

Green Finance in Banking Industry: A Systematic Literature Review Using Bibliometric Analysis

Dimas Bagus Wiranatakusuma¹, Indah Khoerunnisa², Nur Arissa Balqis Binti Norazmi³, Nur Afiqah Aqilah Binti Abdul Malek⁴, Anggi Aprizal⁵

dimas_kusuma@umy.ac.id¹, indahkhoerunnisa424@gmail.com², arissabalqis0108@gmail.com³, afyqaqyla@gmail.com⁴, anggi.aprizal.psc23@mail.umy.ac.id⁵

Faculty of Economics and Business, Universitas Muhammadiyah Yogyakarta¹, Undergraduate Program, Universitas Muhammadiyah Yogyakarta², Undergraduate Program, Universiti Sultan Azlan Shah, Malaysia³, Undergraduate Program, Universiti Sultan Azlan Shah, Malaysia⁴, Postgraduate Program, Universitas Muhammadiyah Yogyakarta⁵

Corresponding author: Dimas Bagus Wiranatakusuma

Abstract. The objective of this investigation is to examine the bibliometric attributes associated with green banking by utilizing data from the Scopus database spanning the period from 2013 to 2024. Additionally, this paper presents recommendations for prospective avenues of study and advancement in this issue. By employing VOSviewer software, 56 articles underwent bibliometric scrutiny and facilitated the visualization of patterns, such as using keyword co-occurrence. The findings revealed a conspicuous constraint in the exploration of green banking, which remains underexplored. Addressing this shortfall could be achieved by establishing a dedicated journal explicitly focused on green banking. Furthermore, several subjects are delineated based on discerned trends in keywords, offering potential directions for further investigation, particularly related to banks' sustainability. Moreover, this inquiry underscores the existing literature concerning green banking, particularly within the Indonesian context.

Keywords: Bibliometric Analysis, Green Banking, Scopus, VOSviewer

1. Introduction

Green banking is a sustainable approach to banking that incorporates environmental factors into all aspects of operations, including internal resource and energy management, lending, and investment choices [1],[2],[3]. It aims to encourage environmentally conscious practices and promote sustainable development. Green banking products include green bonds and eco-friendly credit cards and support projects focused on energy efficiency, renewable energy, and sustainable agriculture [4],[5]. Financial institutions aim to combat climate change, facilitate a low-carbon economy, and encourage responsible consumption. This strategy reduces environmental hazards, creates new economic opportunities, and enhances banks' standing with investors and environmentally conscious customers [6],[7].

Green banking is becoming a significant part of the financial industry, promoting innovation and a more sustainable future [8],[9],[10]. The methodology employed for bibliometric analysis in this study mirrors approaches previously utilized in research on diverse subjects, akin to investigations conducted before [11],[12],[13]. This study endeavors to scrutinize documents associated with green banking utilizing bibliometric methodologies reliant on the Scopus database. The outcomes derived aim to serve as a roadmap for the exploration and advancement of discussions within this domain. To steer this investigation towards its intended goals, the research inquiry focuses on delineating the attributes of publications concerning green banking and elucidating prevailing trends in financial research pertaining to green banking. Previous endeavors in this realm restricted their analysis to academic papers. As such, this research aims to fill a gap in green banking research by analyzing appraisals and articles related to green banking. It aims to expand the keywords used in the data search and provide a more comprehensive array of relevant documents. The study found that a considerable proportion of green banking articles in the Scopus database were authored by Indonesians or focused on stock exchange stability in Malaysia, Bangladesh, and the US. This research, therefore, aims to provide additional guidance to scholars studying green banking in these regions.

The absence of a specialized academic journal dedicated to green banking suggests a need for a more concentrated and systematic approach to research dissemination and discussion in this field. A need exists for more comprehensive research efforts to investigate the factors that contribute to stable and efficient green banking, as the current literature is sparse. The potential for expanding knowledge on ensuring robust green banking within the Indonesian context by holistically analyzing financial sustainability, assets, community outcomes, risks, and investor perspectives. These gaps highlight the need for further research to deepen the understanding of green banking, particularly within the Indonesian market. The analysis underscores the need for more research on green banking by revealing a significant publication gap in this area. Despite the importance of green banking for global financial markets, the bibliometric analysis using the Scopus database from 2013 to 2024 uncovered that studies specifically focused on this topic are still limited compared to those on broader financial stability issues. The lack of a specialized academic journal dedicated to green banking further highlights this gap, suggesting that the field could benefit from a more concentrated and systematic approach to research dissemination and discussion. The analysis also points out that while the number of articles on green banking has increased over time, it remains sparse, indicating that focused research efforts are still needed to comprehensively investigate the factors that contribute to stable and efficient green banking. Additionally, the analysis categorizes articles by Indonesian scholars into three key themes, suggesting that there is room for further exploration of these topics to enhance the understanding of green banking within the Indonesian context.

2. Methodology

This study used bibliometric analysis to explore specific topics through data from literature sources. The data utilized in the study was downloaded on May 24, 2024, from the Scopus database, which was selected as the primary platform for this research due to its multidisciplinary coverage and strong linkages to other pertinent information systems. Scopus was chosen as the preferred data source not only because it offers extensive information but also because it provides institution-related data and publication rankings, making it a top-tier option for this study and helping minimize potential overlap with other databases. The exclusive reliance on Scopus as the sole data source for this study was driven by the specific considerations and requirements that guided the selection of this platform over others. The structure of bibliometric analysis in this study adapted similar methods that were used previously in the context of different topics, as can be seen in a study (Vogel, 2012¹¹). This approach adopts a framework that has proven relevant and effective in analyzing literature trends, identifying important contributions, and evaluating topic developments in bibliometric databases. Defining document search keywords is the first step, and commonly used terms in green banking studies include "green banking," "banks," "sustainable," and "finance." It should be noted that the proper use of keywords is vital in summarizing literature related to this topic.

Table 1. Initial Search through Selected Keywords

Document Type	Number of Document
Article	55
Review	1
Total	56

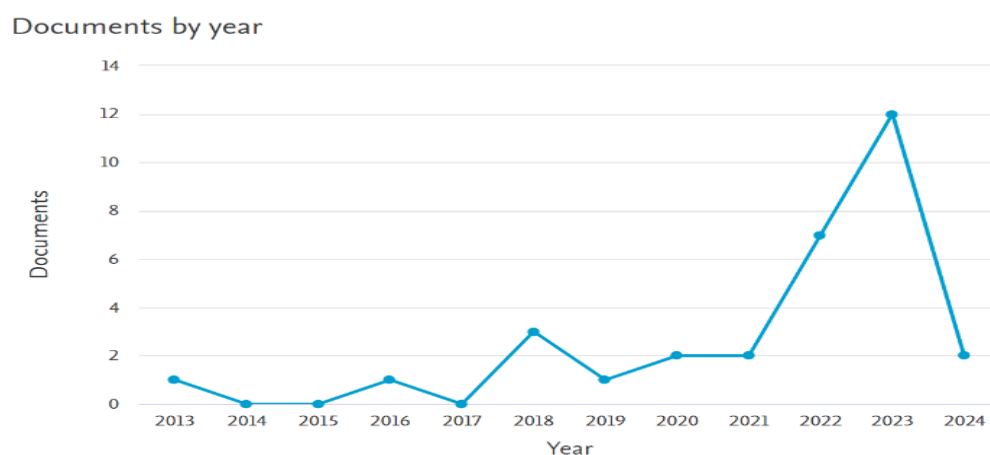
The second stage of the research process involved refining the preliminary results by carefully curating a dataset of 56 documents published between 2013 and 2024, limiting the selection only to articles and review papers. Any documents that did not fall under these two publication types were then removed from the dataset. The third step entailed filtering out any documents that were not published in English and ensuring that only the final, published versions of the papers were considered while excluding articles that were still in the pre-press or in-press stage. The fourth step involved checking for and removing any documents from journals that had been discontinued over the years, as those publications were no longer active and would not be included in the final analysis.

Finally, the 55 selected articles and one review paper were analyzed using the Scopus Analyze Search Results feature as well as the VOSviewer software. This allowed the researchers to conduct in-depth analysis and visualization of co-authorship patterns, citation networks, and keyword co-occurrences within the refined dataset.

3. Result and Discussion

The data collected from the Scopus database yielded a total of 56 articles relevant to the topic of green banking. Table 1 in the paper provides details on the annual publication counts for this subject matter. However, it is interesting to note that within the entire collection of Scopus articles related to green banking, there was only a single document that was first published in 2020. This is due to the specific sorting and filtering process applied to identify the relevant articles. If the search had not been narrowed down, the results could have included over 100 articles on this topic. The final set of publications on green banking was drawn from a diverse range of countries and subject areas, including articles related to financial systems, economics, and green banking itself. The relatively low number of articles found in 2013 resulted from the rigorous sorting and selection criteria used to curate the final dataset from the broader Scopus records.

Figure 2 illustrates that only one green banking-related article in 2013 and 2016 served as a starting point for observation. However, there was a significant increase where the number reached three articles in 2018. The peak number of articles occurred in 2023, with a total of 12 articles, being the year with the highest number of publications related to green banking in the



observed period.

Figure 1. Number of Documents in Green Banking by Year

This bibliometric examination elucidated discernible trends in the primary publication venues concerning research on green banking. In the year 2021, the preeminent contributor in this domain was the Journal of MDPI, which disseminated six scholarly contributions on this subject matter. Following closely, the Environment and Development of Sustainability

displayed the second-highest publication volume, with five articles. Subsequently, the Finance Research Letter, alongside with Bank and Bank System, had two articles, respectively. Collectively, these eminent peer-reviewed periodicals have served as pivotal conduits for the dissemination of erudite perspectives on green banking. Their persistent dissemination of scholarly works over successive years underscores the enduring significance of this realm of research. Looking ahead, these influential journals are poised to assume a significant role in sculpting the trajectory of knowledge pertaining to mechanisms aimed at fortifying and optimizing green banking. Their publication output quotas underscore their status as well-positioned hubs for the latest empirical discoveries, theoretical advancements, and policy analyses in this domain.

Table 2. The Most Productive Publisher in Green Banking Publications

Rank	Source Document	Number of papers	Additional Information
1 st	Journal of MDPI	6	Quartiles 1
2 nd	Environment And Development of Sustainability	5	Quartiles 1
3 rd	Finance Research Letter	2	Quartiles 1
4 th	Bank and Bank System	2	Quartiles 2

Meanwhile, there is currently no journal that specifically focuses its attention on green banking, which is different from the situation in several other fields. Therefore, it is important to take the first step in establishing a journal that prioritizes green banking to support the exploration of research concepts and related empirical studies. Quartile data was obtained from the Scimago Journal and Country Rank website.

Table 3. The Most Cited Documents

Authors	Title	Cited By	Journal
Young et al. (2010)	Sustainable Consumption: Green Consumer Behavior when Purchasing Products	516	Wiley Inter Science
Yip & Bocken (2018)	Sustainable business model archetypes for the banking industry	463	Journal of Cleaner Production
Dikau & Volz (2021)	Central bank mandates, sustainability objectives and the promotion of green finance	446	Ecological Economics
Taghizadeh-Hesary & Yoshino (2020)	Sustainable Solutions for Green Financing and Investment in Renewable Energy Projects	356	Journal of MDPI

Authors	Title	Cited By	Journal
Park & Kim (2020)	Transition towards green banking: role of financial regulators and financial institutions	265	Asian Journal of Sustainability and Social Responsibility
Khan et al. (2022)	Does green finance really deliver what is expected? An empirical perspective	168	Borsa Istanbul Review
Gilchrist et al. (2021)	The Limits of Green Finance: A Survey of Literature in the Context of Green Bonds and Green Loans	165	Journal of MDPI
Sharma & Choubey (2021)	Green banking initiatives: a qualitative study on Indian banking sector	160	Journal of Environment, Development and Sustainability
Julia & Kassim (2020)	Exploring green banking performance of Islamic banks vs conventional banks in Bangladesh based on Maqasid Shariah	137	Journal of Islamic Marketing Emerald Publishing
Aracil et al. (2021)	Sustainable banking: A literature review and integrative framework	126	Journal of Finance Research Letters

The three most cited documents were articles [14], with 516 citations. The article [14] contains a study on sustainable consumption: green consumer behavior when purchasing products using a comparative method of explanations based on external short-term debt. On the other hand, [15] discussed sustainable business model archetypes for the banking industry with 463 citations. Meanwhile [16] study is about Central bank mandates, sustainability objectives, and

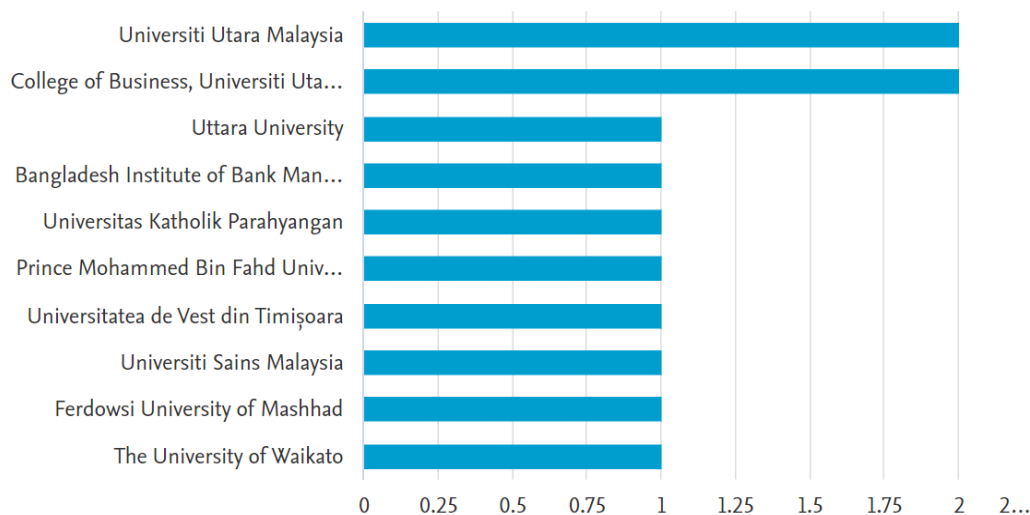


Figure 3. Prolific Authors

the promotion of green finance with 446 citations. Prolific authors of green banking studies at Universiti Utara Malaysia and College of Business, also at Universiti Utara Malaysia, had two articles each. The next productive writers are from Uttara University, Bangladesh Institute of Bank Management, Prince Mohammad bin Fahd University, Universitatea de Vest din Timisoara, Universiti Sains Malaysia, Ferdowsi University of Mashhad, and the University of Waikato, with one each article.

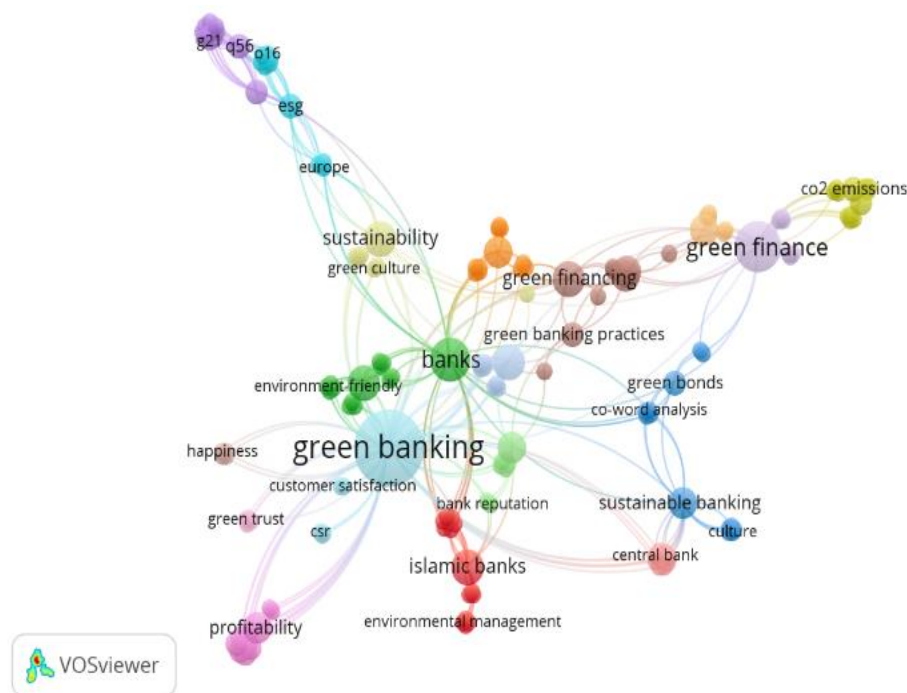


Figure 4. Visualization of Keywords with Minimal Occurrence

Figure 4 depicts a network map of articles-keywords related to green banking, consisting of twenty-seven (27) keywords that appeared. Meanwhile, the size of the nodes and words in the image represents the weight of each keyword and large ones such as green banking and banks. The two most prominent keywords were discussed in the analyzed articles, and the above results correspond to Table 4, showing the 27 keywords with the most links. Furthermore, the table shows reasonable results, where the keywords “green banking” and “banks” had the largest network.

The link between the two keywords in Figure 3 also reflects the co-occurrence of the two, and the distance between the nodes reflects how strong the relationship between those keywords is. A shorter distance signifies a stronger connection between them. Meanwhile, nodes of the same

color indicate a cluster, and in total, there are five clusters visible in the image. The blue cluster consists of green banking, green bonds, sustainable banking, and culture, while the red cluster consists of Islamic banks, bank reputation, central bank, and environmental management. On the other hand, the purple cluster includes the keywords g21, q56, and green finance, while the yellow cluster contains the keywords CO₂ emissions, sustainability, and green culture. Finally, the pink and brown clusters encompass the keywords profitability, green trust, happiness, green banking practice, and green financing.

Table 4. Co-occurrence of Keywords: Minimal Occurrences Threshold of One

Keyword	Occurrences	Total Link Strength
Green banking	18	85
banks	6	32
Green finance	8	30
Sustainable banking	3	21
Islamic banking	4	19
Green financing	4	18
Sustainability	4	18
Environmental performance	4	17
Finance	2	17

The two most prominent keywords in the analyzed article correspond to the results in Table 4, which identifies the ten keywords with the most links. These results consistently show that "Green Banking" and "Banks" are keywords with the widest network; it can be seen in Table 4 that green banking had 18 occurrences and a total link strength of 85, followed by banks having six occurrences and a total link strength of 32. This exhibits that these two have a very good relationship with other keywords, so they become the highest co-occurrences among others.

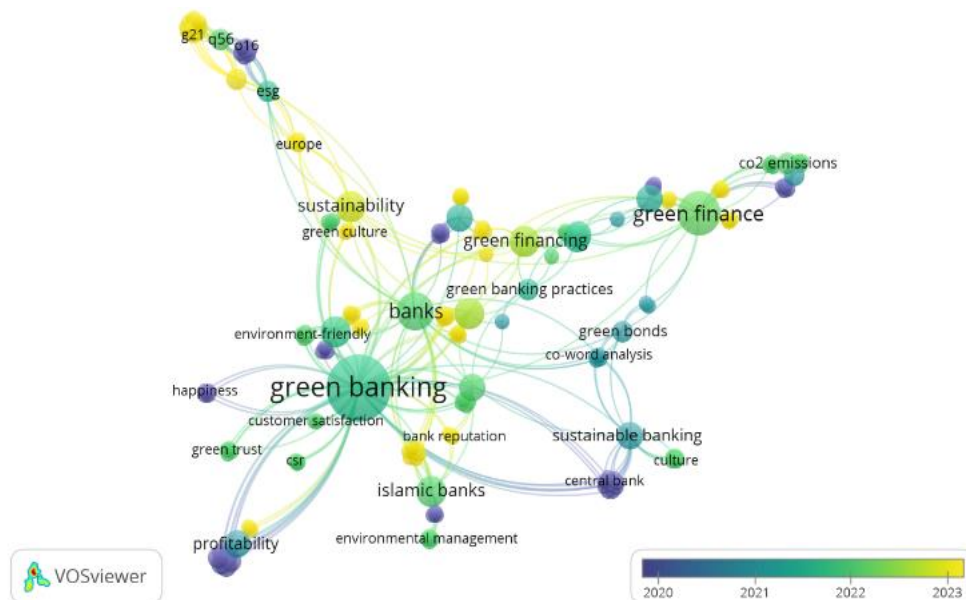


Figure 5. Visualization of Keywords with Minimal Occurrence

Figure 5 is an overlay visualization of the results of the VOSviewer software, where current topics are depicted in yellow, green, and purple. In this research, the keywords to be discussed are green banking, banks, green finance, Islamic banks, sustainable banking, and others. The first covers the topic of green banking, which tries to conceptualize a sustainable financial stability model. Other similar research was conducted using risk management and its relationship to economics and finance. Further methods, innovations, and models can be further researched on this topic. Researchers and practitioners may dynamically assess and develop the best green banking to achieve sustainability.

The keyword analysis revealed several predominant research foci within the green banking literature. Second, banks have emerged as a major theme, with scholars recognizing the importance of maintaining strong financial performance to promote green banking and broader societal impacts. Third, green finance is an area of emphasis, with researchers aiming to provide insights into how capital market education targeting certain could increase green banking across countries. This serves as a key benchmark for specialized green banking studies. Fourth, Islamic banking has become a salient contemporary topic, as many investigators explore the potential gains from integrating asset management strategies with green banking finance dynamics to magnify their joint benefits. In summary, analyses of frequently occurring keywords spotlight major trends, including risk assessments, educational

initiatives, international comparative ratios, and asset integration as active research programs seeking to elucidate and advance green banking. Tracking the evolution of keywords over time could provide a valuable window into how focus areas shape and reshape in response to crises, regulations, and innovations in this critical domain.

A salient finding was the substantial number of articles authored by researchers (around 56) after the screening process, suggesting a focus on issues related to green banking. Compared to prominent keywords, these topics could provide fruitful future research directions concerning green banking. For instance, holistically analyzing financial sustainability, assets, community outcomes, risks, and investor perspectives may reveal new insights into promoting green banking. In summary, the categorization of articles by scholars spotlights productive avenues for expanding knowledge on ensuring robust green banking within this unique context.

4. Conclusion

An evaluation of 56 Scopus articles published between 2013 and 2024 demonstrates that research on green banking covers a wide and diverse range of subjects. This extensive body of work provides substantial value for both researchers and practitioners, serving as a comprehensive guide to identifying and developing future research topics, whether they are conceptual or empirical in nature. The insights gleaned from these studies are instrumental in furthering the development of green banking systems. Moreover, these articles are not only informative but also practical, offering a solid foundation for future research endeavors. Trends identified through keywords within these studies highlight areas of significant interest and importance, making them valuable references for upcoming investigations. Researchers in the field of green banking can benefit from these insights to shape their research agendas and explore new avenues.

In particular, the analysis underscores the importance of focusing on specific subjects that have been frequently discussed and hold substantial relevance. The emphasis on these areas is particularly noteworthy in the context of Indonesia, where the financial landscape presents unique challenges and opportunities. By addressing these topics, researchers can contribute to a deeper understanding of the green banking mechanisms and their impact on the banking sector, fostering a more robust and resilient financial system. Overall, this evaluation highlights the rich and varied nature of green banking research and underscores the critical role it plays in guiding future studies aimed at enhancing the efficacy and reliability of green banking systems globally, with a specific focus on regions like Indonesia.

References

- [1] Zhang, X., Wang, Z., Zhong, X., Yang, S., & Siddik, A. B. (2022). Do green banking activities improve the banks' environmental performance? The mediating effect of green financing. *Sustainability*, 14(2), 989.
- [2] Bose, S., Khan, H. Z., & Monem, R. M. (2021). Does green banking performance pay off? Evidence from a unique regulatory setting in Bangladesh. *Corporate Governance: An International Review*, 29(2), 162-187.
- [3] Rehman, A., Ullah, I., Afridi, F. E. A., Ullah, Z., Zeeshan, M., Hussain, A., & Rahman, H. U. (2021). Adoption of green banking practices and environmental performance in Pakistan: A demonstration of structural equation modelling. *Environment, Development and Sustainability*, 1-21.
- [4] Bukhari, S. A. A., Hashim, F., & Amran, A. (2020). Green Banking: A road map for adoption. *International Journal of Ethics and Systems*, 36(3), 371-385.
- [5] Hermawan, S., & Khoirunisa, Z. A. (2024). The emergence of green banking: a sustainable financing strategy for protecting against deforestation in asean. *The Journal of Environment & Development*, 33(1), 96-124.
- [6] Leonidou, L. C., Christodoulides, P., Kyrgidou, L. P., & Palihawadana, D. (2017). Internal drivers and performance consequences of small firm green business strategy: The moderating role of external forces. *Journal of business ethics*, 140, 585-606
- [7] Al Amin, M., Ahad Mia, M. A., Bala, T., Iqbal, M. M., & Alam, M. S. (2023). Green finance continuance behavior: the role of satisfaction, social supports, environmental consciousness, green bank marketing initiatives and psychological reactance. *Management of Environmental Quality: An International Journal*, 34(5), 1269-1294.
- [8] Agrawal, R., Agrawal, S., Samadhiya, A., Kumar, A., Luthra, S., & Jain, V. (2024). Adoption of green finance and green innovation for achieving circularity: An exploratory review and future directions. *Geoscience frontiers*, 15(4), 101669
- [9] Afridi, F. E. A., Afridi, S. A., Zahid, R. A., Khan, W., & Anwar, W. (2023). Embracing green banking as a mean of expressing green behavior in a developing economy: exploring the mediating role of green culture. *Environmental Science and Pollution Research*, 1-11.
- [10] Barua, S. (2020). *Principles of green banking: Managing environmental risk and sustainability*. Walter de Gruyter GmbH & Co KG.
- [11] Vogel, R. (2012). The visible colleges of management and organization studies: A bibliometric analysis of academic journals. *Organization Studies*, 33(8), 1015-1043.
- [12] Xiao, H., & Li, L. (2021). A bibliometric analysis of critical discourse analysis and its implications. *Discourse & Society*, 32(4), 482-502.
- [13] Lardo, A., Corsi, K., Varma, A., & Mancini, D. (2022). Exploring blockchain in the accounting domain: a bibliometric analysis. *Accounting, Auditing & Accountability Journal*, 35(9), 204-233.
- [14] Young, W., Hwang, K., McDonald, S., & Oates, C. J. (2010). Sustainable consumption: green consumer behaviour when purchasing products. *Sustainable development*, 18(1), 20-31.
- [15] Yip, A. W., & Bocken, N. M. (2018). Sustainable business model archetypes for the banking industry. *Journal of cleaner production*, 174, 150-169.
- [16] Dikau, S., & Volz, U. (2021). Central bank mandates, sustainability objectives and the promotion of green finance. *Ecological Economics*, 184, 107022.
- [17] Taghizadeh-Hesary, F., & Yoshino, N. (2020). Sustainable solutions for green financing and investment in renewable energy projects. *Energies*, 13(4), 788.
- [18] Park, H., & Kim, J. D. (2020). Transition towards green banking: role of financial regulators and financial institutions. *Asian Journal of Sustainability and Social Responsibility*, 5(1), 1-25.
- [19] Khan, M. A., Riaz, H., Ahmed, M., & Saeed, A. (2022). Does green finance really deliver what is expected? An empirical perspective. *Borsa Istanbul Review*, 22(3), 586-593.
- [20] Khaer M, Anwar S. Encouraging Sustainability and Innovation: Green Banking Practices Growing in Indonesia. *EKSYAR J Ekon Syari'ah Bisnis Islam*. 2022;9(2):173-182. doi:10.54956/eksyar.v9i2.422

- [21] Gilchrist, D., Yu, J., & Zhong, R. (2021). The limits of green finance: A survey of literature in the context of green bonds and green loans. *Sustainability*, 13(2), 478.
- [22] Sharma, M., & Choubey, A. (2022). Green banking initiatives: a qualitative study on Indian banking sector. *Environment, Development and Sustainability*, 24(1), 293-319.
- [23] Julia, T., & Kassim, S. (2020). Exploring green banking performance of Islamic banks vs conventional banks in Bangladesh based on Maqasid Shariah framework. *Journal of Islamic Marketing*, 11(3), 729-744.
- [24] Aracil, E., Nájera-Sánchez, J. J., & Forcadell, F. J. (2021). Sustainable banking: A literature review and integrative framework. *Finance Research Letters*, 42, 101932.