Sustainable Banking Practices and Cost Efficiency: Evidence on Profitability from Islamic Commercial Banks in Indonesia

Fathihani[1], Rini Sulistiyowati[2], Hendra Kusuma[3]

[1,2]University Dian Nusantara, Indonesia
[3]University Pawyatan Daha Kediri
Email: fathihani@undira.ac.id, Rini.Sulistiyowati@dosen.undira.ac.id, hendraku73@gmail.com

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Abstract

This study aims to examine the effect of green banking implementation and operational cost efficiency on the profitability of Islamic Commercial Banks in Indonesia during the period 2020–2024. The variables used in this study include green banking as an exogenous variable, operational efficiency (BOPO) as an independent variable, and return on assets (ROA) as a measure of profitability. This quantitative study employs secondary panel data sourced from the annual reports of Islamic Commercial Banks registered with the Financial Services Authority (OJK). The analysis uses a path model approach. The results reveal that green banking has a positive and significant effect on ROA while BOPO has a significant negative effect on ROA. Simultaneous testing found that the implementation of green banking as measured by GCR and BOPO had a positive and significant influence on ROA.These findings indicate that sustainable banking practices and cost efficiency play a critical role in enhancing the financial performance of Islamic banks in Indonesia.

INTRODUCTION

In recent decades, environmental degradation and climate change have emerged as global challenges that demand urgent and collective action (Hoque et al., 2022). The increasing needs of human civilization and the rapid pace of industrialization have contributed to a continuous rise in carbon emissions, which in turn intensifies global warming. This phenomenon has not only altered climate patterns but has also created multidimensional risks affecting health, food security, economic productivity, and ecosystem sustainability. The escalation of such environmental issues has compelled governments, industries, and institutions worldwide to integrate environmental considerations into all aspects of decision-making, including in the financial sector (Ziolo, 2021).

Although banks are not considered major contributors to direct environmental pollution, they are not exempt from accountability in environmental issues. Banks can have an environmental impact both directly through their carbon footprint generated by operational activities and indirectly, by channeling funds to industries that are environmentally harmful. This dual impact has encouraged the development of green banking, a concept that aligns banking operations with the principles of environmental sustainability (Azhgaliyeva & Liddle, 2020).

In Indonesia, however, the implementation of green banking remains voluntary and relatively limited in scope. This stands in contrast to the situation in many developed countries, where environmental sustainability has been formally integrated into banking operations and transparently disclosed through annual reports (Wayan Budiasa, 2020). The voluntary nature of green banking in Indonesia indicates the absence of regulatory mandates and industry-wide frameworks that would otherwise encourage more proactive and consistent adoption. Therefore,

it is essential for policymakers and regulators to provide clearer guidelines and incentives to strengthen the role of banks in supporting sustainable development.

Green banking is not merely a tool for environmental preservation; it also represents a long-term strategic approach to aligning business objectives with environmental and social goals. As noted by (Kweeswara & Irawan, 2023), green banking practices are designed to measure and guide the progress of banks' long-term strategies toward sustainability. Banks that have committed to green banking principles are expected to integrate sustainability into their core business competencies, particularly in developing countries, where such transformation can drive innovation, market relevance, and resilience (Maryanti et al., 2021).

Despite its growing popularity, the implementation of green banking continues to generate debate, particularly regarding its real impact on financial performance. Some studies have found a negative relationship between green banking and profitability. For instance, (Chowdhury, 2023) argue that sustainability initiatives may lead to increased operational costs and reduced short-term profits. In contrast, research by (Ratnasari et al., 2021) suggests that green banking initiatives positively contribute to profitability by enhancing efficiency, improving brand image, and attracting sustainability-focused investors and customers. These conflicting findings highlight the need for further empirical research to determine the financial implications of green banking, especially within the unique institutional and cultural context of Islamic banking in Indonesia.

Another important factor influencing bank performance is operational efficiency, often measured by the BOPO ratio (Operating Expenses to Operating Income). A low BOPO ratio indicates a more efficient bank that is capable of minimizing costs while maximizing revenues (Fransiskus Freklindo et al., 2023). Since profitability reflects how well a bank utilizes its resources to generate income, efficiency plays a critical role in determining financial performance. Therefore, studying the relationship between operational efficiency and profitability is essential in assessing the internal drivers of bank success.

This research is supported by two theoretical foundations. Legitimacy theory posits that institutions must operate in accordance with societal expectations and values to gain and maintain public approval (Rizma Novita Sari & Farah Wulandari Pangestuty, 2024). Banks that adopt sustainable practices, such as green banking, are more likely to earn legitimacy and trust from stakeholders, which in turn enhances their performance. Meanwhile, stakeholder theory argues that banks have an obligation to consider the interests of all parties affected by their activities including customers, employees, investors, regulators, and the broader community (Bose et al., 2018). Addressing these interests responsibly can improve a bank's long-term reputation, market positioning, and financial returns.

Based on the issues outlined above, this study seeks to provide empirical evidence on the influence of green banking practices and operational efficiency on the profitability of Islamic Commercial Banks in Indonesia. Specifically, this study investigates green banking and BOPO as independent variables, and profitability as measured by Return on Assets (ROA) as the dependent variable.

Stakeholder theory, introduced by Freeman (1984), emphasizes that the success and sustainability of an organization are influenced not only by its ability to generate profits for shareholders but also by its responsibility to various stakeholders. These stakeholders include employees, customers, regulators, investors, and the surrounding community. The theory posits that organizations that recognize and manage their relationships with these groups are more likely to achieve long-term success.

In the context of Islamic banking, stakeholder theory aligns naturally with the ethical and social values promoted by Sharia principles. The implementation of green banking is seen as a tangible manifestation of a bank's commitment to stakeholder interests, particularly in addressing environmental and societal challenges (Ahsan & Qureshi, 2022). By adopting environmentally responsible practices, such as sustainable financing and energy-efficient operations, banks can enhance stakeholder trust and improve their reputation. This, in turn, can positively influence financial performance by attracting loyal customers and responsible investors who value sustainability. Stakeholder theory thus supports the hypothesis that green banking and efficient operations are not merely ethical responsibilities but also strategic actions that can drive profitability in the long term (Nst et al., 2020).

Legitimacy theory, as articulated by Suchman (1995), suggests that organizations seek to operate within the bounds and norms of their social systems to gain approval and maintain their existence. Legitimacy is defined as a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within a socially constructed system of norms, values, beliefs, and definitions (Hadinata, 2019).

For financial institutions, legitimacy can be established through transparent, responsible, and sustainable practices. Green banking serves as a vehicle through which banks demonstrate alignment with broader societal concerns, particularly environmental protection. By integrating sustainability into their operations, banks reinforce their legitimacy in the eyes of the public, regulators, and other stakeholders. This alignment can lead to a stronger institutional image, reduced regulatory pressures, and increased stakeholder support.

Legitimacy theory is particularly relevant to this study because it explains how external perceptions such as a bank's environmental credibility can affect its financial performance (Felani et al., 2020). A bank that is perceived as legitimate is more likely to maintain market confidence, which can translate into improved profitability.

Profitability is a key performance indicator in banking and reflects the institution's ability to generate profits relative to its total assets. Return on Assets (ROA) is commonly used to measure profitability, as it indicates how effectively a bank converts its assets into net income. A higher ROA implies that the bank is managing its assets efficiently to generate profits. ROA is also a critical metric for stakeholders, as it reflects both the bank's financial strength and its potential for sustainable growth (Lubis et al., 2023).

In relation to green banking and cost efficiency, profitability serves as the end measure of how well these initiatives translate into financial performance. Practices that reduce costs or enhance reputation, such as environmental responsibility, can improve financial returns through increased customer loyalty, investor interest, and market competitiveness. ROA shows effectiveness company in produce profit with optimizing assets. If ROA increases, then the bank has used its assets optimally for obtain high profits. With so, increasingly good ratio profitability, then the Better describe ability its height acquisition profit company. The level of bank profitability No direct can describe health a bank. One of them is exists possible implementation of green banking influence profitability a bank. ROA is calculated using the formula:

$$Return\ On\ Asset = \frac{Net\ Income}{Total\ Assets}\ x\ 100\%$$

Green banking refers to the banking sector's strategic commitment to integrating environmental sustainability into both operational practices and financial decision-making (Ai'ni Rahma Dewi &

Pamungkas, 2024). According to Bank Indonesia, green banking involves conducting banking activities based on the principles of sustainable development. It requires banks not only to focus on maximizing profits but also to contribute to environmental preservation. Green banking unites four dimensions nature, human well-being, economy, and society into a banking system that prioritizes human safety and ecological balance (Karyani & Obrien, 2020).

In practice, green banking is implemented through efforts to reduce carbon footprints, such as digitizing services, minimizing paper use, conserving energy, and financing environmentally responsible projects. Banks are also expected to conduct environmental assessments and due diligence to ensure that financing is directed toward sustainable ventures. In doing so, banks play a direct and indirect role in preventing environmental degradation. (Siyamto, 2023) state that green banking enhances not only ecological outcomes but also operational cost efficiency, competitive advantage, strong brand image, and economic goals. Green Banking is calculated using the formula:

$$GB = \frac{Total\ Banks\ in\ GB\ Application}{Green\ Coin\ Ratings\ Indicator}\ x\ 100\%$$

Operational efficiency in banking reflects the institution's ability to manage its resources effectively to generate income while minimizing costs. One of the most widely used indicators for measuring cost efficiency is the BOPO ratio (Operational Costs to Operating Income). A lower BOPO ratio indicates higher efficiency, meaning that the bank is able to generate more income with lower operational expenditures. Conversely, a higher BOPO ratio suggests inefficiency and may signal excessive overhead or poorly optimized operational processes (Harfian, 2021).

In the context of green banking, improving operational efficiency can be supported by sustainable practices such as energy-efficient operations, digital banking services, and waste reduction. These initiatives not only align with environmental goals but also contribute to the reduction of long-term operational costs. The BOPO ratio is calculated using the following formula:

$$BOPO = \frac{Operating\ Expenses}{Operating\ Income}\ x\ 100\%$$

Green banking is a banking approach that integrates environmental sustainability principles into all aspects of a bank's operational activities and financing policies. In this context, banks are not solely profit-oriented but are also responsible for preserving the environment and supporting sustainable development. The implementation of green banking includes various initiatives such as service digitalization, energy consumption reduction, the use of eco-friendly technologies, and the allocation of financing to environmentally responsible projects. These actions not only contribute to environmental protection but also offer economic benefits, including operational cost efficiency, enhanced institutional reputation, and stronger relationships with stakeholders (Fathihani et al., 2021).

This concept aligns with stakeholder theory, which states that an organization's success is not measured solely by its financial performance, but also by its ability to fulfill the expectations and interests of its stakeholders. In the banking context, stakeholders include not only shareholders but also customers, the community, regulators, and the environment itself. By adopting green

banking practices, banks demonstrate their commitment to social and environmental responsibility, which can increase public trust, customer loyalty, and institutional legitimacy in the eyes of regulators. This growing trust has the potential to attract more customers and expand financing opportunities, which indirectly contributes to revenue growth and profitability.

This study is consistent with the findings of previous research by (Nur Ajizah & Agus Widarjono, 2023) which confirm that green banking practices have a positive and significant effect on banks' financial performance. (Nurmalia, 2021) also found that the green banking index positively influences Return on Assets (ROA), as environmentally responsible practices enhance both bank efficiency and institutional reputation. (Bouteraa et al., 2020) argue that green banking fosters competitive advantage, strengthens brand image, and promotes operational efficiency, all of which ultimately improve profitability. Similarly, (Sharmeen & Yeaman, 2020) emphasize that green banking not only reduces environmental risk but also strengthens long-term financial performance through improved risk management and greater stakeholder loyalty. Based on stakeholder theory and the supporting empirical evidence, it can thus be assumed that green banking implementation positively affects bank profitability, including in the context of Islamic Commercial Banks in Indonesia.

Operational cost efficiency is one of the key indicators for assessing a bank's internal performance. High efficiency reflects a bank's ability to manage its resources optimally in order to generate income while minimizing costs. In the banking industry, operational efficiency is commonly measured by the BOPO ratio (Operating Expenses to Operating Income). This ratio indicates how much operational expense is incurred by a bank to generate income from its core activities. The lower the BOPO ratio, the more efficient the bank's operations, which ultimately has a positive effect on profitability—one of which is reflected in the Return on Assets (ROA) (Ayu & Nurulrahmatiah, 2023).

This concept aligns with stakeholder theory, which asserts that companies are not only accountable to shareholders but also to all parties with a vested interest in the sustainability and performance of the organization. In this regard, cost efficiency management is a form of managerial responsibility toward internal stakeholders, such as investors and shareholders, who place great importance on optimizing financial performance. By maintaining operational efficiency, banks can minimize waste, increase profit margins, and strengthen their competitiveness in the financial sector. Furthermore, improved efficiency enhances stakeholder confidence in the bank's management capabilities and financial stability, thereby reinforcing its position within the financial system.

Several previous studies support the existence of a relationship between operational efficiency and profitability. (Febry Malangi et al., 2023) emphasized that the BOPO ratio has a significant impact on bank profitability; the lower the BOPO ratio, the greater the bank's ability to generate profit. This is consistent with the findings of (Fransiskus Freklindo et al., 2023), who stated that operational efficiency is a critical foundation for long-term profitability growth. In the context of Islamic banking, operational efficiency is even more essential, as Sharia principles prohibit speculative and unproductive practices, thereby encouraging more cautious and responsible resource management. Thus, managerial rationality in minimizing costs and optimizing revenue not only affects profitability but also forms part of a bank's ethical and strategic responsibility to its stakeholders.

Based on stakeholder theory and previous empirical findings, it can be assumed that operational cost efficiency has a positive influence on bank profitability, including within the context of Islamic

Commercial Banks in Indonesia.

Based on hypothesis in study this, researcher elaborate framework conceptual study as following
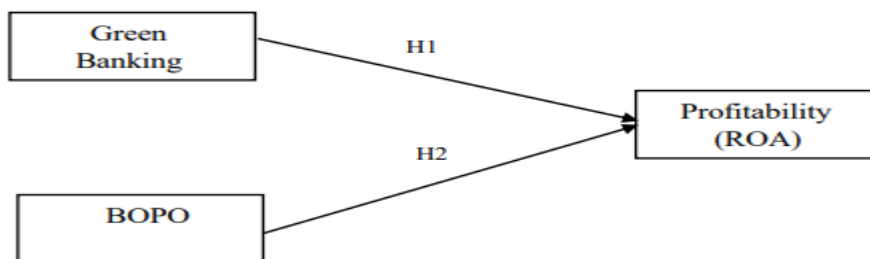

Figure 1: Conceptual Framework

METHODS

Study This use approach quantitative with utilize the secondary data collected through technique documentation. Data obtained with access the official site Financial Services Authority (www.ojk.go.id) and the official website of each bank for get public data related to sharia commercial banks registered in the 2020-2024 period. Collected data form Green Coin Ratings (GCR) indicator, ratio Cost Operational to Income Operations (BOPO), and Return on Assets (ROA). Research sample chosen use purposive sampling technique with consider criteria certain relevant ones so that 8 sharia commercial banks were obtained from a total of 14 banks registered with the Financial Services Authority (OJK). Criteria special in study This as following:

Table 1. Variable Operational Definition

Variable		Indicators		Exp. Sign
Dependent Variable				
Return Of Assets	ROA	Return on asset (ROA) is defined as the net profit after tax to total assets.	%	n/a
Independent Varibels				
Green Banking	GBI	The green baking ratio is defined as the ratio of the green coin rating of total Islamic banks to total indicators of green coin rating	%	(+)
Eficiency Cost	BOPO	Percentage of indicates how much operational expense is incurred by a bank to generate income from its core activities	%	(+)

Table 2. Sample Criteria

No	Uraian	Jumlah
1	Registered sharia commercial bank at the Financial Ser-vices Authority (OJK) for the 2020-2024 period	14
2	Sharia commercial banks are not publishing report conti-nuity in a way complete 2020-2024 period (green banking information)	(6)

	Amount Bank samples	8
	Amount 5 Year Observation (5 x 8)	40

Source: secondary data (processed)

In research Here, data analysis is carried out use method panel data regression that includes three approaches, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Election approach best will do through the Chow test, Hausman test, and Assumption test Classic. Additionally, analysis it also involves hypothesis testing. Data processing is carried out use device soft EViews 12. Eq deep panel data regression study This is as following:

$$ROA_{it} = \beta_0 it + \beta_1 GB_{it} + \beta_2 BOPO_{it} + e_{it}$$

Description :

ROA it = Return on Assets

β_0 = Constant

β_1, β_2 = Coefficient Value Regression

GB it = Green Banking

BOPO it = Operating Expenses to Operating Income Ratio

i = Cross Section

t = Time Series

e = disturbance error

RESULTS AND DISCUSSION

Model tested moreover formerly for determine the most appropriate model used in analysis panel data regression. Implemented testing in study This includes Chow Test, Hausman Test, and Langrange Multiplier Test. The first test carried out is Uji Chow, which aims for choose between the CEM and FEM models is better for used furthermore. The output results from the Chow Test are obtained as following:

Table 2. Chow Test Results

Effects Test	Statistics	Prob.
Cross-section F	14.317710	0.0000
Cross -section Chi-square	56.892857	0.0000

Source: Data processed with EViews 12, 2025

The results show that mark probability on cross-section chi-square < 0.05.
Therefore that is, the selected model in this test is the *Fixed Effect Model (*FEM), which is later need next with the next test, namely the Hausman Test

Table 3. Hausman Test Results

Test Summary	Chi.Sq. Statistics	Prob.

Cross -section Chi-square	16.866321	0.004771

Source: Data processed with EViews 12, 2025

Based on the results of the Hausman test, the Probability Cross-section Random value was found to be 0.0000. Since the probability value obtained (0.004771) is less than the significance level of α = 0.05, it can be concluded that the appropriate model to use is the **Fixed Effect Model (FEM)**. Therefore, the Hausman test confirms that the Fixed Effect Model is the most suitable model for this study, and there is no need to perform the Lagrange Multiplier (LM) test.

Test Assumptions Classic

The classical assumption test is a prerequisite for conducting regression analysis. The tests include normality, multicollinearity, heteroscedasticity, and autocorrelation tests. Regression analysis requires data that are normally distributed, free from multicollinearity, homoscedastic, and not affected by autocorrelation. Therefore, the results of the classical assumption tests are presented in Table 4.

Table 4. Asumsi Klasik Test Results

Model	*Tolerance*	VIF	Sig
Green Banking	0,826	1,073	0,215
BOPO	0,817	1,304	0,051
Asymp. Sig. (2-tailed)			0,627
Durbin-Watson			1.740

Based on the results presented in Table 3, the normality test yielded a significance value of 0.627, which is greater than 0.05. This indicates that the data are normally distributed. The multicollinearity test results show that the green banking variable has a tolerance value of 0.826 (> 0.1) and a VIF value of 1.073 (< 10). Similarly, the BOPO variable has a tolerance value of 0.817 (> 0.1) and a VIF value of 1.304 (< 10). These results indicate that there is no indication of multicollinearity. In the heteroscedasticity test, the significance value for green banking is 0.215 (> 0.05) and for BOPO is 0.051 (> 0.05), which suggests that there is no indication of heteroscedasticity. Furthermore, the autocorrelation test resulted in a Durbin-Watson value of 1.740, which falls within the acceptable range (1.5495 < 1.740 < 2.4505). Therefore, it can be concluded that there is no indication of autocorrelation in the regression model.

Multiple Linear Regression Test Results

Multiple linear regression analysis is a statistical method used to measure the relationship between one dependent variable and two or more independent variables. This regression method is necessary to determine the extent to which the dependent variable is influenced by the independent variables. The results of the multiple linear regression analysis are presented in Table 5:

Table 5. Multiple Linear Regression Test Results

Coefficients[a]				
	Unstandardized	Standardized		

Model		Coefficients		Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.257	1.183		1.208	.358
	Green Banking	2.881	1.127	.291	2.557	.019
	BOPO	1.069	1.005	.173	1.683	.085

From Table 5, the multiple linear regression equation is presented as follows:

$$Y = 1,257 + 2,881X^1 + 1,069X^2 + e.$$

Based on the multiple linear regression equation above, the interpretation is as follows:

1. The constant value (a) is positive at 1.257, which means that if both green banking and BOPO are equal to zero (0), the profitability (ROA) will increase by 1.257 units.
2. The regression coefficient for the green banking variable ($X1$) is positive at 2.881, indicating that green banking has a positive influence on profitability (ROA).
3. The regression coefficient for the BOPO variable ($X2$) is also positive at 1.069, meaning that BOPO positively affects profitability (ROA).

These results indicate that both green banking and BOPO have positive regression coefficients—2.881 for green banking and 1.069 for BOPO. Since 2.881 > 1.069, it can be concluded that green banking is the most dominant variable influencing the profitability (ROA) of Islamic Commercial Banks.

Hypothesis Testing Results
Partial Test (t-test)
The individual parameter test, or t-test, is used to measure the effect of each independent variable on the dependent variable individually. This test is applied to evaluate the partial significance of each hypothesis proposed in the study. In this research, the hypotheses tested are as follows:

1. **H_1**: Green banking has a positive effect on profitability.
2. **H_2**: BOPO has a negative and significant effect on profitability.

Hypotheses 1 and 2 aim to examine the partial influence of each independent variable on the dependent variable. To test these partial effects, the t-test is employed. Based on the results presented in Table 5, the t-test value for the green banking variable is 2.881, meaning that a one-unit increase in green banking corresponds to an increase in profitability by 2.881 units. Similarly, the coefficient for the BOPO variable is 1.069, indicating that a one-unit increase in BOPO results in an increase in profitability by 1.069 units.

Using a t-table critical value of 1.99346 for comparison:

1. **H_1**: The green banking variable has a calculated t-value (t_h) of 2.557, which is greater than 1.99346. Therefore, the hypothesis is accepted, and it is concluded that green banking has a **positive and significant** effect on profitability.
2. **H_2**: The BOPO variable has a calculated t-value of 1.683, which is less than 1.99346. Thus, the hypothesis is rejected, and it is concluded that BOPO does **not have a significant negative effect** on profitability.

Coefficient of Determination (R^2)

Table 6. Coefficient of Determination (R²) Test

Model	R	R Square	Adjusted R-Square	Std. Error of the Estimate
1	0,327a	0.435480	0.582169	0,00284

Test result obtained mark Adjusted R Square is 0.582 or 58.2% which shows that variable free Green Banking (GB) and BOPO available explain ROA variable, so concluded that donation influence variable independent to variable dependent in a way simultaneous (simultaneous) of 38.4%. whereas the rest 41.8 % were influenced other variables outside model used in research This.

Discussion

  1. **The Effect of Green Banking on the Profitability of Islamic Banks**

Based on the results of panel data regression analysis using annual data from Islamic Commercial Banks in Indonesia during the period 2020–2024, it was found that the green banking variable has a positive and significant effect on profitability, as measured by Return on Assets (ROA). This finding is indicated by a positive coefficient for the green banking variable and a significance level below 5% (p-value < 0.05), suggesting that increased implementation of green banking practices by Islamic banks has a tangible impact on enhancing their profitability.

These results indicate that the more extensively green banking is applied through service digitalization, reductions in paper and energy usage, environmentally responsible financing, and sustainability reporting the greater the bank's capacity to generate profits from its total assets. This reinforces the understanding that sustainability practices not only generate environmental and social benefits but also deliver financial value for banking institutions.

Theoretically, this finding is consistent with stakeholder theory (Freeman, 1984), which asserts that organizations that consider the interests of all stakeholders including the environment and society are more likely to gain social legitimacy, enhance their reputation, and ultimately improve financial performance. Banks that adopt green banking principles demonstrate their social and environmental responsibility, which helps build customer trust, investor loyalty, and a stronger institutional image (Windasari Rachmawati, 2023). This trust, in turn, can broaden the customer base and increase the volume of productive financing, directly contributing to higher ROA.

This result is also supported by previous empirical research conducted by (Sharmeen & Yeaman, 2020), which found that the green banking index has a positive impact on the profitability of Islamic banks in Indonesia. Similarly, (Bouteraa et al., 2020) reported that green banking not only improves operational efficiency and corporate image but also significantly contributes to the achievement of long-term financial objectives. Therefore, the findings of this study provide empirical evidence that integrating sustainability principles into the operations of Islamic banks is a relevant and strategic approach to enhancing both economic value and corporate social responsibility.

2. **The Effect of Cost Efficiency on the Profitability of Islamic Banks**

Based on the panel regression analysis using annual data from Islamic Commercial Banks in Indonesia for the period 2020–2024, it was found that operational cost efficiency, as measured by the BOPO ratio (Operating Expenses to Operating Income), has a negative and significant effect on profitability, which is measured by Return on Assets (ROA). The negative coefficient of the

BOPO variable, with a significance level below 5% (p-value < 0.05), indicates that a higher BOPO ratio is associated with a lower level of bank profitability.

This finding suggests that an increase in operating costs that is not accompanied by a proportional increase in operating income leads to inefficiency in resource management, ultimately reducing the bank's ability to generate profit from its total assets. In other words, operational inefficiency becomes one of the main obstacles to achieving optimal profitability in financial institutions, including Islamic Commercial Banks. In practice, a high BOPO ratio may result from administrative burdens, personnel expenses, technological infrastructure costs, and inefficient or outdated service processes (Putri et al., 2024).

These results are consistent with stakeholder theory (Freeman, 1984), which emphasizes the importance of managing resources effectively and efficiently as a form of corporate responsibility to internal stakeholders, such as investors and management. When a bank can maintain operational efficiency, it is perceived as managing public funds responsibly and transparently—thereby strengthening stakeholder trust and creating long-term corporate value. Conversely, low levels of efficiency can reduce stakeholder confidence and have a direct negative impact on the financial performance of the institution.

Empirically, this finding is in line with the studies by (Ayu & Nurulrahmatiah, 2023),(Febry Malangi et al., 2023) who argued that the BOPO ratio is a critical indicator of internal efficiency that significantly affects bank profitability. A high BOPO ratio indicates that the proportion of operating expenses relative to income is too large, thereby eroding the bank's profit margin. Similarly, a study by (Hasibuan, 2021)found that BOPO has a negative and significant effect on ROA in Islamic banks in Indonesia, as high BOPO reflects the bank's limited managerial effectiveness in controlling cost burdens.

Therefore, it can be concluded that improving operational cost efficiency is a key factor in driving the profitability of Islamic Commercial Banks. To achieve this, banks must adopt digital technologies, improve process management, and conduct a comprehensive evaluation of their cost structures to ensure more optimal resource utilization and support sustainable financial performance.

CONCLUSION

Based on the results of the analysis and discussion conducted, the researcher draws the following conclusions:

Green banking has a positive effect on the profitability of Islamic banks in Indonesia. This finding indicates that the more extensively banks implement sustainability practices—such as energy efficiency, service digitalization, and green financing—the greater their ability to generate profits from total assets. This confirms that green banking not only benefits the environment but also creates economic value for financial institutions.

Cost efficiency has a negative effect on the profitability of Islamic banks in Indonesia. A higher BOPO ratio, which reflects lower operational efficiency, corresponds with a decline in the bank's ability to generate profit from its assets. This suggests that managing operational expenses effectively remains a significant challenge for Islamic banks in improving their financial performance.

Recommendations

Based on the conclusions above, the researcher offers the following recommendations:

For the management of Islamic Commercial Banks, it is recommended to continue strengthening the implementation of green banking as a core component of business strategy. Banks should expand digital-based services, reduce the use of non-renewable resources, and broaden their portfolio of environmentally friendly financing. These initiatives have been shown to not only enhance the bank's image and reputation but also improve financial performance. To increase operational cost efficiency, banks should reformulate their cost structures and adopt technological innovations that streamline service processes and reduce operating burdens. Digital transformation and the development of human resource capacity should become the primary strategies to sustainably lower the BOPO ratio.

For regulators and policymakers, such as the Financial Services Authority (OJK) and Bank Indonesia, it is hoped that they will continue to provide support in the form of regulations, fiscal incentives, and strengthened green infrastructure to encourage Islamic banking institutions to be more progressive in implementing sustainability principles without compromising financial system stability.

For future research, it is recommended to incorporate additional variables such as bank size, asset quality, or non-financial indicators to enrich the understanding of the relationship between green banking, efficiency, and profitability. Utilizing quarterly data or a longer time-series approach may also provide deeper and more robust insights.

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