THE IMPACT OF ECO-EFFICIENCY ON COMPANY VALUE, MODERATED BY ENVIRONMENTAL PERFORMANCE, FROM THE PERSPECTIVE OF ISLAMIC ECONOMICS

Rhesmita Sutjiati[1]
Evi Ekawati[2]
Ersi Sisdianto[3]

[1,2,3]Universitas Islam Negeri Raden Intan Lampung
Jl. Letnan Kolonel H. Endro Suratmin, Sukarame, Bandar Lampung

[1]rhesmita15@gmail.com
[2]evi.ekawati@radenintan.ac.id
[3]ersisisdianto@radenintan.ac.id

Abstact: *Amid intense business competition, companies are now required to balance economic achievements with concern for social and environmental aspects to build sustainable businesses. One strategic approach to this is eco-efficiency, which aims to manage environmental impacts efficiently while simultaneously improving economic performance. However, firms included in the Jakarta Islamic Index 70 (JII70) continue to encounter obstacles, particularly due to the absence of consistent mandatory sustainability reporting in Indonesia. The study population includes firms listed in JII70 during the 2020–2023 period. A total of 11 companies were selected using purposive sampling, resulting in 44 observations, which were analyzed using panel data regression with the help of Eviews version 12. The findings reveal that eco-efficiency has a positive effect on firm value. However, environmental performance does not moderate the relationship between eco-efficiency and firm value. From an Islamic perspective, environmental preservation is a fundamental duty of humankind, as emphasized in QS. Ar-Rum verse 41 and QS. Al-A'raf verse 56.*
Keywords: Eco-Efficiency, Firm Value, Environmental Performance, JII70

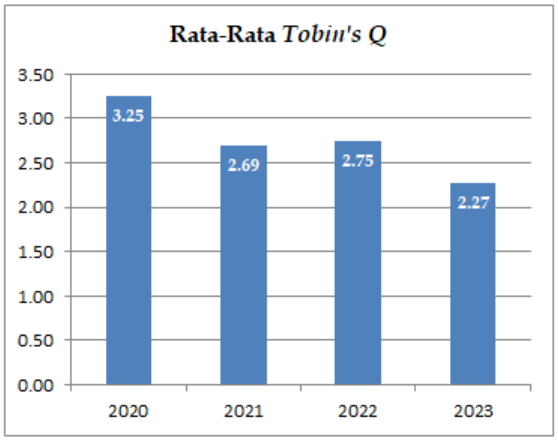
Abstrak: Di tengah persaingan bisnis yang ketat, perusahaan kini perlu menyeimbangkan pencapaian ekonomi serta kepedulian terhadap aspek sosial maupun lingkungan untuk menciptakan bisnis yang berkelanjutan. Salah satu pendekatan dalam hal ini adalah eco-efficiency yang menjadi isu strategis untuk mengelola dampak lingkungan secara efisien sekaligus meningkatkan kinerja ekonomi. Namun, implementasinya pada perusahaan-perusahaan Jakarta Islamic Index 70 (JII70) masih menghadapi tantangan, terlihat dari belum adanya kewajiban pelaporan keberlanjutan yang konsisten di Indonesia. Populasi penelitian mencakup perusahaan yang terdaftar di JII70 tahun 2020-2023. Sebanyak 11 perusahaan dipilih melalui purposive sampling, menghasilkan 44 observasi yang kemudian dianalisis menggunakan regresi data panel dengan Eviews versi 12. Hasil yang ditemukan dalam penelitian ini yakni eco-efficiency berpengaruh positif terhadap nilai perusahaan. Namun, kinerja lingkungan tidak mampu memoderasi pengaruh eco-efficiency terhadap nilai perusahaan. Dalam perspektif Islam, menjaga kelestarian lingkungan merupakan kewajiban umat manusia yang tertuang dalam QS. Ar-Rum ayat 41 dan QS. Al-A'raf ayat 56.
Kata Kunci: Eco-Efficiency, Nilai Perusahaan, Kinerja Lingkungan, JII70

INTRODUCTION

The rapid development of business demands that companies compete globally and adopt the right strategies to maintain their competitive edge and ensure business continuity—one of which is attracting investor attention to secure capital investment. Investor activity in the capital market is positively correlated with rising stock prices, which ultimately contributes to enhancing company value (Nugraha & Nursasi, 2022). The value of a company reflects how investors perceive its prospects and its overall performance. However, not all companies are able to maintain or increase their value as reflected by the fluctuations occurring in the capital market (Kurniawan *et al.*, 2024).

The value of a company can be evaluated using Tobin's Q, which is an indicator that provides a comprehensive picture of how much the market value of the company compares to the replacement cost of its assets. If Tobin's Q > 1, it means the market assesses that the company has the potential for positive growth, whereas if Tobin's Q < 1, it reflects the suboptimal utilization of assets (Mediyanti *et al.*, 2021). Based on the calculation, the average Tobin's Q of 11 sample companies in the Jakarta Islamic Index 70 (JII70) during 2020-2023 is as follows:

Graph 1. Average Tobin's Q Value of JII70 Companies 2020-2023



Source: processed data, 2025

Graph 1 illustrates the variation in the Tobin's Q value of 11 JII70 companies from 2020 to 2023. In 2020, the value was 3.25, then dropped by about 17.2% to 2.69 in 2021. Although there was a 2.2% increase in 2022 to 2.75, the trend declined again in 2023 by 17.5%, with an average value of 2.27. These variations reflect the fluctuations in market valuation of the companies, indicating the importance of further research on the variables determining company value, such as eco-efficiency and environmental performance.

Companies are not only required to be financially efficient but also to fulfill their responsibilities toward social aspects and environmental sustainability. (Ningsih *et al.*, 2021). The concept of eco-efficiency was first introduced by Schaltegger & Sturm and then widely popularized by Schmidheiny and the World Business Council for Sustainable Development (WBCSD) (Rodríguez-García *et al.*, 2022). Since then, eco-efficiency has been recognized as a key strategic issue in global business practices, especially with regard to corporate commitments and activities towards sustainable development. Eco-efficiency, or ecological efficiency, is a company's strategy to reduce environmental impact through operational efficiency.

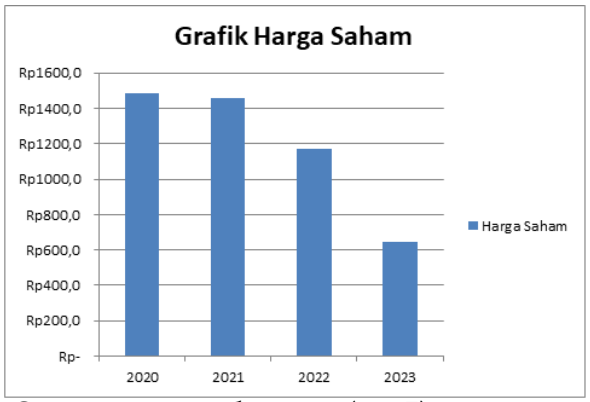
This strategy integrates production efficiency through responsible resource management by saving raw materials, energy, and water, as well as minimizing the amount of waste generated per unit of product (Pratama & Ainiyah, 2023).

Eco-efficiency combines economic and environmental efficiency through the principle of "doing more with less", where companies strive to maximize output while minimizing the use of resources, waste, and emissions. The concept of eco-efficiency is not solely focused on production cost efficiency but also aims to drive profit increases, which in turn can enhance the company's value and strengthen its appeal to investors. (Atiningsih & Setiyono, 2023). However, the effectiveness of eco-efficiency is highly dependent on the quality of the company's environmental performance because good performance serves as a positive signal to stakeholders while poor performance can undermine the legitimacy of the company (Ramadani *et al.*, 2023).

Environmental performance refers to a company's ability to address environmental damage arising from its operational activities. This includes waste reduction, emissions management, energy and water conservation, and compliance with applicable environmental regulations (Bundoyo & Davianti, 2019). Good environmental performance reflects the company's seriousness in integrating sustainability into its business strategy and indirectly strengthens the company's reputation in the eyes of investors and the public (Daromes & Kawilarang, 2020). Conversely, failure to manage environmental aspects can trigger legal sanctions, community rejection and even a decline in the company's market value.

The issue of environmental damage is increasingly in the public and investor spotlight. Companies that do not pay attention to their environmental responsibilities will face various risks such as loss of public trust, legal actions, and a decline in stock market value. The case of PT Timah Tbk from 2015 to 2022 provides a concrete example. Its mining activities have caused not only economic losses but also significant environmental damage in *Bangka Belitung*. The damage caused to the forests is estimated to reach Rp271 trillion, with impacts including the loss of biodiversity, air and water pollution, and soil instability (Anitasari, 2024). This case shows that although it provides economic benefits, business activities that neglect environmental aspects can actually lead to more detrimental long-term consequences.

Graph 2. Share Price of PT Timah Tbk 2020-2023



Source: www.idx.com, (2025)

Graph 2 shows that PT Timah Tbk's stock price has been declining since 2020. Although the stock price remained relatively stable in 2021 at Rp1,455, a significant decline occurred from 2022 to 2023, when it fell from Rp1,170 to Rp645. The fluctuations that occur reflect the impact of business instability, including environmental issues and regulations that can affect investor confidence in the company (Fitria & Mariana, 2025).

On the other hand, companies included in the JII70 are expected not only to excel in financial aspects but also to commit to social and environmental aspects. This index identifies businesses that uphold Sharia principles in all aspects of their operations (Ika & Suryani, 2024). But in reality, there are still companies in this index that have not fully implemented sustainability principles. An example is PT Bukit Asam Tbk., which was reported to have polluted the Kiahaan River on June 7, 2021 (Rmolsumsel, 2022). Moreover, the implementation of eco-efficiency in Indonesia has not been optimal, as reflected in the inconsistent and still voluntary sustainability reporting in Indonesia (Saputri & Sisdianto, 2021).

Rodríguez-García et al., (2022) found that eco-efficiency with emission intensity indicators has a positive impact on financial performance. The lower the greenhouse gas emission ratio to sales, the higher the Tobin's Q value. As explained in the study by Daud et al., (2023), companies with low GHG emissions have better financial performance. However, different results were found by Nengzih (2022), which showed that carbon dioxide emissions do not affect financial performance due to the high investment costs in environmentally friendly technology that suppress short-term profits.

Besides emission intensity, several studies use possession of ISO 14001 certification as an indicator of eco-efficiency. Research conducted by Aulia & Machdar (2024), Pratama & Ainiyah (2023), and Sinkin et al., (2008) found that eco-efficiency positively affects company value. Companies that implement eco-efficiency are able to reduce operational costs and increase profitability, thereby gaining higher market appreciation. However, Nashrulloh & Achyani (2024) and Yuliandhari et al., (2023) found that eco-efficiency does not have a significant impact on company value.

There are inconsistencies in the findings within the literature that indicate a research gap, which has led the researchers to be interested in conducting this study. Environmental performance acts as a moderator in this study, reflecting the extent to which the company effectively manages its environmental impact. Rahmanita's (2020) research supports this view by revealing that companies that achieve high rankings in PROPER (*Program Penilaian Peringkat Kinerja Lingkungan*) or Environmental Performance Rating Program tend to have a positive environmental reputation, which impacts market perception and company value.

This research is relevant because even sharia-based companies in the JII70 still face challenges in environmental management. Thus, this research is expected to expand academic understanding of environmental accounting and provide practical contributions for companies and investors in assessing sustainability strategies.

THEORETICAL REVIEW

Legitimacy Theory

The legitimacy theory emphasizes the importance of aligning corporate activities with prevailing norms and values in order to maintain support and trust from the community. The mismatch between corporate values and social expectations can threaten legitimacy and potentially lead to legal, economic, or social sanctions (Dowling & Pfeffer, 1975). One way companies maintain legitimacy is by transparently disclosing their social and environmental responsibilities (Putri & Hadinugroho, 2023). Through this disclosure, the company aims to create a positive image that can strengthen stakeholder trust and contribute to the growth of positive perceptions of the company's performance in the market.

Signal Theory

Signal theory in economics and finance reveals how internal parties with comprehensive information can signal external parties with less information to reduce information asymmetry. Companies need to provide information through the disclosure of data that is considered relevant and credible (Fahmi, 2014). The form of signaling conveyed by the company includes various indicators, both financial and non-financial, such as environmental achievements, implementation of sustainability and the level of business efficiency (Suwardjono, 2013).

Eco-Efficiency

Eco-efficiency reflects the integration of economic and ecological aspects by emphasizing the optimal use of resources to create economic value while minimizing the impact on the environment (DeSimone & Popoff, 2000). Companies that implement this concept strive to run business processes efficiently and environmentally friendly to reduce costs and improve long-term competitiveness.

Company Value

The value of a company reflects the level of confidence investors have in the current business performance and its potential for future growth. The movement of stock prices on the exchange typically reflects this confidence. When stock prices rise, it indicates that the market believes the company has promising prospects, which ultimately strengthens confidence and provides economic benefits to shareholders (Wulandari & Widyawati, 2020).

Environmental Performance

The company demonstrates its environmental responsibility through the management of operational impacts, including resource efficiency, emission and waste reduction, and compliance with environmental regulations. When the company improves its environmental performance, it reduces the risk of pollution and environmental damage (Ramadani et al., 2023).

Environmental Performance in the View of Islamic Economics

Environmental performance in Islam is a concrete manifestation of the implementation of the values of tawhid, amanah and maslahah. Humans have a role as leaders on earth who are entrusted with the task of caring for and managing the environment with full responsibility and wisdom. Therefore, attention to the environment is not only a form of compliance with regulations but also a manifestation of spiritual responsibility. Islam views the environment as a trust that must be maintained. As *QS. Ar-Rum* (30:41):

ظَهَرَ الْفَسَادُ فِى الْبَرِّ وَالْبَحْرِ بِمَا كَسَبَتْ اَيْدِى النَّاسِ لِيُذِيْقَهُمْ بَعْضَ الَّذِيْ عَمِلُوْا لَعَلَّهُمْ يَرْجِعُوْنَ

"Corruption has spread on land and sea as a result of what people's hands have done, so that Allah may cause them to taste ˹the consequences of˺ some of their deeds and perhaps they might return ˹to the Right Path."

The above verse emphasizes that actions damaging nature due to human greed constitute a violation of Islamic teachings. Sustainability and social responsibility are fundamental principles that demand a balance between profit achievement and environmental preservation (Husna & Pangestu, 2024). This is why Allah SWT clearly emphasizes the importance of environmental preservation and the application of Islamic principles in managing life, because humans have the role of leaders and stewards of the earth who must be responsible.

The Influence of Eco-Efficiency on Company Value

Eco-efficiency is a corporate strategy to achieve economic efficiency while maintaining environmental sustainability by minimizing air and water pollution and using natural resources more economically and wisely. Based on legitimacy theory, companies are expected to carry out operational activities in accordance with social norms and community expectations in environmental aspects. Through the implementation of eco-efficiency, companies seek to gain legitimacy from the public and regulators.

Furthermore, according to the signaling theory, the dissemination of information by the company to the public can reflect the level of trust and business growth potential, which contributes to shaping the capital market's perception of the company's valuation. The implementation of good eco-efficiency reflects long-term sustainability and social responsibility, which can enhance investors' positive perception of the company's reputation. Companies that adopt environmentally friendly strategies are generally rated higher by the market due to their success in reducing costs and increasing profitability compared to companies that do not implement them (Sinkin et al., 2008).

Research by Rodríguez-García et al., (2022) shows that eco-efficiency measured using the proxy of emission intensity has a positive effect on financial performance. This finding is consistent with the research by Daud et al., (2023) that companies capable of reducing greenhouse gas emissions tend to show superior financial performance. However, different results were reported by Nengzih (2022) who stated that emission intensity does not affect financial performance.

H1: Eco-Efficiency has a positive effect on Company Value.

The Role of Environmental Performance in Moderating the Eco-Efficiency Variable on Company Value

Environmental performance reflects how well a company manages the ecological impact of its activities, which can be measured through the PROPER program. According to signaling theory, a high environmental ranking reflects the company's commitment to sustainability, which serves as a positive signal for investors. The implementation of eco-efficiency by the company will have a greater impact on increasing the company's value if supported by excellent environmental performance because this reflects efficiency that is not solely aimed at maximizing profit but also considers ecological sustainability (Damas et al., 2021).

The results of the study by Damas et al., (2021) prove that environmental performance moderates the impact of eco-efficiency on company value. Through responsible environmental practices, companies are able to build public trust and gain social recognition for their commitment to preserving the environment. The result is in line with Rahmanita's (2020) research, which found that environmental performance moderates the impact of carbon emission disclosure on company value. However, these findings differ from Anggraeni's (2015) results, which did not find evidence of the moderating role of environmental performance on the disclosure of greenhouse gas emissions and company value.

H2: Environmental Performance strengthens the relationship between Eco-Efficiency and Company Value.

RESEARCH METHOD

This quantitative research uses secondary data in the form of annual reports and sustainability reports obtained from the official website of the Indonesia Stock Exchange (IDX) as well as the official websites of each company. Meanwhile, the data for the *Penilaian Peringkat Kinerja Perusahaan* (PROPER) or Corporate Performance Rating was obtained from the official website of the Ministry of Environment and Forestry through www.menlh.go.id. The population in the study includes all issuers listed in JII70 from 2020-2023. The sample determination was conducted using purposive sampling, resulting in 11 companies with a total of 44 observations. The sample criteria are presented as follows:

1. Companies that are regularly listed on the JII70 during the period 2020-2023.
2. Companies that regularly publish annual reports and sustainability reports during 2020-2023.
3. Companies that present financial information in rupiah currency.
4. Companies registered in the PROPER program for the years 2020-2023.

This research involves several variables, namely company value, which serves as the dependent variable; eco-efficiency, which functions as the independent variable; and environmental performance, which is placed as the moderating variable. The operationalization of each variable is presented as follows:

Table 1. Operationalization of Research Variables

Variabel	Indicator	Measurement	Source
Company Value	Tobin's Q Ratio	$Tobin's\ Q = \frac{MVE + Debt}{Total\ Assets}$	Mediyanti et al., 2021
Eco-Efficiency	Emission Intensity	$Eco - Efficiency = \frac{Emisi\ GRK}{Total\ Sales\ (millions\ of\ rupiah)}$	Daud et al., 2023
Environmental Performance	PROPER Rating	PROPER scores are classified into five color levels: Gold = 5 Green = 4 Blue = 3 Red = 2 Black = 1	Ministry of Environment and Forestry (MoEF), 2002

Source: processed data, 2025

The data analysis process in this study involved several steps: beginning with descriptive statistics and model selection, followed by classical assumption testing, the application of multiple linear regression analysis using the Moderated Regression Analysis (MRA) approach, and concluding with hypothesis testing. The regression model is as follows:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2}$$

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_1 X_2 \, e}$$

Where Y represents firm value, α is a constant, β_1, β_2, and β_3 are regression coefficients, X_1 is eco-efficiency, X_2 is environmental performance, and $X_1 \cdot X_2$ denotes the interaction term between eco-efficiency and environmental performance. Meanwhile, e represents the error term.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Below are the results of descriptive analysis for each operational variable:

Table 2. Descriptive Statistics

	X	Y	Z
Mean	0.145095	2.740470	4.068182
Median	0.013100	1.443200	4.000000
Maximum	0.817100	14.41470	5.000000
Minimum	0.000400	0.566300	3.000000
Std. Dev.	0.281417	2.988676	0.846270
Observations	44	44	44

Source: processed data, 2025

In Table 2, the mean value of eco-efficiency (X) is 0.145095, with a standard deviation of 0.281417, a minimum value of 0.000400, and a maximum value of 0.817100. The firm value variable (Y) has a mean of 2.740470, a standard deviation of 2.988676, a minimum value of 0.566300, and a maximum value of 14.414700. Meanwhile, the environmental performance variable (Z) has a mean of 4.068182, a standard deviation of 0.846270, a minimum value of 3.000000, and a maximum value of 5.000000.

Panel Data Model Estimation

To determine the most appropriate model, three stages of estimation tests were conducted, starting with the Chow test to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM).

Table 3. Chow Test

	Statistic	d.f.	Prob.
Cross-section F	39.083372	(10,31)	0.0000
Cross-section Chi-square	114.867456	10	0.0000

Source: processed data, 2025

As shown in Table 3, the probability value of the Chow test is 0.0000 < 0.05; therefore, it can be concluded that the Fixed Effect Model (FEM) is more appropriate than the Common Effect Model (CEM). Subsequently, the Hausman test was conducted to determine the most suitable model between FEM and the Random Effect Model (REM).

Table 4. Hausman Test

	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.434918	2	0.4880

Source: processed, 2025

As shown in Table 4, the probability value is 0.4880, which is greater than 0.05. This indicates that the Random Effect Model (REM) is more appropriate to use than the Fixed Effect Model (FEM). The final step is to conduct the Lagrange Multiplier (LM) test to evaluate the superiority of the REM over the Common Effect Model (CEM).

Table 5. LM test

	Cross-section	*Time*	*Both*
Breusch-Pagan	49.94121	1.008043	50.94925
	(0.0000)	(0.3154)	(0.0000)

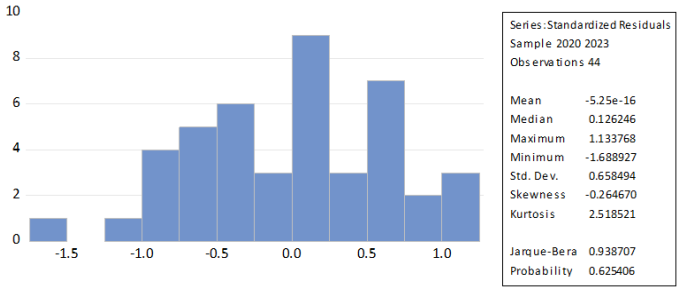
Source: processed, 2025

In Table 5, the Breusch-Pagan value is 0.0000 < 0.05, so the REM model is more appropriate to apply than the CEM. From all test results, the most relevant model for this study is the Random Effect Model (REM).

Classical Assumptions Testing

Normality Test

Figure 3. Normality Test



Source: processed data, 2025

As shown in Figure 3, the probability value of the Jarque-Bera test is 0.625406, which is greater than 0.05, indicating that the variable is normally distributed.

Multicollinearity Test

Multicollinearity Test

	X	**Z**
X	1.000000	0.246773
Z	0.246773	1.000000

Source: processed data, 2025

Table 6 shows that the correlation between independent variables is below 0.8, so it can be concluded that there is no multicollinearity among the variables.

Heteroscedasticity Test

Table 7. Heteroscedasticity Test

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C	0.732127	0.316598	2.312482	0.0258
X	-0.019375	0.038479	-0.503516	0.6173
Z	-0.065134	0.060588	-1.075026	0.2886

Source: processed data, 2025

As shown in Table 7, all variables have probability values greater than 0.05, indicating that the model is free from heteroscedasticity.

Hypothesis Testing

Multiple Linear Regression Analysis

Table 8. Equation I

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.193151	0.376248	-0.513360	0.6104
X	-0.206452	0.078741	-2.621904	0.0121

Source: processed data, 2025

Table 8 presents the resulting simple linear regression equation, which can be expressed as follows:

$$Y = -0.193151 - 0.206452(X) + e$$

From the equation above, the constant value of -0.193151 indicates that when eco-efficiency is zero, the firm's value is estimated to be -0.193151. The regression coefficient of eco-efficiency, which is -0.206452, suggests that each one-unit increase in the emission intensity ratio (tons of CO_2e per one million rupiah in sales) will reduce the firm's value by 0.206452, assuming other variables remain constant. This finding indicates that the lower the eco-efficiency, as measured by emission intensity, the higher the firm's value tends to be.

Table 9. Equation II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.919795	0.682564	1.347558	0.1854
X	-0.117151	0.172003	-0.681099	0.4997
Z	-0.291110	0.149851	-1.942660	0.0591
XZ	-0.026983	0.041958	-0.643091	0.5238

Source: processed data, 2025

Table 9 presents the results of the multiple linear regression equation using the Moderated Regression Analysis (MRA), which can be formulated as follows:

$$Y = 0.919795 - 0.117151(X_1) - 0.291110(X_2) - 0.026983(X_1X_2) + e$$

According to the equation above, the interaction coefficient value between the eco-efficiency variable and environmental performance (XZ) is -0.026983, indicating that the coefficient is negative. This means that when environmental performance increases, the negative impact of eco-efficiency on company value becomes stronger. However, this interaction effect is also not statistically significant, as indicated by the probability value of 0.5238 > 0.05, meaning that environmental performance cannot moderate the impact of eco-efficiency on company value.

Partial Test (t-Test)

Table 10. t-Test for Equation I

	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.193151	0.376248	-0.513360	0.6104
X	-0.206452	0.078741	-2.621904	0.0121

Source: processed data, 2025

As shown in Table 10, eco-efficiency (X), measured by emission intensity, has a coefficient of -0.206452. This indicates that emission intensity is inversely related to firm value. Since lower emission intensity reflects better eco-efficiency performance, the negative coefficient actually suggests a positive relationship between eco-efficiency and firm value. Furthermore, the probability value of 0.0121 is less than 0.05, indicating that the effect is statistically significant.

Table 11. t-Test for Equation II

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	0.919795	0.682564	1.347558	0.1854
X	-0.117151	0.172003	-0.681099	0.4997
Z	-0.291110	0.149851	-1.942660	0.0591
XZ	-0.026983	0.041958	-0.643091	0.5238

Source: processed data, 2025

As shown in Table 11, the coefficient for the interaction variable between eco-efficiency and environmental performance (XZ) is -0.026983, with a probability value of 0.5238, which is greater than 0.05. Therefore, it can be concluded that environmental performance does not significantly moderate the effect of eco-efficiency on firm value.

Coefficient of Determination (R^2)

Table 12. R^2 Test for Equation I

R-squared	0.143591
Adjusted R-squared	0.123200

Source: processed data, 2025

In Table 12, the R-squared value is 0.143591, indicating that the eco-efficiency variable (X) can explain 14.36% of the variation in firm value (Y). The remaining 85.64% is influenced by other factors not examined in this study.

Table 13. R^2 Test for Equation II

R-squared	0.264905
Adjusted R-squared	0.209773

Source: processed data, 2025

In Table 13, the adjusted R-squared value is 0.209773, indicating that the eco-efficiency variable (X), environmental performance (Z), and their interaction (XZ) can explain approximately 20.98% of the variation in firm value (Y). The remaining 79.02% is attributed to other variables not examined in this study.

The Effect of Eco-Efficiency on Firm Value

Partial testing through a t-test for the eco-efficiency variable yielded a regression coefficient of -0.206452 and a probability value of 0.0121 (< 0.05), indicating that eco-efficiency has a statistically significant effect on firm value. The negative coefficient should be interpreted in light of how eco-efficiency is measured in this study—using emission intensity. Since lower emission intensity reflects higher eco-efficiency, the negative coefficient implies that a decrease in emission intensity, representing improved eco-efficiency, will lead to an increase in firm value.

Environmentally efficient companies are generally associated with an increase in firm value. This result supports the view of Rodríguez-García et al. (2022), who state that the eco-efficiency coefficient measured through emission intensity should be negative, as lower emission intensity indicates better environmental performance. These findings confirm the first hypothesis, which states that "eco-efficiency has a positive effect on firm value."

The results are supported by two complementary theoretical perspectives. The implementation of eco-efficiency principles by companies serves as a signal of their commitment to responsible resource and environmental management. This signal may foster positive perceptions among investors, which in turn strengthens their confidence in the company's performance and prospects, potentially increasing its firm value. According to legitimacy theory, applying eco-efficiency also enables

companies to gain social recognition, especially from the public and stakeholders. This is particularly important for companies listed on the JII70 index, as Islamic principles emphasize sustainability, integrity, and social responsibility (Farhan et al., 2025).

The findings of this study reinforce previous results by Rodríguez-García et al. (2022) and Daud et al. (2023), who found that companies with lower greenhouse gas emissions tend to exhibit stronger financial performance and higher market value. Both studies emphasize that implementing sustainable business practices not only mitigates environmental risks but also enhances a company's appeal to investors. Therefore, eco-efficiency serves not only as a sustainability strategy but also as a means of increasing economic value—fully aligned with the principles of Islamic investment.

The Effect of Eco-Efficiency on Firm Value Moderated by Environmental Performance

The MRA analysis results in Table 9 show that the interaction coefficient between eco-efficiency and environmental performance (XZ) is -0.026983, with a significance value of 0.5238 (> 0.05). This indicates that environmental performance does not moderate the effect of eco-efficiency on firm value. Therefore, the second hypothesis, which states that "environmental performance moderates the effect of eco-efficiency on firm value," is rejected.

Based on signaling theory, this insignificance suggests that information regarding environmental performance has not yet been recognized by the market as a strong signal in investment decision-making. Anggraeni (2015) emphasized that the market has not fully trusted the PROPER rating as a credible and relevant benchmark for investors. This situation arises due to the lack of sufficient standardization and transparency in corporate environmental performance reporting. Moreover, the four-year observation period may be too short to capture the long-term effects of environmental performance.

This finding aligns with the general conditions in capital markets of developing countries, including Indonesia, where awareness of sustainability issues remains at an early stage and sustainability reporting is still voluntary (Saputri & Sisdianto, 2021). Investors tend to prioritize conventional financial indicators, which means environmental considerations have yet to become a primary factor in investment decisions (Nurfahmi & Anis, 2022). As a result, information on environmental performance has not yet fully functioned as a strong and credible signal for investors.

The findings of this study differ from those reported by Damas et al. (2021) and Rahmanita (2020), who found that environmental performance could strengthen the effect of carbon emission disclosure on firm value. However, the present results are consistent with Anggraeni (2015),, who concluded that the market has not yet fully trusted the *Company Performance Rating Program in Environmental Management* (*Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan Hidup*, or **PROPER**) as a credible and relevant indicator in investment decision-making.

Environmental Performance from an Islamic Economic Perspective

The discussion begins by emphasizing that humans must uphold noble morals in their daily lives by caring for the environment and preventing environmental

degradation. Such actions serve as a tangible effort to preserve life on earth and to avoid various disasters caused by human behavior. Allah SWT has clearly commanded humanity not to cause destruction on earth, as stated in Surah Al-A'raf, verse 56:

وَلَا تُفْسِدُوْا فِى الْاَرْضِ بَعْدَ اِصْلَاحِهَا وَادْعُوْهُ خَوْفًا وَّطَمَعًاۗ اِنَّ رَحْمَتَ اللّٰهِ قَرِيْبٌ مِّنَ الْمُحْسِنِيْنَ

"Do not spread corruption in the land after it has been set in order. And call upon Him with hope and fear. Indeed, Allah's mercy is always close to the good-doers."

According to Tafsir Al-Misbah, damaging the environment is considered a violation of the boundaries set by Allah SWT. He created the universe in harmony and perfection to fulfill the needs of all His creations and entrusted humans with the responsibility to care for and improve it sustainably. The prophets were also sent to restore the order of life that had been damaged. Thus, causing harm to something that has already been restored is viewed as a greater offense than the initial damage. Even harming an environment that remains in good condition is considered unjust. In Islamic teachings, humans are permitted to utilize nature's resources, provided it is done wisely and with a sense of trust (*amanah*). Nature must be managed responsibly to maintain environmental quality. If this is upheld, stability and well-being in the world will be more attainable (Mustakim, 2017).

CONCLUSION

The results of this study show that a reduction in emission intensity, as an indicator of eco-efficiency, reflects operational efficiency without causing significant environmental harm, demonstrates a commitment to sustainability, and helps build a positive image that strengthens social legitimacy and investor confidence in firm value. However, environmental performance based on PROPER ratings has not been fully taken into account by investors due to limited transparency and its unclear linkage to financial performance. As a result, environmental performance is unable to moderate the influence of eco-efficiency on firm value. Referring to signaling theory, business entities must present environmental information that is relevant, transparent, and integrated with economic prospects in order to positively influence investor perceptions. Preserving the environment is a responsibility entrusted to humans as stewards and caretakers of life on Earth, as emphasized in *QS. Al-A'raf (7:56)* and *QS. Ar-Rum (30:41)*. Therefore, caring for the environment is not merely an ecological obligation, but also a form of obedience to Allah's command.

This study is limited to companies listed in the JII70 index from 2020 to 2023; therefore, the findings cannot yet be generalized to all sectors with varying characteristics. Additionally, the use of a single independent variable, namely eco-efficiency, does not fully capture the influence of other factors that may also affect firm value. Future research is recommended to broaden the scope of analysis, including companies from other indices and specific sectors, with a longer observation period to produce more focused and comprehensive results. It is also advisable for future studies to incorporate additional variables that may potentially influence firm value

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