The Role of Green Finance in Sustainable Business Strategies: Opportunities and Challenges for Business Organizations

Syarifuddin Lakasse^{*1}, Amril², Helmy Syamsuri³, Ikhsan Amar Jusman⁴

¹Program Studi Akuntansi, Sekolah Tinggi Ilmu Ekonomi (STIE) YPUP Makassar, Indonesia
²Program Studi Akuntansi, Universitas Muhammadiyah Makassar, Indonesia
³Program Studi Manajemen, Sekolah Tinggi Ilmu Ekonomi (STIE) YPUP Makassar, Indonesia
⁴Program Studi Magister Manajemen, Sekolah Tinggi Ilmu Ekonomi (STIE) YPUP Makassar, Indonesia
Email: ¹syarif070707@gmail.com, ²amril.arifin@unismuh.ac.id, ³helmysyamsuri@stie.ypup.ac.id,

Email: ¹syarif0/0/0/@gmail.com, ²amril.arifin@unismuh.ac.id, ³helmysyamsuri@stie.ypup.ac.id, ⁴ikhsanamar@stie.ypup.ac.id

Abstract

Amidst increasing awareness of environmental and social issues, businesses worldwide are increasingly recognizing the importance of adopting sustainable business strategies. Green finance has become a popular approach among companies to integrate financial aspects with sustainable environmental goals. This research aims to investigate in-depth the opportunities and challenges associated with green finance practices for business organizations. The study is a literature review with a qualitative approach, utilizing descriptive analysis. Data for this research were obtained through a search of articles on Google Scholar spanning from 2014 to 2024. The study findings indicate that in an era where environmental awareness is on the rise, green finance practices are becoming increasingly crucial for companies looking to adopt sustainable business strategies. Green finance enables companies to integrate environmental values into investment decisions and fund allocation, creating incentives for more environmentally efficient business practices, and helping to mitigate environmental risks that may disrupt long-term operations. However, the implementation of green finance faces several challenges, including lack of understanding and awareness, complexity in measuring environmental impact, initial costs and economies of scale, limitations in data and measurement methods, as well as resource and internal capacity constraints. To address these challenges, cross-sector collaboration among private, government, and financial institutions is key.

Keywords: Business Organizations, Green Finance, Sustainable Business

1. INTRODUCTION

In an era marked by increasing awareness of environmental and social issues, companies across the globe are increasingly recognizing the importance of integrating sustainable business strategies into their operations. This focus extends beyond mere financial gain to encompass considerations of the broader impacts on the environment and society (Schlütter et al., 2023).

There has been a significant uptick in the adoption of green financial approaches by companies aiming to blend financial aspects with sustainable environmental goals. This approach encompasses a range of actions, from investing in eco-friendly projects to allocating capital to reduce carbon emissions, as well as financial reporting that takes environmental factors into account (Ye & Dela, 2023). This marks a significant transition in the modern business paradigm, where sustainability has become an inevitable strategic priority for organizations seeking to maintain their relevance in an increasingly environmentally conscious era.

Demand for sustainable products and services is on the rise, driving business organizations to incorporate green financial practices into their operational strategies. Consumer awareness of the environmental impact of the products they consume is increasing, thereby influencing their preferences and purchasing decisions (Lopes et al., 2024). This phenomenon signals a paradigm shift in consumer behavior, with significant implications for marketing strategies and product development within business organizations.

Green financial practices not only have the potential to reduce negative environmental impacts but also open doors to new and sustainable business opportunities (Fu et al., 2024). Companies adopting

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this approach have the opportunity to tap into emerging markets for eco-friendly products and services while gaining competitive advantages through product differentiation and enhanced corporate reputation. This integration of sustainability into financial strategies is not only a moral responsibility but also a smart strategic move to strengthen market position and expand market share.

Despite the significant benefits of implementing green finance, it is accompanied by a series of challenges that need to be addressed. These challenges include uncertainty regarding applicable regulations, complexity in measuring the environmental impact of business activities, and the initial costs that may be required to adopt green financial practices (Agrawal et al., 2023). In tackling these challenges, companies must implement strategies focused on risk mitigation, innovation in technology and environmental impact measurement methodologies, and careful financial management to ensure that investments yield optimal long-term results.

Therefore, within this context, research on the role of green finance in sustainable business strategies aims to thoroughly investigate the opportunities and challenges associated with green financial practices for business organizations. With a better understanding of these dynamics, it is hoped that business organizations can develop more effective strategies to simultaneously achieve their financial and environmental goals.

2. RESEARCH METHOD

This research is a literature review employing a qualitative approach and utilizing descriptive analysis. The qualitative approach was chosen to gain a deeper understanding of the role of green finance in sustainable business strategies and to analyze the data descriptively in detail. Data for this study were obtained through a search of articles on Google Scholar spanning from 2014 to 2024. The initial search yielded 60 relevant articles, however, through rigorous selection based on relevance and quality, 28 most pertinent and recent articles were chosen for this research.

3. RESULTS AND DISCUSSION

Green finance refers to a financial approach that considers environmental and social factors in financial decision-making, aiming to create long-term sustainable value for companies and society as a whole (Kalaiarasi & Kirubahari, 2023). This approach encompasses investments in environmentally friendly projects, capital utilization to reduce carbon emissions and other environmental impacts, and transparent financial reporting on practices that positively impact the environment. By integrating financial aspects with environmental considerations, green finance enables companies to generate financial profits while addressing their social and environmental responsibilities, creating sustainable business opportunities, and strengthening corporate reputation in the context of global sustainability (L. Wang et al., 2023).

Sustainable business refers to business practices that consider their impact on the three pillars of sustainability: economic, environmental, and social (Correia, 2019). In this context, businesses not only focus on financial profitability but also consider the long-term implications of their business decisions on the natural environment and society. Sustainable businesses strive to create balanced long-term value among economic profit, environmental preservation, and social welfare (Bansal & DesJardine, 2014). This involves adopting environmentally friendly business practices such as energy efficiency, waste reduction, and socially responsible material usage. Additionally, sustainable businesses also consider their social responsibilities to employees, local communities, and society at large, aiming to create sustainable positive impacts for all stakeholders involved (Etikan, 2024).

Business organizations refer to entities or legal bodies established to conduct economic or commercial activities by creating and selling products or services (Gadzali et al., 2023; Rustiawan et al., 2023). Business organizations can be companies, cooperatives, or other business entities with organized structures, purposes, and operations (Azzaakiyyah et al., 2023; Sutrisno et al., 2023). They aim to generate financial profits through trading, production, or services, by managing their human resources, capital, and production facilities. Business organizations can operate in various economic sectors including manufacturing, trade, services, technology, or finance, and they vary in size and scope, ranging from small and medium-sized businesses to multinational corporations. The primary goal of business

organizations is to achieve financial success, growth, and long-term sustainability while complying with regulations and considering their social responsibilities to society and the surrounding environment (Muhamad et al., 2023).

In a period where awareness of environmental implications is experiencing significant growth, companies worldwide are increasingly recognizing the essential nature of adopting sustainability-focused business strategies. One crucial aspect of sustainable business implementation is ecosystemaligned financial management, often known as "green finance." This concept encompasses not only environmentally responsible financial management practices but also emphasizes the significance of integrating environmental considerations into financial decision-making processes (Yucel et al., 2023).

In the context described, the role of green finance in sustainable business strategies is increasingly garnering attention. Furthermore, green finance offers opportunities for corporate entities to incorporate environmental principles into investment decision-making and capital allocation processes (Falcone, 2020). This implies that corporations can invest in projects that support ecosystems, such as the development of renewable energy technology, enhancing energy efficiency, or sustainable waste management efforts. Thus, rather than solely pursuing short-term financial gains, companies can create sustainable value for the environment and society as a whole.

Moreover, green finance also creates incentives for corporate entities to engage in more environmentally optimal business practices (Fu et al., 2023). By leveraging financial instruments that stimulate carbon emission reductions, resource efficiency improvements, and environmental risk management, corporations can achieve financial gains while significantly contributing to ecosystem preservation.

However, despite clear opportunities, the implementation of green finance faces several challenges that affect business organizations. One major challenge is the lack of understanding and awareness regarding the concept of green finance among stakeholders, including investors, managers, and company employees. Without adequate understanding of the essence and benefits of green finance, companies struggle to effectively implement sustainable financial strategies (Tafsir, 2021). Therefore, there is a need for more intensive educational efforts and communication to enhance understanding and commitment to green finance practices within the business scope.

There are also challenges related to the complexity and uncertainty in measuring and assessing the environmental impacts of financial decisions. In this context, environmental impacts are often not directly considered in conventional financial parameters, making it difficult for companies to accurately evaluate the benefits and risks of investments aimed at environmental sustainability (Alvira et al., 2020). Hence, a holistic approach and careful methodology are required to address these challenges, including the development of more complex measurement methods and the integration of broader risk analysis into sustainable financial decision-making processes.

Additionally, there are challenges related to initial costs and economies of scale associated with sustainable projects. Although investments in environmentally oriented technologies and business practices can yield significant long-term benefits, the initial costs of adopting new technologies or changing business processes can often be barriers for some companies (Saarikko et al., 2020). This is particularly relevant for business entities operating in industries with thin profit margins, where any additional operational costs can have a significant impact on their short-term financial balance. Therefore, there is a need for appropriate financial strategies and support to overcome these challenges, including the development of innovative business models and a deeper understanding of the potential long-term benefits of investments in environmental sustainability.

In addressing these complex challenges, companies are required to take a holistic approach involving various strategies, such as internal and external educational efforts, close collaboration with stakeholders, and the development of innovative financial instruments. This holistic approach allows companies to broaden understanding and awareness of green finance and encourage active participation from various stakeholders. Moreover, governments and financial institutions play a crucial role in supporting the transformation of green finance through the establishment of progressive regulations and providing appropriate incentives (C. Wang et al., 2023). With clear regulatory frameworks and

incentivizing provisions in place, companies will feel more compelled to adopt financially sustainable business practices.

Furthermore, the role of green finance is becoming increasingly important in shifting the global investment paradigm towards a more sustainable direction. Investors are becoming more aware that environmental, social, and corporate governance (ESG) factors significantly influence the long-term performance of a company (Chen et al., 2023). In this framework, green finance practices become a key element in ensuring that investments not only result in financial gains but also contribute to positive impacts on the environment and society as a whole. By embracing and implementing green finance principles, investors can play an active role in driving the transformation towards more sustainable business models and encouraging companies to innovate in integrating ESG factors into their operations and business strategies.

Additionally, green finance plays a significant role in helping companies manage environmental risks that may disrupt their operations in the long term (Numan et al., 2023). By adopting environmentally friendly business practices, companies can reduce the likelihood of disruptions in raw material supply, be responsive to increasingly stringent environmental regulations, and address legal demands related to environmental pollution impacts. These steps not only provide protection against potential risks but also offer a competitive advantage for companies in facing the escalating environmental uncertainty levels. Thus, integrating the concept of green finance into business strategies can form a solid foundation for companies to strengthen their resilience to environmental challenges.

However, to realize the full potential of the green finance concept, companies are expected to address several emerging challenges. One of them is the lack of adequate data availability and consistent measurement methods to assess the environmental impacts of financial decisions. The unavailability of accurate data and reliable measurement methods can hinder companies from objectively evaluating their environmental performance and tracking progress towards sustainable goals (Suárez Giri & Sánchez Chaparro, 2023). Therefore, further efforts are needed to develop comprehensive frameworks and clear standards for measuring the environmental impact of financial activities, enabling companies to more effectively integrate environmental considerations into their financial decision-making.

Moreover, significant challenges related to the complexity of integrating environmental factors into financial decision-making processes also arise. In many cases, financial decisions are still based on traditional financial considerations that tend to overlook the comprehensive environmental impacts that may arise from such choices (Chu & Karr, 2017). Therefore, it is essential for companies to develop a comprehensive framework to ensure that environmental factors are thoroughly considered at every stage of their financial decision-making. Measures such as integrating environmental risk assessment methods, environmental impact analysis, and sustainable performance assessments can help overcome these challenges by generating a deeper understanding of the environmental implications of each financial decision made, thereby supporting the creation of more sustainable business strategies.

Furthermore, another challenge faced is the limitation of resources and internal capabilities in implementing green finance practices. Implementing sustainable business strategies requires significant investment in terms of time, funds, and manpower (Arief et al., 2021). Therefore, companies need to ensure adequate commitment and support from senior management and the entire organizational structure to ensure success in green finance implementation. This support involves not only adequate resource allocation but also the establishment of a corporate culture that supports innovation and environmental responsibility. Through understanding and active participation at all organizational levels, companies can enhance the sustainability of green finance practices and create sustainable positive impacts on the environment and society at large.

In facing these complex challenges, close collaboration between the private sector, government, and financial institutions is recognized as key to success. By fostering open dialogue and cross-sector cooperation, the potential to create an environment supportive of growth and innovation in the green finance realm can be significantly enhanced. Additionally, the role of government cannot be ignored as they have the capacity to play a crucial role in shaping fiscal incentives and regulations that encourage and facilitate green finance practices (Khanna, 2020). These steps include providing tax incentives for sustainable investments, implementing regulations that limit environmentally harmful activities, and

providing financial and technical support to companies committed to environmentally responsible financial practices. Thus, cross-sector collaboration and progressive policies from governments can provide a strong foundation for accelerating the transformation towards green finance globally.

Overall, green finance has tremendous potential to be a key driver in propelling companies towards more sustainable business models. By addressing existing challenges and taking concrete steps to implement green finance practices, companies can achieve not only long-term financial gains but also create sustainable value for the environment, society, and all stakeholders involved. The transformation towards green finance is not just about changing how we invest and operate, but also about building a solid foundation for sustainable and inclusive economic development. By integrating sustainability principles into their business strategies, companies can not only strengthen their positions in the market but also actively contribute to shaping a better future for our planet.



Figure 1. Process of Green Finance's Role in Sustainable Business Strategy

	Table 1. Opportunities, Chanenges, and Strategies				
	Opportunities	Challenges			
•	Integration of Environmental Value in • Investments.	Lack of Understanding and Awareness.			
•	Incentivising More Environmentally • Efficient Business Practices.	Uncertainty in Environmental Impact Measurement.			
•	Role in Changing the Global Investment • Paradigm.	Initial Costs and Economies of Scale			
٠	Reducing Environmental Risks •	Lack of Consistent Data and Measurement			
		Methods and Limited Internal Resources and			
		Capabilities			
Strategies					
1.	Integrate Environmental Values in Investment Decisions and Fund Allocation.				
2.	Adopt More Environmentally Efficient Business Practices.				
3.	Education and Awareness on Green Finance Concepts.				
4.	Development of Environmental Impact Measurement Methods.				

Table 1	Opportunities	Challenges	and Strategies
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- 5. Integration of Environmental Factors in Financial Decision-Making.
- 6. Senior Management Commitment and Support.
- 7. Inter-Sector Collaboration.
- 8. Role of Government and Regulation.

4. CONCLUSIONS

In an era where environmental awareness is increasingly heightened, the practice of green finance becomes increasingly crucial for companies aiming to adopt sustainable business strategies. Green finance enables companies to integrate environmental values into investment decisions and fund allocation, creating incentives for more environmentally efficient business practices, and helping to mitigate environmental risks that may disrupt long-term operations. However, the implementation of green finance faces several challenges, including lack of understanding and awareness, complexity in measuring environmental impact, initial costs and economies of scale, limitations in data and measurement methods, as well as resource and internal capacity constraints. To address these challenges, cross-sector collaboration among private, government, and financial institutions is crucial. Recommendations based on the findings of this research are: 1) Education and Awareness: Companies should enhance understanding and awareness of the concept of green finance among stakeholders, including investors, managers, and employees. 2) Development of Financial Instruments: Companies need to develop innovative financial instruments that incentivize environmentally friendly business practices and reduce barriers to adoption. 3) Measurement and Evaluation of Environmental Impact: Companies should work to develop consistent and reliable measurement methods to evaluate the environmental impact of financial decisions. 4) Integration of Environmental Factors in Decision Making: Companies should develop a comprehensive framework to ensure that environmental factors are thoroughly considered in every financial decision. 5) Senior Management Support: Companies should ensure they have sufficient commitment and support from senior management and the entire organization to succeed in implementing green finance. 6) Cross-Sector Collaboration: Companies, government, and financial institutions should collaborate to create an environment that supports growth and innovation in green finance through dialogue and cross-sector cooperation. 7) Government Role: Governments can play a significant role in creating fiscal incentives and regulations that promote green finance practices and reduce barriers to adoption. By taking these steps, companies can create long-term sustainable value for the environment, society, and their stakeholders through green finance practices.

REFERENCES

- Agrawal, R., Agrawal, S., Samadhiya, A., Kumar, A., Luthra, S., & Jain, V. (2023). Adoption of green finance and green innovation for achieving circularity: An exploratory review and future directions. *Geoscience Frontiers*, 101669. https://doi.org/10.1016/j.gsf.2023.101669
- Alvira, A., Lindrianasari, L., Asmaranti, Y., & Oktavia, R. (2020). Finance Sustainability to the Environmental Investment. *The International Journal of Business Review (The Jobs Review)*, 3(2), 65–72. https://doi.org/10.17509/tjr.v3i2.30076
- Arief, A. S., Mulyadi, M., & Liriwati, F. Y. (2021). sustainable business strategy during the new normal era: lesson for Indonesian academic. *International Research Journal of Management, IT and Social Sciences*, 8(3), 274–285. https://doi.org/10.21744/irjmis.v8n3.1667
- Azzaakiyyah, H. K., Ausat, A. M. A., Gadzali, S. S., Diawati, P., & Suhartono. (2023). Analisis Faktor Pembentuk Budaya Inovatif dalam Konteks Bisnis: Kunci Kesuksesan untuk Inovasi Organisasi. *JRB-Jurnal Riset Bisnis*, 7(1), 41–52. https://doi.org/https://doi.org/10.35814/jrb.v7i1.4668
- Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, *12*(1), 70–78. https://doi.org/10.1177/1476127013520265
- Chen, S., Song, Y., & Gao, P. (2023). Environmental, social, and governance (ESG) performance and financial outcomes: Analyzing the impact of ESG on financial performance. *Journal of Environmental Management*, 345, 118829. https://doi.org/10.1016/j.jenvman.2023.118829
- Chu, E. W., & Karr, J. R. (2017). Environmental Impact: Concept, Consequences, Measurement ☆. In *Reference Module in Life Sciences* (pp. 1–22). Elsevier. https://doi.org/10.1016/B978-0-12-809633-8.02380-3
- Correia, M. S. (2019). Sustainability: An Overview of the Triple Bottom Line and Sustainability Implementation. *International Journal of Strategic Engineering*, 2(1), 29–38. https://doi.org/10.4018/IJoSE.2019010103
- Etikan, J. (2024). Corporate Social Responsibility (CSR) and its Influence on Organizational Reputation. *Journal of Public Relations*, 2(1), 1–12. https://doi.org/10.47941/jpr.1694
- Falcone, P. M. (2020). Environmental regulation and green investments: the role of green finance.InternationalJournalofGreenEconomics,14(2),159.https://doi.org/10.1504/IJGE.2020.10032078
- Fu, C., Lu, L., & Pirabi, M. (2023). Advancing green finance: a review of sustainable development. Digital Economy and Sustainable Development, 1(1), 20. https://doi.org/10.1007/s44265-023-00020-3

- Fu, C., Lu, L., & Pirabi, M. (2024). Advancing green finance: a review of climate change and decarbonization. *Digital Economy and Sustainable Development*, 2(1), 1. https://doi.org/10.1007/s44265-023-00026-x
- Gadzali, S. S., Gazalin, J., Sutrisno, S., Prasetya, Y. B., & Ausat, A. M. A. (2023). Human Resource Management Strategy in Organisational Digital Transformation. *Jurnal Minfo Polgan*, 12(2), 760– 770. https://doi.org/https://doi.org/10.33395/jmp.v12i2.12508
- Kalaiarasi, H., & Kirubahari, S. (2023). Green finance for sustainable development using blockchain technology. In *Green Blockchain Technology for Sustainable Smart Cities* (pp. 167–185). Elsevier. https://doi.org/10.1016/B978-0-323-95407-5.00003-7
- Khanna, M. (2020). Growing Green Business Investments in Asia and the Pacific: Trends and Opportunities. https://doi.org/10.22617/WPS200357-2
- Lopes, J. M. M., Gomes, S., & Trancoso, T. (2024). Navigating the green maze: insights for businesses on consumer decision-making and the mediating role of their environmental concerns. *Sustainability Accounting, Management and Policy Journal*, 1–23. https://doi.org/10.1108/SAMPJ-07-2023-0492
- Muhamad, L. F., Bakti, R., Febriyantoro, M. T., Kraugusteeliana, & Ausat, A. M. A. (2023). Do Innovative Work Behavior and Organizational Commitment Create Business Performance: A Literature Review. *Community Development Journal: Jurnal Pengabdian Masyarakat*, 4(1), 713– 717. https://doi.org/10.31004/cdj.v4i1.12479
- Numan, U., Ma, B., Sadiq, M., Bedru, H. D., & Jiang, C. (2023). The role of green finance in mitigating environmental degradation: Empirical evidence and policy implications from complex economies. *Journal of Cleaner Production*, 400, 136693. https://doi.org/10.1016/j.jclepro.2023.136693
- Rustiawan, I., Gadzali, S. S., Suharyat, Y., Iswadi, U., & Ausat, A. M. A. (2023). The Strategic Role of Human Resource Management in Achieving Organisational Goals. *Innovative: Journal Of Social Science Research*, 3(2), 632–642. https://doi.org/https://doi.org/10.31004/innovative.v3i2.345
- Saarikko, T., Westergren, U. H., & Blomquist, T. (2020). Digital transformation: Five recommendations for the digitally conscious firm. *Business Horizons*, *63*(6), 825–839. https://doi.org/10.1016/j.bushor.2020.07.005
- Schlütter, D., Schätzlein, L., Hahn, R., & Waldner, C. (2023). Missing the Impact in Impact Investing Research – A Systematic Review and Critical Reflection of the Literature. *Journal of Management Studies*, 1–25. https://doi.org/10.1111/joms.12978
- Suárez Giri, F., & Sánchez Chaparro, T. (2023). Measuring business impacts on the SDGs: a systematic literature review. Sustainable Technology and Entrepreneurship, 2(3), 100044. https://doi.org/10.1016/j.stae.2023.100044
- Sutrisno, Sitinjak, H., Diawati, P., Sitinjak, I. Y., & Ausat, A. M. A. (2023). Telaah Dampak Positif Gaya Kepemimpinan Transformasional bagi Peningkatan Produktivitas Individu dan Organisasi. Community Development Journal: Jurnal Pengabdian Masyarakat, 4(1), 726–731. https://doi.org/10.31004/cdj.v4i1.12483
- Tafsir, M. (2021). Sustainable Finance: A Strategy to Increase Good Corporate Governance and Company Value in Banking Industry. *Atestasi : Jurnal Ilmiah Akuntansi*, 4(2), 164–172. https://doi.org/10.57178/atestasi.v4i2.99
- Wang, C., Qiao, G., Ahmad, M., & Ahmed, Z. (2023). The Role of the Government in Green Finance, Foreign Direct Investment, Technological Innovation, and Industrial Structure Upgrading: Evidence from China. Sustainability, 15(19), 14069. https://doi.org/10.3390/su151914069
- Wang, L., Ur Rehman, A., Xu, Z., Amjad, F., & Ur Rehman, S. (2023). Green Corporate Governance, Green Finance, and Sustainable Performance Nexus in Chinese SMES: A Mediation Moderation Model. *Sustainability*, 15(13), 9914. https://doi.org/10.3390/su15139914
- Ye, J., & Dela, E. (2023). The Effect of Green Investment and Green Financing on Sustainable Business Performance of Foreign Chemical Industries Operating in Indonesia: The Mediating Role of

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CorporateSocialResponsibility.Sustainability,15(14),11218.https://doi.org/10.3390/su151411218

Yucel, O., Celik, G., & Yilmaz, Z. (2023). Sustainable Investment Attitudes Based on Sustainable Finance Literacy and Perceived Environmental Impact. *Sustainability*, *15*(22), 16026. https://doi.org/10.3390/su152216026