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How To Create Sustainable Bank Performance? The Influence of Green Banking on Sustainable Bank Performance Through Green Finance

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Abstract: This study aims to examine the effect of green banking on sustainable bank performance and to assess the mediating role of green finance in strengthening sustainability outcomes. Using a quantitative research design, the study applies Partial Least Squares–Structural Equation Modeling (PLS-SEM) to analyze the relationships among the variables. Data were collected through a structured survey and subsequently processed to evaluate the direct influence of green banking on sustainable bank performance as well as the indirect effect through green finance. The findings indicate that green banking has a significant positive effect on sustainable bank performance, while green finance plays a mediating role in this relationship. This study provides original empirical evidence demonstrating that the integration of green banking practices with green finance mechanisms can effectively enhance sustainability performance, thereby contributing valuable insights to the development of sustainable financial management.

Keywords: Banking, Green Banking, Green Finance, Sustainable Bank Performance

Introduction

Global sustainable debt has exceeded the trillion-dollar threshold, with the 2025 report showing more than USD 6 trillion in GSS+ instruments. Green bond issuance continues to rise, although quarterly data for 2025 shows fluctuations, with some periods falling below 2024 levels. Institutions such as CPI, the Climate Bonds Initiative, the World Bank, the OECD, and UNEP FI are updating climate finance flow mapping and policy tools, highlighting financing needs and capital movements. The 2024–2025 reports emphasize the large funding gap, especially in developing countries, which require trillions of dollars annually to meet 2030–2035 targets. The medium-term outlook suggests a continued shift of capital toward low-carbon activities driven by tighter regulations, growing institutional investor demand, and emerging standards like ISSB and the EU Taxonomy. The pace of growth will still depend on macroeconomic trends, geopolitics, and how effectively policies address greenwashing.

The sustainability-labeled finance market continues to expand, with global issuance of green and sustainable bonds and the value of sustainable funds reaching new highs in 2023–2024. Regulations such as the EU Taxonomy, SFDR, and IFRS/ISSB standards push banks to classify activities as green, improve transparency, and refine risk and product reporting. Europe's taxonomy shows strong influence on bank financing and disclosures. Regulators and central banks through the NGFS are also promoting climate scenario analysis, stress tests, and climate risk reporting. These developments are accelerating the integration of transition and physical climate risks into banking supervision and internal risk management (Naran et al, 2025).

In Indonesia, the development of green banking has become a focus of attention for various parties, including the government (Setyorini & Hakam, 2025). The government is encouraging the banking industry to fund projects that consider their impact on the environment. Government support for efforts to improve green banking practices is reflected in Bank Indonesia Regulation No. 14/15/PBI/2012 concerning the obligation of banks to include environmental considerations in assessing the feasibility of projects to be funded. Bank Indonesia is also involved in encouraging green financing through regulations, instrument development, and supporting green MSMEs by providing business model guidelines and carbon footprint calculators. The regulations made by the government are expected to encourage banking institutions to truly develop sustainable finance action plans and implement Environmental, Social, and Governance (ESG) principles in the business processes of bank-funded projects (A.P., 2024).

However, upon closer examination of the existing legal system, the policies issued by the government are still relatively new and, of course, do not yet have comprehensive, systematic, and broadly binding regulations. This situation can give rise to various problems ranging from implementation aspects, oversight aspects, and the law enforcement process in their implementation. On the other hand, along with the increasing awareness of banking institutions in implementing green banking, opportunities for strengthening green banking regulations also open up, this is reflected in international support concerned with green investment. Nadiarini, et al. (2025) stated that to maximize its support for green finance practices, the government should take strategic steps to establish special laws, strengthen regulations, harmonize policies, provide incentives for implementation, and increase institutional capacity to realize a sustainable and inclusive green economy.

In its implementation in Indonesia, sustainable financing plays a crucial role in advancing the global sustainability agenda (Ernawati & Budi, C, 2024). According to data published by the Financial Services Authority (OJK) in 2020, several institutions have provided various sustainable financing instruments to support environmentally friendly programs. These instruments include green bonds and gender bonds with a total financing value of IDR 59.9 trillion, green loans of IDR 809.75 trillion, global sustainability bonds with a total financing value of IDR 7.9 trillion, and blended finance, a joint financing instrument between the private sector and the government with a total financing value of IDR 35.6 trillion.

Figure 1. Implementation of Sustainable Finance
Source: Katadata.id website (accessed November 1, 2025)

The implementation of sustainable finance does not always run smoothly, in Indonesia the implementation of sustainable finance faces several significant challenges that affect bank performance (Siahaan et al, 2021). Key challenges include low public awareness that limits demand for green finance products, and the lack of unified taxonomy despite OJK's roadmap and Indonesian Green Taxonomy. Green projects are often viewed as costly and high risk, making banks more cautious in financing (Xia et al, 2025). Regulations exist but field implementation remains weak due to limited supervision and overlapping rules. Banks also struggle with inadequate environmental impact data, which hampers accurate assessment and reporting. Another issue is the shortage of human resources with expertise in sustainable finance and environmental risk analysis.

History shows that the growing human population has increasingly harmed nature and intensified the exploitation of the environment and natural resources (Bukhari et al, 2020). Therefore, sustainable business performance is critical as it enables companies to balance profitability with environmental and social responsibility, tackle worldwide issues like climate change, resource depletion, and social inequality (Siddik et al, 2024). This balance not only ensures long-term viability, but also enhances corporate reputation, meets stakeholder expectations, and reduces regulatory and operational risks (Malik & Singh, 2022). Incorporating green banking and green finance into business strategies plays an important role in achieving sustainability goals (Bukhari et al, 2020).

As environmental challenges become more urgent and the world commits to sustainable development, banks are feeling more pressure to consider the environment in how they operate (Dong et al, 2021; Zheng et al, 2025). Since banks act as financial middlemen, they have a key role in promoting sustainable economic growth by directing funds toward eco-friendly projects. This is where green banking comes in a strategy that weaves environmentally friendly practices into the day-to-day workings, policies, and

products of banks (Kumar et al, 2024a). Beyond just being a way for banks to show social responsibility, green banking also helps them stay competitive and respected in the long run.

Green banking involves financial institutions adopting environmentally friendly practices and offering products that promote ecological sustainability (Aslam & Jawaid, 2023). Green finance involves directing funds toward projects that provide environmental advantages, including renewable energy initiatives, pollution reduction, and conservation efforts (Bukhari et al, 2020). These practices are critical in directing investments towards sustainable ventures, thereby facilitating the transition to a low-carbon economy.

Research shows that green banking practices significantly improve the sustainability performance of financial institutions (Kumar et al, 2024b). They found that banks in developing countries experienced internal practices related to employees, top management, operations, and policies positively influenced green finance initiatives, which in turn improved banks' sustainability performance. Interestingly, customer-related practices were found to have an insignificant direct impact, suggesting that internal organizational commitment is a more important driver of sustainable outcomes (Kumar et al, 2024a).

Research Method

This research uses a quantitative method featuring a cross-sectional survey to examine the relationship between green banking, green finance, and sustainable banking business performance. The analysis was conducted at the individual level, with participating respondents filling out questionnaires through an online survey. The research sample was selected using purposive sampling technique by sample size 298 respondents, focusing on employees who work in banking companies with the criteria that employees have worked for at least 2 years in the company. The data obtained were then analyzed using Structural Equation Modeling (SEM) through two stages.

The measurement model is assessed in the initial phase using established standards for reliability and validity. In the subsequent phase, the structural model is examined, comprising both the outer and inner models. The outer model's evaluation focuses on indicator composite reliability as well as convergent and discriminant validity. Meanwhile, the inner model assessment relies on measures like R-square values for endogenous latent variables and the path coefficients. A positive coefficient signifies a direct relationship between exogenous and endogenous variables, whereas a negative coefficient reflects an inverse relationship (Hair et al, 2021).

All instruments used in this study were adapted from previous studies. In this study, green banking is measured using indicators from (Rehman et al, 2021), green finance is measured using a scale by (Dai & Siddik, 2022), and the sustainable business performance instrument was adapted from (Yadegaridehkordi et al, 2023).

Result and Discussion

Measurement Models Evaluation

The evaluation of the measurement model centers on assessing the quality of the instruments used to measure constructs, specifically focusing on reflective measurement, which is grounded in theoretical foundations and developed by the researchers. This evaluation involves examining validity both discriminant and convergent as well as reliability, measured using composite reliability and Cronbach's alpha. The results of this assessment serve as the foundation for the subsequent hypothesis testing stage.

Convergent Validity Test

Jr et al. (2008) stated that convergent validity is established when each construct has a factor loading greater than 0.50. The convergent validity test is presented in detail on Table 1.

Table 1. Result of Convergent Validity

Variable	Indicators	loading	CA	CR
Green Banking	GB1	0.836	0.867	0.805
	GB2	0.852		
	GB3	0.824		
	GB4	0.652		
	GB5	0.573		
Green Finance	GF1	0.815	0.883	0.832
	GF2	0.879		
	GF3	0.796		
	GF4	0.735		
	GF5	0.639		
Sustainable Bank Performance	SBP1	0.817	0.898	0.857
	SBP2	0.735		
	SBP3	0.801		
	SBP4	0.827		
	SBP5	0.807		

As presented in Table 1, all indicators exhibit loading factors greater than 0.50, indicating that each item is valid and suitable for further analysis. Moreover, the reliability test demonstrates strong internal consistency, with both Cronbach's alpha and composite reliability values exceeding the 0.60 threshold.

Discriminant Validity Test

The second validity check, known as discriminant validity, is performed using two methods: comparing the square root of the average variance extracted (AVE) with the correlations between constructs, and examining each construct's loadings relative to those of other constructs. Detailed results of this discriminant validity test are presented in Table 2.

Table 2. Result of Discriminant Validity

	GB	GF	SBP
GB	**0.756**		
GF	0.315	**0.777**	
SBP	0.312	0.476	**0.798**

Table 2 displays the results of the discriminant validity test, confirming that the criteria have been satisfied. This is demonstrated by the square root values of the average variance extracted (AVE) shown along the diagonal, which are higher than the inter-construct correlations in the corresponding columns. Furthermore, the data processing results reveal a clear distinction between the values of each construct and those of other constructs within the same column.

Structural Model Evaluation

The proportion of variance in the endogenous variable accounted for by the exogenous variables is represented by the coefficient of determination (R^2). For sustainable bank performance (SBP), the R^2 is 0.562, meaning that green banking and green finance explain 56.2% of its variance. For green finance (GF), the R^2 value is 0.525, showing that green banking accounts for 52.5% of its variance. These results demonstrate strong explanatory power within the structural model.

Beyond R^2, predictive relevance was assessed using the Q-Square (Q^2) metric. A Q^2 value above zero signifies that the exogenous variables predict the endogenous variable effectively. In this research, Q^2 values are 0.568 for sustainable bank performance (SBP) and 0.531 for green finance (GF), exceeding the threshold and confirming robust predictive capability of the model.

Effect size (f^2) was also measured to assess each exogenous variable's contribution to the R^2, with values classified as small (0.02), medium (0.15), or large (0.35) (Jr et al, 2008). The effect sizes found were 0.353 for green banking on sustainable bank performance (SBP), 0.530 for green banking (GB) on green finance (GF), and 0.21 for green finance (GF) on sustainable bank performance (SBP). These values indicate substantial practical impact, highlighting the varying significance of predictor variables within the model's explanatory framework.

The hypothesis testing in this research was conducted through Structural Equation Modeling (SEM) employing the Partial Least Squares (PLS) method, specifically employing Warp PLS software. A positive path coefficient indicates a positive influence of the exogenous variable on the endogenous variable, while a negative path coefficient signifies a negative effect. The significance levels are interpreted based on p-values, with thresholds set at < 0.01 (1% significance), < 0.05 (5% significance), and < 0.1 (10% significance). The detailed results of the hypothesis testing are presented in Table 3.

Table 3. Coefficient of Latent Variable

Path Relationship	Path Coefficient	P-Value	Status
GB → SBP	0.41	<0.001***	Supported
GB→GF	0.76	<0.001***	Supported
GF→SBP	0,45	<0.001***	Supported
GB → GF→SBP	0,22	<0.001***	Supported

*** Significant at level 0.01 (*2-tailed*)

Table 3 summarizes the hypothesis testing results, showing that green banking positively affects sustainable bank performance with a path coefficient of 0.41 (GB → SBP) and a p-value below 0.001, supporting Hypothesis 1. Additionally, green banking strongly influences green finance, evidenced by a path coefficient of 0.76 (GB → GF) and p-value < 0.001, confirming Hypothesis 2. Finally, green finance also has a significant positive effect on sustainable bank performance, with a path coefficient of 0.45 (GF → SBP) and p-value < 0.001, thus supporting Hypothesis 3.

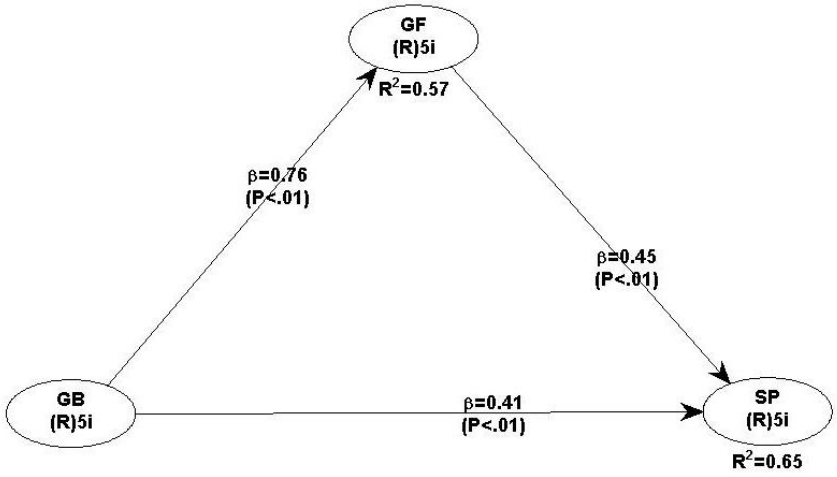

Figure 2. Research Result

Furthermore, the data indicate that green finance mediates the effect of green banking on sustainable bank performance, with a path coefficient of 0.22 (GB → GF→SBP) and a p-value < 0.001. Accordingly, Hypothesis 4 is also supported based on the statistical analysis.

Green banking goes beyond just a marketing tactic; it represents a holistic approach that emphasizes managing environmental risks, promoting sustainable lending, enhancing energy efficiency, and supporting environmental conservation through banking services (Weber, 2010). As more banks embrace green policies and frameworks, an important question emerges: how does green banking affect sustainable bank performance, and how much does green finance mediate this relationship?

Green banking includes a variety of practices, such as providing green loans, investing in renewable energy projects, reducing carbon footprints in banking operations, and encouraging customers to adopt environmentally friendly habits (Tanchangya et al, 2025). These efforts help banks align with global sustainability objectives, like the United Nations

Sustainable Development Goals (SDGs) and the Paris Agreement (Aitken, 2017). By integrating environmental considerations into their financial decisions, banks can better manage environmental risks, improve their reputation, and attract clients and investors who prioritize sustainability.

Research shows that green banking positively impacts sustainable bank performance, which encompasses economic, environmental, and social aspects. Economically, green banking can lower operational costs (for example, through paperless transactions), provide access to green capital markets, and create new revenue opportunities through green products. Environmentally, it helps reduce pollution and resource depletion by funding green initiatives. Socially, it enhances the bank's image and strengthens relationships with stakeholders (Yadav & Pathak, 2013).

However, the connection between green banking and sustainable bank performance isn't always straightforward. A key factor in this relationship is green finance, which refers to financial investments directed toward sustainable development projects that aim to lower carbon emissions and improve environmental outcomes (Dong et al, 2021; Fichera et al, 2025). Green finance includes tools like green bonds, green loans, and climate finance products.

Green finance serves as a vital link that transforms green banking practices into real sustainability results (Aji et al, 2025). For example, if a bank implements green lending policies but does not offer corresponding green financial products, its efforts may have limited effectiveness. Conversely, when green banking initiatives are supported by a strong array of green finance instruments, banks are more likely to meet their sustainability goals (Al Mamun, Md & Boubaker, Sabri & Nguyen, 2022). Green finance enables banks to allocate resources in ways that support long-term environmental objectives while also generating financial returns and reducing climate-related financial risks.

Additionally, green finance can enhance the advantages of green banking by expanding the bank's role in financing the green economy (Palmieri et al, 2025; Setyorini & Hakam, 2025). By providing funding for renewable energy, green infrastructure, sustainable agriculture, and clean transportation, green finance boosts the bank's contribution to environmental sustainability (Hidayat-ur-Rehman & Hossain, 2025; Lei & Ma, 2025). These investments not only provide environmental benefits but also offer banks opportunities to diversify their portfolios and lessen their exposure to sectors at risk from climate change (Alblooshi et al, 2023).

Empirical studies back the mediating role of green finance. For instance, research by Siddik et al. (2024) found that banks with strong green banking frameworks achieved significantly better sustainability performance when their volume of green finance was high. Well-structured green finance products acted as a bridge between green policies and improved environmental performance metrics, such as carbon intensity and clean energy financing.

Moreover, regulatory support and stakeholder pressure are crucial in strengthening this mediated relationship. Government incentives for green finance, like tax breaks or regulatory relief, can encourage banks to create more green financial products (Ma et al,

2026). Similarly, investors and customers are increasingly demanding that banks show environmental responsibility, prompting them to adopt both green banking and green finance strategies (UNEP FI, 2016).

The relationship between green banking and sustainable bank performance is both direct and indirect. While green banking initiatives provide a foundation for sustainable practices, their effectiveness is greatly enhanced when supported by green finance. Banks that strategically incorporate green financial instruments into their operations are better equipped to achieve comprehensive sustainability outcomes. Future research should continue to investigate this mediated relationship, especially in various regulatory and cultural contexts, to guide policy and banking strategies toward a greener financial system.

Conclusion

The study highlights how important green banking is for achieving sustainable performance in banks, especially when combined with green finance. Green banking involves practices like considering environmental issues in financial decisions, providing eco-friendly financial products, and using energy-efficient operations. These practices have a clear and positive effect on sustainability in the banking industry. When green finance is included, this positive impact becomes even stronger. Green finance helps direct funds toward projects that are good for the environment, which supports the goals of green banking.

The results indicate that banks that focus on and promote green financial products like green bonds, environmental loans, and sustainable investment portfolios are more likely to enhance their performance in environmental, social, and governance (ESG) areas. This not only boosts their reputation and helps them comply with environmental laws but also attracts investors and customers who car(Sharma et al, 2024)e about sustainability. In the long run, this approach can lead to greater profitability and reduced risks.

This study also has a limitation, so, future research agenda can use a longitudinal design to know the comprehensive the effect of situational factor on sustainable bank performance. Beside, the future research can use a government variable because the government as regulatory board.

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