experience and readiness of each country, as well as the focus on sustainability impacts that can be emphasized in that country. Therefore, the government needs to provide an ecosystem that supports the flow of green funding to Indonesia through supportive regulations and policies, as well as the readiness of Indonesian businesses to receive the funds. This effort needs to be designed immediately as a crucial part of creating a green ecosystem.

To mature policy formulation, research is needed as a foundation for policy formulation. Thus, this paper is designed to analyze in depth the breadth and depth of research on green finance in Indonesia, as an effort to strengthen references for policy formulation and implementation of green finance.

RESEARCH METHODOLOGY

The research method is a bibliographic study using Vosviewer to visualize the results of the data analysis. The data source comes from the official journal website of the Ministry of Research, Technology, and Higher Education, Garuda (Garba Rujukan Digital), which contains articles published in Indonesian journals. This is because the research focuses on the readiness of the Indonesian ecosystem to capture green funding opportunities through the adequacy of supporting research.

The data was a census of articles on websites using the keyword "green finance." The collection technique used a Digital Object Identifier (DOI) for each article, allowing for data interpretation based on the title, abstract, and keywords of each research article.

The results show that a search for the keyword "green finance" on June 15, 2026, yielded 431 entries from over 15 million articles in the Garuda database. Technically, the stages of the data filtering process are presented in the following table.

Table 1. Filtering the Articles

No	Steps	N
1	Keywording on Garuda Website (Green finance)	341
2	Tabulating the available DOI	311
3	Filtering the redundant data	284
4	Checking active DOI	197
	Data used	**197**

RESULTS AND DISCUSSION

After retrieving the data from the Garuda website, the analysis was conducted on 4,719 words using VOSviewer. Applying a minimum threshold of 10 occurrences yielded 147 items. Subsequently, data visualization focused on the top 60% most relevant terms, resulting in the 88 most frequently occurring keywords.

Table 2. Filtering the Keywords

No.	Steps	N (words)
1	Total Words	4.719
2	Occurrence 10x	147
3	Kata diolah (60%)	88

Once the relevant and frequent keywords were extracted from the 197 analyzed articles, the system processed and visualized the data in the figure below.

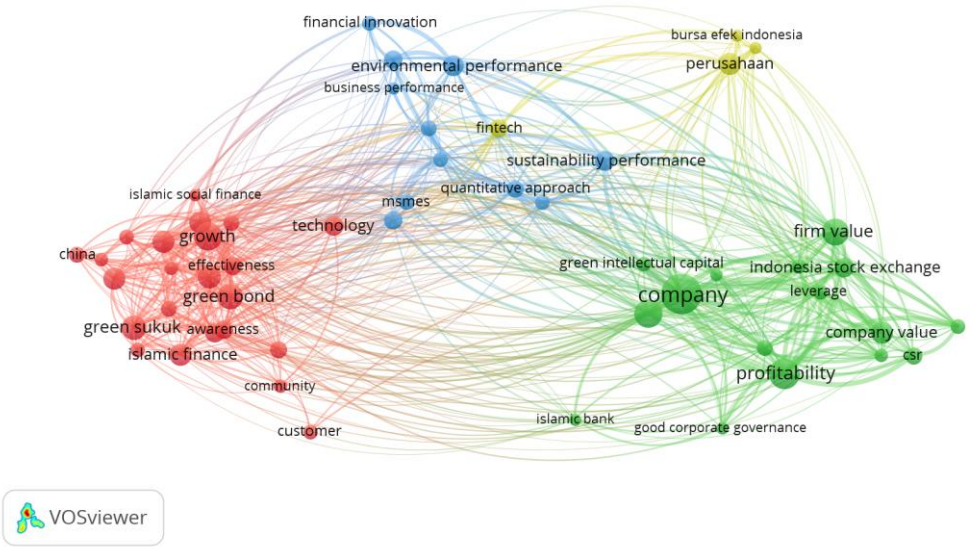


Figure 1. Network Visualization Research regarding Green Finance in Indonesia

Based on the figure, it can be seen that studies on green finance can be grouped into 4 clusters with details: Cluster 1 has 23 items, Cluster 2 has 16 items, Cluster 3 has 11 items, and Cluster 4 has 4 items.

The network visualization shows frequently discussed topics in green finance research. For example, in Cluster 1 (highlighted in red color), research focuses on green sharia investment instruments such as green sukuk. Several studies focus on the development of green investment instruments or green banking products, such as green securities, green investments,

climate finance, carbon finance, green insurance, green credit, and green infrastructure bonds (Akomea-Frimpong et al., 2022).

Other research grouped in cluster 2 (highlighted in yellow color) focuses on the application of green finance in corporations, particularly those listed on the stock exchange. The aspects frequently observed in the use of green finance in corporations include its impact on company profits, corporate value or firm value, and corporate governance readiness, as measured by good corporate governance, CSR implementation, and the availability of green intellectual capital. As stated by (Hu & Gan, 2025) that the lack of capacity and expertise in conducting comprehensive environmental risk assessments can hinder the analysis and management of environmental risks effectively.

The third cluster (highlighted in blue) focuses on the application of green finance in the MSME sector. Research examines the role of green finance in sustainability performance, environmental performance, and business performance. Business studies also involve the use of technology and innovation to enable MSMEs to keep pace with the pace of business transformation in today's digital era.

However, based on an in-depth evaluation, several keywords/items shared similar meanings but were located in different clusters. For example, the term "Indonesia stock exchange" has the same meaning as "Indonesian stock exchange," and the term "perusahaan" has the same meaning as "company." This is due to linguistic differences that the system cannot interpret, thus treating them as two distinct entities. Therefore, keywords grouped in cluster four could not be analyzed in more depth.

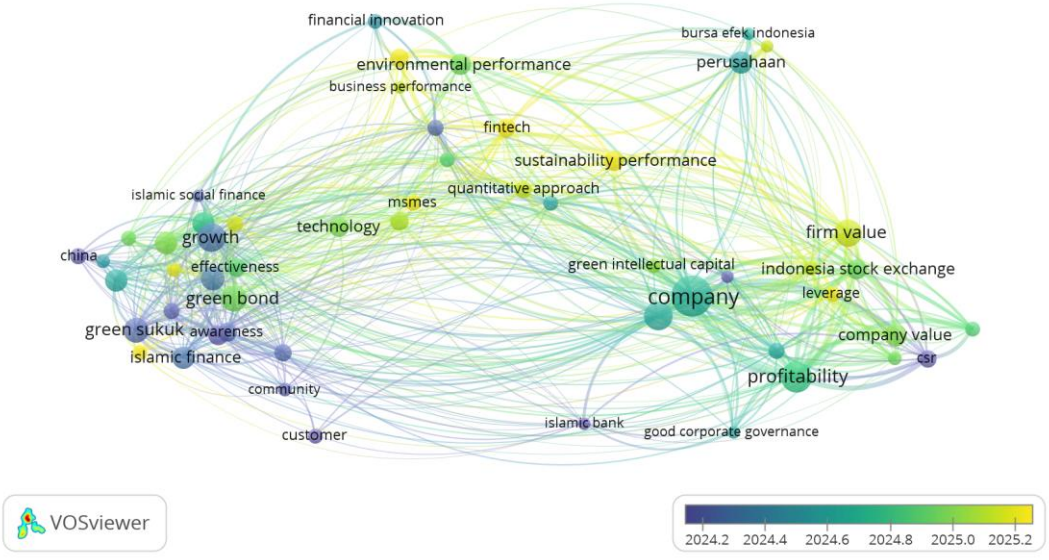


Figure 2. Overlay Visualization Research regarding Green Finance in Indonesia

Based on the overlay visualization presented in Figure 2, the data shows that research in Indonesia on green finance is relatively new. Of all the articles on the Garuda website, the first research on green finance appeared in 2024.

Previously, in 2024, many researchers in Indonesia conducted studies on green

finance, linking it to green financial instruments as investment products that could attract investors. Then, in the following era, the research focus shifted to evaluating the use of green finance in corporations and its impact on company profits. Meanwhile, in 2025 and 2026 (yellow highlight), research remained focused on these two topics, and began to touch on the use of green finance in the microbusiness sector and the use of technology. Medium-sized, slightly smaller yellow circles indicate a paucity of research on these topics compared to previously studied topics.

Recent research on green finance has begun to explore the use of fintech and its implementation in MSMEs. The utilization of technology and digitalization to strengthen green finance has the potential to become a key research topic in the future. Furthermore, the application of blockchain, artificial intelligence, and other emerging technologies can facilitate the documentation of green financial transactions, thereby enabling green performance reporting in accordance with the guidelines and indicators of the Sustainable Development Goals (SDGs). (Portugal-Nunes, 2022).

The use of financial technology also enables technological innovations that transform and revolutionize traditional financial services. Fintech can have a significant impact on how green finance is conducted, accessed, and scaled, offering new solutions to address existing barriers and challenges (Portugal-Nunes, 2022).

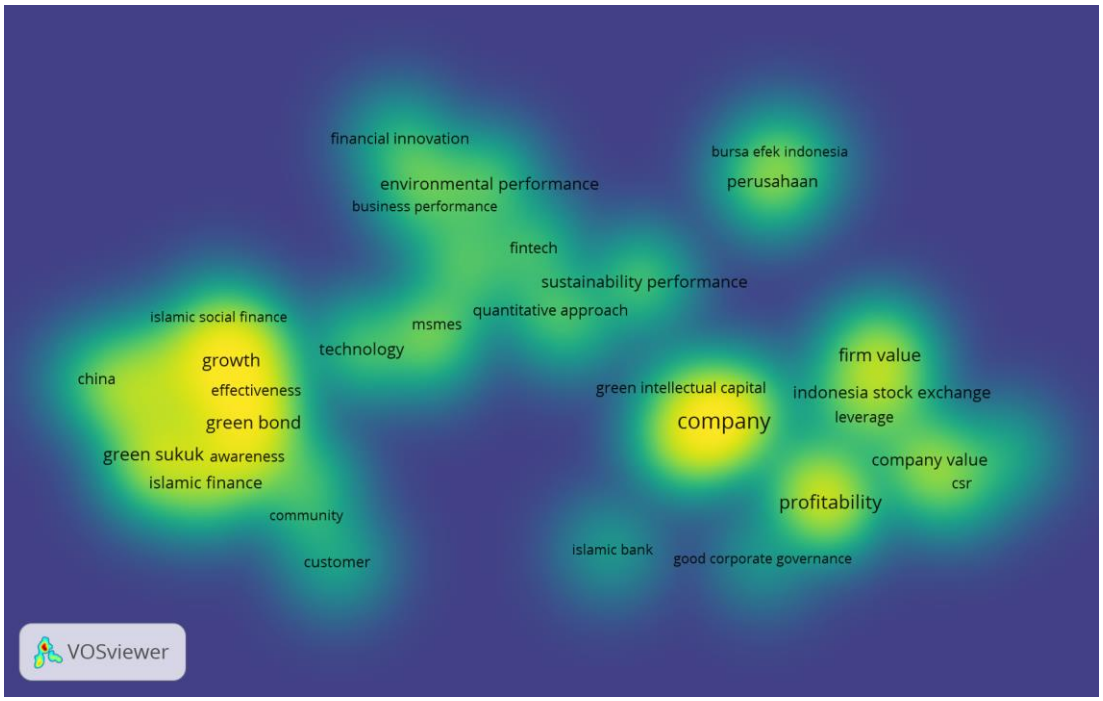


Figure 3. Density Visualization Research regarding Green Finance in Indonesia

The density visualization results presented on Figure 3 indicate that the majority of green finance researchers in Indonesia focus on corporate applications and the formulation of green investment instruments, such as green sukuk and green bonds. Conversely, studies exploring the integration of green finance within Islamic banking and MSMEs remain substantially limited.

Green finance for MSMEs in other terms is a green loan, which serve as a core component of broader green banking products alongside green securities,

investments, climate financing, carbon finance, insurance, credit, and infrastructure bonds (Akomea-Frimpong et al., 2022). To standardize these practices, the Green Loan Principles (GLP) were established in 2018, explicitly outlining frameworks for allocating funds to environmentally friendly projects. This builds on a longer historical trajectory; for instance, US banks had already begun implementing specialized loans to support green entrepreneurial ventures as early as 2005 (Ali et al., 2024).

The detailed insights from the bibliographic data visualization corroborate the assertion that extensive research has been dedicated to developing viable green financing frameworks designed to incentivize investors and asset owners to fund sustainability-related initiatives (Ali et al., 2024; Fu et al., 2023; Priya et al., 2025; Rohma, 2023; Yucel et al., 2023). Therefore, previous studies have predominantly focused on integrating Environmental, Social, and Governance (ESG) criteria into investment decision-making, strengthening investment protection through risk mitigation, formulating policies as legal safeguards, and establishing comprehensive data monitoring strategies for green financing outcomes to ensure accountability to investors. These measures also collectively promote sustainable investment, which can further drive green financing initiatives (Fu et al., 2023). Moreover, green finance has the potential to foster sustainable economic development (Fu et al., 2023).

Nevertheless, research examining the implementation of green financing among entrepreneurs remains scarce (Idris & Yunanto, 2025; Luo et al., 2024). As illustrated by the data visualization in Figure 3, studies integrating green finance with MSMEs are still highly limited.

This research gap aligns with real-world challenges observed globally and locally. In Luxembourg, for instance, small enterprises and green businesses struggle to secure funding because major banks prefer financing more profitable large corporations capable of providing accountable sustainability reports (Dörry & Schulz, 2018). A similar disparity is evident in Indonesia; while total green credit reached 1,452 trillion IDR in 2024 (Virasma, 2025), green financing received by MSMEs only accounted for 29.3 trillion IDR by 2025 (Departmen Komunikasi Bank Indonesia, 2025).

The disparity between the market dominance of MSMEs and the financial sector's reluctance to allocate green finance to them can be attributed to several critical considerations. These include concerns over investment returns, weak regulatory frameworks (Priya et al., 2025), and a shortage of analytical techniques and experts capable of assessing green project risks (Desalegn & Tangl, 2022). In addition, the micro-industry sector is generally still weak in providing accountable sustainability reports (Dörry & Schulz, 2018), as well as institutional concerns over higher rates of return and credit risk (Priya et al., 2025). Consequently, investors and funders face significant challenges in obtaining high-quality data to evaluate environmental performance. This data scarcity ultimately hinders the ability of financial institutions to manage environmental risks effectively (Hu & Gan, 2025).

Conversely, MSMEs serve as a major economic backbone in numerous countries, such as Indonesia (Muñoz-Céspedes et al., 2024; Parthiban et al., 2024; Truong, 2018). Illustrating this, in 2021, Indonesia’s 65.46 million MSMEs generated 60.3% of the nation's GDP and accounted for 97% of employment (Noerhidajati et al., 2025). Furthermore, in addition to being inherently more ethical, green financing typically offers a lower cost of capital due to its direct

positive impacts on society and the ecosystem (Rohma, 2023). Therefore, green finance represents a cost-effective and appropriate funding alternative for micro-level industries.

Operating as green business entities gives MSMEs a substantial advantage in accessing green bank financing. Nevertheless, the current landscape is constrained by a lack of banking regulations requiring the disclosure of green lending activities (Hu & Gan, 2025). On the other hand, precise reporting regarding the field-level deployment of green finance remains crucial for both environmental impact evaluation and effective risk assessment.

The definition of green finance encompasses innovative green investment strategies and the leverage of existing conditions to create new markets for climate and environmental financing. Whether through the concept of bricolage or by integrating alternative financing for small-scale, environmentally friendly, and socially inclusive local and regional businesses, this approach has the potential to foster a more equitable distribution of wealth and resources among diverse social groups. Ultimately, it enhances access to vital resources, including education, the labor market, and healthy working environments (Dörry & Schulz, 2018).

CONCLUSION

This study demonstrates that green finance support for green micro and small-scale industries remains low. This limited distribution of green finance toward MSMEs is because of the constrain of business actors to fulfilling green finance reporting requirements, which subsequently increases perceived credit risks. Nonetheless, green finance basically offers MSMEs a lower cost of capital by shifting the business process to environmental impacts. The core challenge, however, lies in the mandate for standardized sustainability reporting, which remains highly difficult for these small-scale enterprises to achieve limited capacity and the lack of a firm regulatory framework to support such initiatives.

Ultimately, the findings of this study offer several novel contributions from a distinct perspective by enhancing green financing feasibility for micro and small-scale entrepreneurs (microentrepreneurs).

This phenomena gap, coupled with the identified research gap demonstrating a scarcity of studies on green finance within the micro-business sector, serves as a strong motivation to expand the breadth and depth of research on this topic in Indonesia. Consequently, the country can build a robust ecosystem in terms of infrastructure, policy, and real-sector readiness to manage green funds effectively.

RECOMMENDATION

Based on the findings and limitations of this study, several recommendations are proposed for relevant stakeholders. The primary recommendation stems from data constraints; specifically, out of 284 retrieved data points, only 197 had active DOIs (69%). This finding underscores the need for journal managers to guarantee that essential features, particularly active and properly linked DOIs, are fully functional for each article.

Subsequent recommendations are formulated based on the findings of this study. Green investment opportunities in developing countries like Indonesia must be seized and addressed through policy formulation to create a supportive and effective green ecosystem. Therefore, policymakers should provide incentives to support relevant research that serves as a foundation for policy making. Additionally, scholars focusing on corporate social responsibility, MSMEs, and banking should further explore viable green finance

concepts tailored to micro-enterprises. These studies will serve as crucial benchmarks for financial institutions in their decision-making and contribute to the establishment of a resilient green ecosystem framework nationwide.

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