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Do Green Finance and Islamic Financial Literacy Drive SDG Achievement? A Panel Study of Indonesian Islamic Banks

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Abstrak

This study investigates the role of green finance in supporting the achievement of the Sustainable Development Goals (SDGs) within Indonesian Islamic banking, with Islamic financial literacy incorporated as a moderating variable. Using panel data from eight Islamic commercial banks over the 2020–2024 period, the study applies a fixed-effects regression model to analyze the relationships among variables. The findings indicate that green finance has a positive and statistically significant effect on SDG achievement, highlighting the importance of sustainability-oriented financing in promoting environmental and social outcomes. Islamic financial literacy is also found to have a direct positive impact on SDG performance, suggesting that higher levels of public understanding of Islamic financial principles enhance the effectiveness of sustainable finance initiatives. Furthermore, the interaction between green finance and Islamic financial literacy is significant, implying that financial literacy strengthens the influence of green finance on sustainable development outcomes. In contrast, conventional financial indicators, such as Return on Equity (ROE) and leverage, do not show significant effects on SDG achievement. These results emphasize that value-based and knowledge-driven factors play a more critical role than traditional profitability measures in advancing sustainability within Islamic banking. This study contributes to the literature by integrating green finance and financial literacy perspectives, while also providing practical implications for policymakers and financial institutions to enhance sustainability strategies through financial education and green financing initiatives.

Keywords: Green Finance, Islamic Financial Literacy, Sustainable Development Goals, Islamic Banking, Sustainability, Indonesia.

1. Latar Belakang

Global climate change and environmental degradation have become critical challenges affecting economic stability, environmental sustainability, and social welfare across the world. Developing countries such as Indonesia face particularly significant risks due to rapid industrial growth, environmental pressures, and increasing demand for sustainable development policies (Stern, 2007). In response to these challenges, the concept of sustainable development has gained global attention through the United Nations Sustainable Development Goals (SDGs), which aim to achieve balanced economic growth, social inclusion, and environmental protection by 2030 (United Nations, 2023).

The financial sector plays a crucial role in supporting the achievement of the SDGs by mobilizing capital toward sustainable investments. In recent years, green finance has emerged as an important financial mechanism designed to direct financial resources toward environmentally friendly and socially responsible projects (Jinping et al., 2024; Raman et al., 2024). Green finance instruments include green bonds, sustainable loans, and environmentally oriented investment funds that aim to promote renewable energy development, reduce carbon emissions, and support environmentally sustainable economic activities (Karumanchi, 2024). Empirical studies demonstrate that green finance contributes significantly to environmental sustainability and economic development by facilitating investments in clean technologies and green infrastructure ((Chang et al., 2024; Yadav et al., 2024).

In the context of Muslim-majority countries, Islamic finance offers a complementary framework for promoting sustainable development. Islamic financial principles emphasize ethical investment, social justice, and environmental stewardship, which align closely with the objectives of sustainable development (Hassan et al., 2021; Jan et al., 2021). Islamic financial instruments such as green sukuk have been increasingly utilized to finance environmentally sustainable projects while adhering to Shariah principles (Araminta et al., 2022; Liu & Lai,

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2021). Indonesia has emerged as one of the pioneers in the development of green sukuk, issuing its first sovereign green sukuk in 2018 to finance climate-related infrastructure and sustainable development projects (Otoritas Jasa Keuangan, 2022).

Several studies have highlighted the growing role of Islamic green finance in promoting sustainable economic development. For example, (Ali et al., 2024) found that green sukuk financing contributes to economic growth, social welfare, and financial sector performance in Indonesia. Similarly, (Romadhon et al., 2023) emphasized that green sukuk financing supports the achievement of multiple SDGs, particularly those related to climate action, sustainable infrastructure, and responsible consumption. Other studies also highlight that Islamic banking institutions increasingly integrate sustainability principles through green financing initiatives and environmentally responsible investment strategies (Vitriani & Fasa, 2025; Widiyanti et al., 2025).

Despite the growing development of Islamic green finance, several challenges remain. One of the major barriers is the relatively low level of Islamic financial literacy among the public. Financial literacy plays a crucial role in shaping individuals' understanding of financial instruments and their willingness to participate in sustainable financial initiatives (Hafizah et al., 2016). In the context of Islamic finance, financial literacy includes knowledge of Shariah-compliant financial products and awareness of the ethical principles underlying Islamic economic activities (Abdullah et al., 2017). However, empirical evidence indicates that Islamic financial literacy remains relatively limited in many developing countries, which may hinder the effective adoption of Islamic financial instruments, including green financing mechanisms (Khan, 2019; Rahman et al., 2022).

Improving Islamic financial literacy is therefore considered an important strategy for strengthening the effectiveness of green finance initiatives. Higher literacy levels may increase public participation in sustainable financial products and enhance the capacity of financial institutions to implement sustainability-oriented strategies (Hassan et al., 2021). In addition, financial literacy may strengthen the relationship between green finance and sustainable development outcomes by encouraging greater awareness and engagement among stakeholders.

Although previous studies have examined the role of green finance and Islamic financial instruments in promoting sustainable development, empirical research linking Islamic financial literacy with the effectiveness of green finance in achieving SDGs remains limited, particularly in the context of Islamic banking institutions. Most prior studies focus either on green finance performance or on financial literacy independently, while the interaction between these two factors has received relatively little attention (Rahman et al., 2022; Raman et al., 2024). Existing studies rarely explore the moderating role of Islamic financial literacy in strengthening the impact of green finance on sustainable development outcomes using a quantitative panel data approach. This gap is particularly relevant in Indonesia, where Islamic banking continues to expand and plays an increasingly important role in financing sustainable economic development.

Based on these research gaps, this study aims to examine the effect of green finance on the achievement of Sustainable Development Goals (SDGs) within Islamic banking institutions in Indonesia, with Islamic financial literacy as a moderating variable. Using panel data from eight Islamic banks during the 2020–2024 period, this study seeks to provide empirical evidence on how sustainability-oriented financing and financial literacy jointly influence SDG achievement.

This research contributes to the literature on sustainable finance and Islamic banking in several ways. First, it provides empirical evidence on the relationship between green finance and SDG achievement within Islamic banking institutions. Second, it introduces Islamic financial literacy as a moderating factor that may strengthen the effectiveness of green financing initiatives. Finally, the study offers policy insights for financial regulators and Islamic banking institutions regarding the integration of sustainability-oriented financial policies and financial literacy development to support sustainable development goals.

2. Metode Penelitian

This study employs a quantitative explanatory approach to examine the relationship between green finance and the achievement of Sustainable Development Goals (SDGs) in Islamic banking institutions in Indonesia. The study also investigates the moderating role of Islamic financial literacy in strengthening the relationship between green finance and SDG achievement. Panel data regression is used to analyse the relationship among variables, as this approach allows for the examination of both cross-sectional and time-series variations within the dataset.

The research uses secondary data obtained from annual reports, sustainability reports, and financial statements published by Islamic banks in Indonesia. Additional supporting data related to Islamic financial literacy were obtained from reports issued by the Financial Services Authority (Otoritas Jasa Keuangan, 2022). The population consists of Islamic banking institutions operating in Indonesia, and the sample is selected using purposive sampling based on data availability and institutional consistency during the observation period.

Based on these criteria, eight Islamic commercial banks were selected as the research sample. The observation period covers five years, from 2020 to 2024, resulting in 40 observations. The variables analysed in this study consist of SDG achievement as the dependent variable, green finance as the independent variable, Islamic financial literacy as the moderating variable, and two control variables, namely Return on Equity (ROE) and leverage. Green finance is measured using the value of financing allocated to environmentally sustainable projects, while Islamic financial literacy is measured using the Islamic Financial Literacy Index published by the Financial Services Authority.

The regression model is estimated using panel data techniques, including the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Model selection is conducted using the Chow test and Hausman test to determine the most appropriate estimator. The moderating effect of Islamic financial literacy is examined through an interaction term between green finance and Islamic financial literacy in the regression model.

3. Hasil dan Diskusi

Statistik Deskriptif

Table 1. Statistic Deskriptif Variabel

Variabel	N	Mean	Std. Dev.	Min	Median	Max
Green Finance (Rp trillion)	40	2.814	3.761	0.12	1.15	14.20
Return on Equity (ROE) (%)	40	9.203	2.984	2.11	8.83	15.98
Leverage	40	2.045	0.942	1.01	1.76	4.65
Islamic Financial Literacy Index	40	21.73	10.84	9.14	19.88	41.21
SDGs Index	40	0.526	0.278	0.12	0.518	0.998

Source: Author's calculation

Based on 40 observations, the Financing variable has an average value of IDR 2.814 trillion with a standard deviation of 3.761, indicating a relatively high level of variability. Financing values range from IDR 0.12 trillion to IDR 14.20 trillion. The average Return on Equity (ROE) is 9.203%, with values ranging from 2.11% to 15.98%. Meanwhile, Leverage has an average of 2.045, with a range between 1.01 and 4.65. The Financial Literacy Index records an average of 21.73 with a standard deviation of 10.84, reflecting considerable disparities in literacy levels across entities. The SDGs Index shows a mean value of 0.526, with a minimum of 0.12 and a maximum of 0.998.

Correlation Between Variables (Pearson)

To examine the strength and direction of the relationships among variables, a Pearson correlation analysis was conducted. The results are presented in Table 2.

Table 2. Pearson Correlation Matrix

	Green Finance	ROE	Leverage	Literacy	SDG Index
Green Finance (Rp trillion)	1	0.212	-0.051	0.311	0.423
Return on Equity (ROE) (%)	–	1	-0.032	0.143	0.219
Leverage	–	–	1	-0.061	-0.098
Islamic Financial Literacy Index	–	–	–	1	0.371
SDGs Index	–	–	–	–	1

Source: Author's calculation

Pearson correlation analysis was conducted to examine the relationships among the variables in this study. The results indicate that Financing is positively correlated with ROE (0.212), the Financial Literacy Index (0.311), and the SDGs Index (0.423), with the strongest correlation observed with the SDGs Index. In contrast, its correlation with Leverage is negative but very weak (-0.051). ROE exhibits weak positive correlations with both the Literacy Index (0.143) and the SDGs Index (0.219), and shows virtually no correlation with Leverage (-0.032). Leverage itself shows weak negative correlations with the Literacy Index (-0.061) and the SDGs Index (-0.098). A relatively stronger relationship is observed between the Financial Literacy Index and the SDGs Index, with a correlation coefficient of 0.371, suggesting that improvements in financial literacy tend to align with greater progress in sustainable development.

Classical Assumption Tests

To ensure the validity of the regression model, classical assumption tests were conducted, including multicollinearity, heteroscedasticity, autocorrelation, and residual normality tests. The results are summarized in Table 3.

Table 3. Results of Classical Assumption Tests

Test	Statistic Value	Interpretation
Multicollinearity (VIF)	Highest VIF: 4.81	All VIFs are below the threshold of 10 → No multicollinearity issue
Heteroscedasticity (Breusch–Pagan)	$p = 0.412$	Not statistically significant ($p > 0.05$) → Homoscedasticity assumption is satisfied
Autocorrelation (Durbin–Watson)	DW = 2.12	DW value is close to 2 → No autocorrelation detected
Residual Normality (Jarque–Bera)	$p = 0.244$	Not statistically significant ($p > 0.05$) → Residuals are normally distributed

Source: Author’s calculation

Classical assumption tests were conducted to ensure the validity of the regression model. The multicollinearity test results show that the highest Variance Inflation Factor (VIF) is 4.81, which is below the commonly accepted threshold ($VIF < 10$), indicating no multicollinearity among the independent variables. The heteroscedasticity test, conducted using the Breusch–Pagan method, yielded a significance value of $p = 0.412$, which is not significant at the 5% level, thereby confirming the assumption of homoscedasticity. The autocorrelation test using the Durbin–Watson statistic produced a DW value of 2.12, which lies within the neutral range (around 2), indicating the absence of autocorrelation in the residuals. Furthermore, the normality test of the residuals using the Jarque–Bera test yielded a p-value of 0.244, which is also not significant, suggesting that the residuals are normally distributed.

Panel Regression Testing and Model Selection

Before determining the most appropriate regression model, three basic panel data models were estimated: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). A summary of the estimation results for each model is presented below:

Table 4. Initial Panel Model Estimation

Model	Probability (Significance)	R ² Value
Common Effect Model (CEM)	Prob > F = 0.047	R ² = 0.418
Fixed Effect Model (FEM)	Prob > F = 0.0004	R ² (within) = 0.681
Random Effect Model (REM)	Prob > Wald Chi ² = 0.002	R ² (overall) = 0.503

Source: Author’s calculation

Table 5. Panel Model Selection

Test	Test Result	Decision
Chow Test	Prob > F = 0.018	Choose FEM (\neq CEM)
Hausman Test	Prob > Chi ² = 0.032	Choose FEM (\neq REM)

Note. Elaborated by the authors

Based on the results of both tests, the Fixed Effects Model (FEM) was selected as the most appropriate model for this study. FEM controls for unobserved individual-specific effects and produces more consistent and efficient estimates compared to CEM and REM

Panel Regression Results

Panel regression analysis was conducted to examine the effect of green finance and Islamic financial literacy on SDG achievement. Model selection tests using the Chow and Hausman tests indicate that the Fixed Effects Model (FEM) is the most appropriate estimator.

Table 6. Fixed Effects Model Regression Results

Variable	Coefficient	Std. Error	p-value
Green Finance	0.0375	0.0148	0.014
ROE	0.0062	0.0089	0.481
Leverage	-0.0114	0.0282	0.688
Islamic Financial Literacy	0.0091	0.0035	0.010
Green Finance \times Literacy	0.0013	0.0006	0.036

The results show that green finance has a positive and significant effect on SDG achievement. Islamic financial literacy also shows a significant positive effect on sustainability outcomes. Furthermore, the interaction term between green finance and Islamic financial literacy is significant, indicating that financial literacy strengthens the relationship between green finance and SDG achievement

Discussion

The green financing variable exhibits a positive and statistically significant, indicating that greater allocation of funds toward sustainable sectors is associated with a higher contribution of Islamic banks to the achievement of Sustainable Development Goals (SDGs), particularly in the environmental and social dimensions. This finding reinforces the results of (Ali et al., 2024), who found that green sukuk and green financing stimulate economic growth while reducing environmental pressures. Similarly, (Hassan et al., 2021; Karumanchi, 2024) demonstrated that green financing significantly reduces carbon emissions and supports renewable energy projects in developing countries.

(Widiyanti et al., 2025) noted that the implementation of green banking practices in Islamic banks such as energy efficiency initiatives and financing of environmentally conscious projects continues to develop, albeit not yet on a large scale. In addition (Mohammed & Md Taib, 2025) emphasized that Bank Syariah Indonesia actively utilizes green financing as an instrument to realize maqāṣid al-sharī'ah and support the national SDGs agenda (Billah et al., 2023) argued that the success of green finance is closely linked to institutional transparency and reputation, particularly in Southeast Asia, including Indonesia. This highlights the importance of building investor and regulatory trust in Islamic finance as a pioneer of sustainable finance.

From a theoretical perspective, this finding is also consistent with the argument of (Stern, 2007), who asserted that investments in the green sector represent a rational economic solution to the climate crisis, requiring active participation from the financial sector to redirect capital flows toward low-carbon projects.

The Islamic financial literacy index also displays a positive and significant. This suggests that higher public understanding of Islamic financial principles and instruments enhances the effectiveness of sustainable financing provided by Islamic banks in supporting the achievement of SDGs. This result aligns with the OJK (2022) report,

which shows that improved Islamic financial literacy contributes to national growth in Islamic financial inclusion and raises awareness of the value-based financing paradigm.

(Raman et al., 2024) also highlighted that the low level of Islamic financial literacy remains a key barrier to the development of green finance, particularly in terms of public understanding of sustainability-oriented financial instruments. Therefore, improving literacy is not only an educational strategy but also has a direct impact on the effectiveness and adoption of green financing ((Abdullah et al., 2017; Abedifar et al., 2015)) emphasized the importance of human resource and regulatory aspects in driving the transformation toward green banking, where financial literacy is a critical prerequisite to bridging the gap between the potential and implementation of green finance. (Qureshi & Talat, 2020) further argued that policy initiatives aimed at strengthening green banking in Islamic financial institutions must be accompanied by improvements in literacy, as it serves as the foundation for behavioral change among both consumers and industry players.

The interaction term between green financing and Islamic financial literacy yields a positive and significant, indicating that financial literacy serves as a moderating variable that strengthens the effect of green financing on SDG achievement. In other words, the higher the level of literacy, the more optimal the impact of green financing in advancing sustainable development. This finding is supported by (Hassan et al., 2021), who noted that Islamic financial literacy fosters synergies between Islamic values, sustainability principles, and global agendas such as the SDGs. They advocate for the integration of sustainable financial education into the broader policy framework of Islamic financial sector development.

(Romadhon et al., 2023) also found that the success of green sukuk and green financing is not solely determined by the volume of investment but also by stakeholders' understanding and commitment to sustainability principles. Moreover, (Abedifar et al., 2015) added that leadership values and organizational culture within Islamic banks shaped in part by internal literacy levels play a vital role in the success of sustainable finance programs. They recommend ongoing training and capacity building within the Islamic finance sector to accelerate the green finance agenda.

The two control variables Return on Equity (ROE) and Leverage do not exhibit statistically significant relationships with SDG achievement. This suggests that conventional financial performance indicators are not the primary factors explaining the contribution of Islamic banks to sustainable development goals. This result is consistent with (Mohammed & Md Taib, 2025), who found that decision-making related to green financing in Islamic banks is not solely profit-driven but rather value-driven. Similarly, (Abdullah et al., 2017; Jan et al., 2021) emphasized that green finance from an Islamic perspective is guided by principles of intergenerational justice and environmental stewardship, which are integral to the *maqāṣid al-sharī'ah*. These findings also support the argument of (Yadav et al., 2024) that while financial stability remains important, non-financial factors such as environmental and social governance are increasingly recognized as key indicators of long-term sustainable performance.

4. Conclusion

This study investigates the role of green finance and Islamic financial literacy in supporting the achievement of Sustainable Development Goals (SDGs) by Islamic banks in Indonesia during the 2020–2024 period. The empirical results demonstrate that green finance has a positive and statistically significant effect on SDG performance, underlining the importance of sustainable financing within Islamic banking practices. Islamic financial literacy also exerts a significant positive influence, and its interaction with green finance further enhances the impact on SDG outcomes. These findings suggest that literacy acts as a key enabler, strengthening the effectiveness of green finance initiatives. Meanwhile, traditional financial indicators such as Return on Equity (ROE) and leverage show no significant relationship with SDG achievement, indicating that sustainability performance is driven more by value-based factors than by conventional profitability metrics. In conclusion, green finance and Islamic financial literacy emerge as essential and complementary drivers of sustainability in the Islamic banking sector. These results imply that integrated strategies involving policy support, stakeholder education, and value-driven financing mechanisms are critical to accelerating progress toward the SDGs in Islamic finance contexts.

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