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Green Finance in Indonesian Banking: Regulation, Implementation, and Challenges

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Abstract

This study aims to analyze the development of green finance in the Indonesian banking sector, focusing on regulatory frameworks, implementation practices, and emerging challenges. The research employs a literature review method by examining academic sources, regulations, and official reports published last five years. Findings indicate that Indonesia has established a relatively comprehensive sustainable finance regulatory framework, such as POJK No. 51/2017 and POJK No. 60/2017, though implementation remains limited. Several state-owned banks, including BNI, BRI, and Mandiri, have begun adopting green finance practices through the issuance of green bonds, financing environmentally friendly MSMEs, and selective financing policies based on ESG principles. Nevertheless, challenges such as limited technical guidelines, insufficient human resource capacity, and low demand for green products continue to hinder progress. This research emphasizes that stronger synergy among regulators, financial institutions, and society is essential to reinforce the green finance ecosystem and support the transition toward a low-carbon economy.

1. Introduction

Green finance has become one of the key instruments in driving the transition to a low-carbon economy and sustainable development. In general, green finance is

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defined as the allocation of financial resources directed to support environmentally friendly projects, such as renewable energy, energy efficiency, sustainable transportation, and sustainable agriculture. Unlike conventional financing, green finance not only pursues financial profitability, but also pays attention to social and environmental impacts. This definition is in line with the view that the financial system has a responsibility to reduce the impact of climate change and environmental degradation, as well as play an important role in achieving sustainable development targets (Wahab et al., 2022). Globally, the development of green finance has been accelerating since the issuance of the Paris Agreement which encourages countries to commit to reducing greenhouse gas emissions. Instruments such as green bonds, green loans, and sustainable investments have experienced significant growth. In fact, international financial institutions are increasingly emphasizing the principle of sustainability in their investment portfolios.

In the context of Southeast Asia, including Indonesia, this trend is beginning to be integrated into economic development strategies. Studies show that banks in the region have a strategic role in financing the energy transition and mitigating climate change (Ariyapruchya & Volz, 2022). Global environmental issues further emphasize the importance of green finance. Climate change and global warming have had serious social, economic, and ecological impacts. The IPCC report confirms that the world has only a limited time to contain the global temperature rise below 1.5°C, and this requires massive investment in green sectors. In the case of Indonesia, the need for funding for climate mitigation and adaptation is expected to continue to increase. Recent analysis estimates that the average annual funding

need for climate action in Indonesia is in the billions of dollars, with the gap between the need and the realization of funding still very large (Bhandary et al., 2021).

The Government of Indonesia has responded to these challenges by issuing various regulations and policies that support sustainable finance. Some of them are Financial Services Authority Regulation (*Peraturan Otoritas Jasa Keuangan*/POJK) No. 51/2017 concerning the implementation of sustainable finance and POJK No. 60/2017 concerning the issuance of green bonds. Bank Indonesia also plays a role in encouraging the implementation of green financing through macroprudential policies and monetary instruments that support environmentally friendly projects. However, gaps still exist between policies and implementation practices, especially in terms of environmental risk assessment mechanisms and sustainability reporting in the banking sector (Saputro & Rahmawati, 2022).

At the level of banking practices, a number of large banks in Indonesia have begun to integrate green finance principles in their business strategies. For example, BNI has conducted a screening of debtors in the oil palm plantation sector by referring to RSPO and ISPO certification standards. BRI has gone further by issuing green bonds and allocating green credit for micro, small, and medium enterprises (MSMEs) that are environmentally friendly. Meanwhile, Bank Mandiri implements a selective financing policy that considers environmental, social, and governance (ESG) aspects. These innovations show that the national banking sector has the potential to be the main driver in supporting the achievement of sustainable development targets in Indonesia (Halimatussadiah, 2020).

However, the implementation of green finance in Indonesia still faces a number of obstacles. Challenges include the absence of uniform technical guidelines, the limited capacity of banking human resources (HR) in understanding green financial instruments, and low public and business actors' awareness of the urgency of green financing. At the global level, similar obstacles are also experienced by developing countries that are trying to balance the needs of economic development with the obligation to maintain environmental sustainability. Therefore, an in-depth analysis of green finance practices in Indonesia is needed to find a more effective strategy in reducing the implementation gap and strengthening the competitiveness of national banks in the era of energy transition (Akomea-Frimpong et al., 2022). Thus, research on green finance in the context of Indonesian banking is very relevant. Academically, this research will add to the literature on sustainable finance in developing countries. In practical terms, the results of the research are expected to provide important inputs for regulators, investors, and the banking sector to strengthen sustainability strategies that support low-carbon development and the achievement of Sustainable Development Goals (SDGs) targets.

2. Literature Review

2.1. Green Finance dan Sustainable Finance

Green finance is an integral part of the sustainable finance framework which emphasizes the importance of investing in environmentally friendly projects. While sustainable finance includes three environmental, social, and governance (ESG) dimensions, green finance is more focused on funding activities that contribute to

climate change mitigation and adaptation (Cunha et al., 2021). In the Indonesian context, this concept is increasingly relevant considering the urgency of funding the energy transition and the achievement of the Sustainable Development Goals (SDGs) targets. Recent studies show that although sustainable finance policies have been introduced, implementation in the banking sector still faces technical and institutional barriers. For example, environmental risk assessment mechanisms in finance are still not fully integrated in bank risk management.

In addition, green finance in Indonesia is also hampered by the limitations of financial instruments that are in accordance with the needs of the domestic market. Research on political and institutional constraints shows that the adoption of instruments such as green bonds or renewable energy loans is often constrained by regulatory certainty and investment attractiveness that is considered riskier than the conventional sector (Guild, 2020). This indicates the need to strengthen the capacity of financial institutions and consistent policy support so that green finance can function optimally as a motor of sustainable development in Indonesia.

2.2. Triple Bottom Line and Sustainable Investment

The Triple Bottom Line (TBL) principle introduced by Elkington emphasizes the balance between profit, people, and the planet. This concept is an important foothold in the practice of green finance because it requires financial institutions to consider social and environmental impacts in addition to economic benefits. In Indonesian banking practices, the adoption of the TBL principle is increasingly evident through the use of digital technology to increase transparency and accountability in sustainability reporting. For example, banks are starting to leverage

digital transformation not only for operational efficiency, but also to ensure the traceability of green financing activities so that the public can assess the extent of the bank's commitment to sustainability (Sendjaja et al., 2022).

In addition, research shows that banks in Indonesia play an important role in supporting the SDGs through financing innovations oriented towards environmentally friendly sectors, such as renewable energy, green MSMEs, and sustainable agriculture. The implementation of the TBL principle in sustainable investment also changed the bank's business paradigm from just a profit-seeking entity to an agent of social change. By balancing the aspects of profitability with environmental and social sustainability, banks can strengthen their competitiveness while contributing to the national development agenda (Halimatussadiah, 2020). Therefore, the implementation of TBL in green finance not only provides long-term economic benefits, but also strengthens the social legitimacy and sustainability of the banking business.

2.3. Environmental, Financial and Long-Term Sustainability Risks

Environmental risk is one of the key factors that is increasingly recognized in the global financial literature. The impacts of climate change, such as natural disasters, droughts, and sea level rise, not only threaten ecosystems, but can also affect the stability of the financial system. For example, the increased risk of default in sectors that are heavily dependent on natural resources makes banks have to adjust their risk management models. In the Indonesian context, the need for funding for climate mitigation actions is expected to continue to increase, so the financial sector

must adapt to a more holistic and risk-sensitive approach to environmental change (Oktari et al., 2022).

On the other hand, the integration of green finance in banking business strategies offers opportunities to reduce long-term risks while creating added value. Investments in the renewable energy, energy efficiency, and sustainable agriculture sectors not only have the potential to generate financial benefits, but also reduce exposure to increased environmental risks. However, challenges remain, especially related to the lack of uniform technical guidelines and the limited capacity of banking human resources. International research confirms that developing countries need to adopt adaptive strategies in managing environmental risks so that the integration of green finance can have a real sustainable impact (Ozili, 2022). Thus, strengthening environmental risk literacy in the financial sector is a strategic step to ensure the long-term sustainability of Indonesia's banking system.

3. Methods

This study uses a literature study approach as the main method. The literature study was chosen because it is suitable to explore the concepts, regulations, practices, and challenges of implementing green finance in the context of Indonesian banking. This method allows researchers to identify patterns, gaps, and directions in the development of previous research, so as to build a strong conceptual foundation and provide critical analysis of emerging issues. Thus, this study not only presents a synthesis of theory and practice, but also highlights policy aspects relevant to the transition to sustainable finance in Indonesia.

The first stage of this method is the collection of library data. The data used in this study came from scientific journal articles, policy reports, regulatory documents, and official publications of international institutions relevant to the topic of green finance and sustainable finance. The focus of data collection is the literature published over the last five years, so that the findings analysed are in line with the latest developments in sustainable finance practices. Data sources are obtained from academic databases such as Google Scholar and Elsevier, as well as official repositories of research institutions and financial regulators.

The second stage is the activity of reading critically on the literature that has been collected. At this stage, the researcher identifies key concepts, such as green finance, sustainable finance, triple bottom line, environmental risks, and the role of financial institutions. In addition, the researcher also examines international and national regulatory frameworks, including the Paris Agreement, POJK No. 51/2017, and POJK No. 60/2017, which are the foothold of sustainable financial policy in Indonesia. Critical reading is also done to find gaps between theory and practice, for example the extent to which existing regulations have been consistently implemented by the banking sector.

The third stage is the systematic recording of reading results. The researcher notes the key points of each literature, including the research objectives, methods used, key findings, and their relevance to the Indonesian banking context. This recording also involves grouping the literature based on specific themes, such as regulations and policies, banking practices, green financial instruments, and

implementation challenges. Thus, the data obtained can be organized in a structured manner and facilitate further analysis.

The fourth stage is the processing of library data. The data that has been recorded is analyzed through a synthesis process, which is to connect various research findings to find patterns and trends. For example, the literature on the implementation of green finance in Indonesian banks is compared to government policies, so that the gap between regulation and practice can be seen. In addition, the analysis is also directed to assess the contribution of the banking sector to the achievement of sustainable development goals and energy transition. The results of the synthesis are then formulated into a comprehensive narrative, so that this research can contribute to both the academic and practical realms.

By using a literature study, this study does not aim to produce new empirical data, but rather to develop a conceptual and practical understanding based on existing research findings. Although this method has limitations, such as reliance on the availability of literature and possible publication bias, the literature study is still relevant to provide a complete picture of the dynamics of green finance in the Indonesian banking system. The results of this method are expected to serve as a basis for more empirical follow-up research, as well as provide input for regulators and banking industry players in strengthening sustainable finance strategies.

4. Results

The results of this study highlight the dynamics of the development of green finance in the Indonesian banking sector with a focus on regulations and policies,

implementation practices in banking institutions, and challenges that arise in its implementation. Analysis of the literature shows that Indonesia already has a fairly comprehensive sustainable finance regulatory framework, although its implementation still faces a number of obstacles. Since 2017, *Otoritas Jasa Keuangan* (OJK) has issued Regulation No. 51/2017 on the implementation of sustainable finance and Regulation No. 60/2017 on the issuance of green bonds. These two regulations are important milestones in efforts to encourage financial institutions to integrate environmental and sustainability aspects into their business strategies. In addition, Bank Indonesia also plays a role through macroprudential policies that support green financing. However, the effectiveness of the regulation is still limited because most of the implementation is carried out by large banks, especially state-owned banks, while medium and small-scale banks still face technical hurdles and a lack of uniform guidelines. This confirms the findings of Setyowati (2021) who stated that although regulations have encouraged awareness of the banking sector, the integration of environmental risks in credit management practices has not been fully consistent across institutions.

On the other hand, broader national policies also seek to strengthen the green finance agenda by including it in the *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN). Indonesia's commitment to the Paris Agreement and the achievement of the Sustainable Development Goals (SDGs) further emphasizes the urgency of green financing in national development. According to Bhandary et al. (2021), the need for climate finance in Indonesia reaches billions of dollars per year, but the realization of funding is still far from sufficient. This gap reflects that the role of the

financial sector, especially banks, is very strategic to close the funding deficit for climate mitigation and adaptation actions. Therefore, green finance is seen not only as a financial innovation, but also as a vital instrument in realizing the transition to a low-carbon economy. Andarsari and Firdiansyah (2020) also emphasized that the implementation of this regulation aims to reduce the level of social inequality, prevent environmental damage, maintain biodiversity, and encourage efficient use of energy and natural resources.

Practices in the banking sector show that state-owned banks have an important role in becoming role models for the implementation of sustainable finance. BNI, for example, implements a screening mechanism for debtors in the palm oil sector by requiring RSPO and ISPO certification. This step demonstrates the bank's commitment to ensuring that financing does not support activities that damage the environment. Meanwhile, BRI has become one of the pioneers in green bond issuance and green credit distribution for environmentally friendly MSMEs. This practice not only strengthens BRI's position in supporting the sustainability agenda, but also expands access to green financing for the small business sector that previously received less attention. Bank Mandiri has also developed a selective financing policy based on environmental, social, and governance (ESG) principles, so that their financing portfolio reflects their commitment to long-term sustainability. According to Guo et al. (2020), these practices are further strengthened by the use of digital technology that helps increase transparency, accountability, and traceability of sustainable financing in the banking sector.

Digital transformation itself is one of the important catalysts in expanding the implementation of green finance in Indonesia. The study by Sendjaja et al. (2022) confirms that digital innovation in the banking sector not only functions as a means of efficiency, but also strengthens banks' capacity to expand access to green financial products. Through digitalization, banks can more accurately monitor the impact of financing on the achievement of the SDGs, while building investor and customer trust in sustainability commitments. Thus, the integration of digital technology and green finance can be considered as a synergistic strategy that accelerates the achievement of sustainable development goals.

Despite the progress, various challenges still loom over the implementation of green finance in Indonesia. The first obstacle is the lack of uniform technical guidelines, so banks interpret regulations in different ways. This creates inconsistencies in the evaluation of green projects and the implementation of environmental standards. The second obstacle is the limited capacity of human resources (HR) in the banking sector. Most bank employees do not have the expertise to comprehensively assess environmental risks, so the feasibility assessment of green projects is often not optimal. The third obstacle is the gap between regulation and practice. Ozili (2022) asserts that despite the growing regulatory framework, weak incentives and technical support make banks hesitant to allocate large portfolios to green projects, which are often considered riskier than conventional sectors.

In addition to internal barriers, external challenges also play a role in slowing down the development of green finance. For example, the level of awareness of the

public and business actors on the urgency of green financing is still relatively low. As a result, the demand for green financial products has not reached its maximum potential. The condition of Indonesia's capital market, which is still dominated by conventional instruments, also limits the growth space for products such as green bonds. Guild (2020) highlights that political and institutional barriers are slowing down the adoption of green finance in Indonesia, especially in renewable energy financing which is still considered risky and less attractive to international investors.

Another important finding is the urgency of more intensive academic research on green finance in Indonesia. It is not only useful for enriching the academic literature, but also as a basis for policy formulation and practical strategies. Ariyapruchya and Volz (2022) emphasize that the success of green finance in Southeast Asia depends on the synergy between domestic regulatory frameworks and international collaboration in supporting climate finance. In the Indonesian context, this means that banks must continue to strengthen internal governance while seizing opportunities for collaboration with international institutions to address the green development financing gap.

The results of this study show that green finance in Indonesia already has a clear regulatory foundation and practices that are starting to develop in large banks, but the scale of implementation is still limited. State-owned banks are pioneering the adoption of green finance and digital integration, although technical barriers, human resource capacity, and market limitations still hinder the acceleration of adoption. The gap between the large need for climate finance and the limited realization of financing is a strong indication that the role of banks needs to be further

strengthened. Therefore, green finance is not only seen as a policy option, but also as a strategic imperative in supporting the energy transition, low-carbon development, and the achievement of SDGs targets in Indonesia.

5. Discussion

The results of this study show that green finance in Indonesia has experienced significant development in recent years, although it still faces various challenges. This discussion outlined three important aspects: the effectiveness of regulation, the role of banks in implementation, and strengthening strategies to overcome existing barriers. First, the effectiveness of regulations is a crucial issue. Since the issuance of POJK No. 51/2017 and POJK No. 60/2017, the direction of sustainable financial policy in Indonesia has become clearer. These regulations formally require financial institutions to integrate sustainability aspects in their business activities. However, as noted by Setyowati (2021), the effectiveness of regulations is still limited due to the lack of detailed technical guidelines and consistent evaluation mechanisms. This leads to a gap between regulatory objectives and implementation realities in the banking sector, especially outside of large banks that have better capacity to adopt sustainability policies.

Second, the role of national banks in the implementation of green finance shows great potential but is not optimal. State-owned banks such as BNI, BRI, and Mandiri have begun to introduce various initiatives, ranging from debtor screening based on environmental certification to the issuance of green bonds and green financing for MSMEs. This practice is a positive indication that banking can function

as an agent of change in supporting sustainable development. However, as shown by Guo et al. (2020), innovations carried out by banks still tend to be pilot projects and have not been evenly distributed across all national banking business lines. In addition, the adoption of digital technology as a tool for sustainability transparency does increase accountability, but it requires significant investments that not all banks are able to afford.

Third, a strengthening strategy is needed to overcome implementation challenges. Obstacles such as low human resource capacity, lack of demand for green products, and limited market instruments must be addressed through a more holistic approach. Akomea-Frimpong et al. (2022) emphasizes the importance of policy incentives and more concrete technical support so that banks have a strong motivation to allocate large portfolios to green financing. In the absence of clear incentives, banks tend to remain focused on conventional sectors that are considered safer and more profitable in the short term. Therefore, stronger synergy is needed between regulators, governments, and the private sector to build a more inclusive and sustainable green finance ecosystem.

This discussion shows that despite progress, green finance in Indonesia is still in its early stages in terms of scale and impact. Existing regulations need to be strengthened with more detailed technical guidelines, while banks need to expand their sustainability initiatives so that they don't stop at symbolic projects. By strengthening incentives, increasing human resource capacity, and encouraging product innovation, Indonesia's banking sector has the opportunity to become a key driver of the transition to a low-carbon economy.

6. Conclusion

This research confirms that green finance has a strategic role in supporting sustainable development and the transition to a low-carbon economy in Indonesia. The regulations that have been issued by the OJK and Bank Indonesia are an important foundation to encourage financial institutions to integrate environmental aspects into their business strategies. However, implementation in the banking sector still faces a number of obstacles, ranging from limited technical guidelines, human resource capacity, to low market demand for green products. Large state-owned banks such as BNI, BRI, and Bank Mandiri have shown progress in adopting green finance practices through the issuance of green bonds, selective financing based on ESG, and support for environmentally friendly MSMEs. Digital transformation also strengthens transparency and accountability in sustainability reporting.

However, this practice is still limited and has not been fully evenly distributed throughout the national banking sector. By looking at these conditions, it can be concluded that strengthening the green finance ecosystem requires stronger synergy between regulators, financial institutions, the government, and the community. Appropriate incentives, human resource capacity building, and innovation of green financial instruments will be key to expanding the scale of implementation. In the end, green finance is expected to be the main driving force for the achievement of inclusive, equitable, and sustainable development in Indonesia.

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