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Exploring the Impact of ESG Practices on Financial Performance: The Moderating Effect of Green Innovation in the Indonesian Energy Sector

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ABSTRACT

This study explores the impact of Environmental, Social, and Governance (ESG) practices on the financial performance of energy companies in Indonesia, with green innovation serving as a moderating variable. The research utilizes secondary data from Indonesian energy firms. It employs a cross-sectional analysis to evaluate the relationships between ESG practices, green innovation, and financial performance, measured by Return on Assets (ROA). The findings reveal that ESG practices alone do not significantly affect financial performance. However, when moderated by green innovation, ESG practices positively and significantly impact financial performance. This suggests that green innovation enhances the benefits of ESG initiatives by improving operational efficiency, reducing costs, and bolstering market competitiveness. The study's results have important implications for corporate managers and policymakers, emphasizing the need for integrating green innovation with ESG strategies to achieve sustainable financial growth.

Keywords: ESG practices, green innovation, financial performance, energy industry

ABSTRAK

Penelitian ini mengeksplorasi dampak dari praktik-praktik Lingkungan, Sosial, dan Tata Kelola (LST) terhadap kinerja keuangan perusahaan-perusahaan energi di Indonesia, dengan inovasi hijau sebagai variabel moderasi. Penelitian ini menggunakan data sekunder dari perusahaan-perusahaan energi di Indonesia dan menggunakan analisis cross-sectional untuk mengevaluasi hubungan antara praktik-praktik ESG, inovasi hijau, dan kinerja keuangan, yang diukur dengan Return on Asset (ROA). Temuan menunjukkan bahwa praktik LST saja tidak secara signifikan mempengaruhi kinerja keuangan. Namun, ketika dimoderasi oleh inovasi hijau, praktik-praktik ESG menunjukkan dampak positif dan signifikan terhadap kinerja keuangan. Hal ini menunjukkan bahwa inovasi hijau meningkatkan manfaat dari inisiatif ESG dengan meningkatkan efisiensi operasional, mengurangi biaya, dan meningkatkan daya saing pasar. Hasil penelitian ini memiliki implikasi penting bagi para manajer perusahaan dan pembuat kebijakan, yang menekankan perlunya mengintegrasikan inovasi hijau dengan strategi ESG untuk mencapai pertumbuhan keuangan yang berkelanjutan.

Kata kunci: Praktik ESG, inovasi hijau, kinerja keuangan, industri energi

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Introduction

Sustainability has become crucial in the business world, along with increasing public awareness of environmental conditions. This concept is the basis for developing the concept of a Green Economy. The World Bank defines the green economy as efficient growth in using natural resources to minimize environmental negative impacts. This includes the impact of the company's activities on the environment and society, which is now a significant concern for stakeholders. Currently, companies are required to generate profits and be responsible for the environment and society. This is the basis for the importance of implementing Environmental, Social, and Governance (ESG) in a company (Radyati et al., 2023).

The energy industry, in particular, has emphasized a new paradigm in sustainable and environmentally friendly economic production and growth

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(Maidasari et al., 2023). Production waste management is one of the crucial aspects that need to be considered in this industry. With the concept of a green economy realized through the implementation of ESG, companies are encouraged to reduce production waste through green innovations such as recycling, environmentally friendly production technology, and other strategies (Nugraha et al., 2024). Green innovation that measures Green Product Innovation Performance (GPIP) itself is the development and application of new products, services, business processes, or management practices that benefit the environment (Nugraha et al., 2024).

For investors, ESG has become one of the primary considerations in investment decisions. This aligns with a survey conducted by BNP Paribas, which showed that as many as 66% of investors choose to integrate more than a quarter of their portfolios into companies that implement ESG (Liziard, 2021). The government also encourages sustainability through POJK Number 51/POJK.03/207 article 10 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers and Public Companies (OJK, 2017). Implementing ESG practices is expected to create sustainable long-term value for a company. This is not limited to environmental and social aspects only but also to the company's financial condition. By implementing ESG practices, companies are expected to participate in implementing laws and regulations, address sustainability issues, and improve the company's reputation and credibility (Radyati et al., 2023).

Companies implementing ESG practices in their business processes have higher profitability. Meanwhile, companies that do not implement ESG practices will face difficulties in increasing company value. This has been proven by Zhang et al. (2020), including research conducted by those that test ESG disclosures on company value. The research shows that the disclosure of environmental and social factors positively impacts the company's value. On the other hand, this practice also affects the financial performance of a company (Minggu et al., 2023). Investing in implementing ESG is not only a cost but also an asset that contributes positively to financial performance. However, along with the improvement of the company's ESG quality, as reflected through the ESG Score, it will significantly influence the company's financial performance. ESG score is a matrix that measures the impact of sustainability or company performance in environmental, social and corporate governance aspects (IDX, 2024).

Several previous studies have focused on the impact of ESG on a company's financial performance. Companies with high ESG scores tend to have better financial performance and are more attractive to investors (Xu & Zhu, 2024). Chouaibi et al. (2022) also expressed the same thing regarding the impact of ESG disclosure on investment decisions and the company's financial performance. However, another perspective states that expenses resulting from the implementation of ESG will increase costs and reduce the company's profitability. Zahid et al. (2022) stated a negative relationship exists between ESG performance and the company's financial performance. On the other hand, ESG Score is not only influenced by key factors such as environmental, social and corporate governance. Other factors, such as green innovation also influence ESG Score. Green innovation can improve a company's ESG performance in environmental aspects. Through the empowerment of environmentally friendly products and programs, green

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innovation can improve the company's ESG score and financial performance (Zheng et al., 2022).

Previous research has looked at the relationship between ESG practices and a company's financial performance from an investor's point of view. In contrast, the perspective of the company itself has rarely been explored. There was also a discrepancy between previous studies' findings, where some showed a positive relationship between ESG practices and financial performance, while others found conflicting results. Therefore, there is a need to investigate further into this relationship and better understand how ESG practices can affect companies' financial performance, particularly in Indonesia's manufacturing industry. This research will fill this gap by taking an internal perspective of companies in exploring the relationship between ESG practices and financial performance and introducing green innovation as a mediating factor. The results of this study are expected to provide a new perspective on the impact of ESG implementation on the company's financial performance related to the implementation of ESG.

Literature review

Green Economy

A green economy is a concept that aims to achieve sustainable economic growth by taking environmental and social aspects into account. This concept emphasizes the efficient use of natural resources, reducing carbon emissions, and creating environmentally friendly jobs (Nugraha et al., 2024). The green economy also encourages investment in sectors that support environmental sustainability, such as renewable energy, sustainable transportation, and effective waste management (Shmatov & Castelli, 2022). Implementing a green economy is important to address the increasingly alarming problems of climate change and environmental degradation.

Implementing a green economy requires a holistic and integrated approach from various sectors, including the government, private sector, and society. The government plays a role in developing policies and regulations that support environmentally friendly practices and providing incentives for businesses that implement green economy principles (Loiseau et al., 2016). The private sector is also responsible for adopting sustainable business models and investing in green technologies. In addition, the active participation of the public in changing consumption patterns and lifestyles to be more environmentally friendly is also an important factor in realizing a green economy (Merino-Saum et al., 2020).

Environmental, Social and Governance

ESG (Environmental, Social, and Governance) practices have become an increasingly important topic in the business and investment world. Various studies show that ESG practices can affect a company's financial performance. Fatemi et al. (2018) state that ESG practices can increase the value of the company if it is considered a positive signal by investors, but it can also reduce the value of the company if it is considered as “cheap talk” Wong et al. (2012) found that a company's ESG strength positively affects its financial performance. In addition,

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green innovation is also an important factor that mediates the relationship between ESG practices and financial performance (Chouaibi et al., 2022).

ESG practices can also affect corporate reputation and competitive advantage. Cahan et al. (2015) found that good ESG performance can generate favorable publicity and increase the firm value if accompanied by positive media coverage. Legitimacy theory also states that involvement in social responsibility can affect a company's financial performance. Thus, companies must consider ESG practices as a sustainable competitive advantage in a volatile environment (Chouaibi et al., 2022).

Green Innovation

In recent years, green innovation has become an increasingly important topic in research and business practice. The concept refers to the development and application of products, services, processes or practices that aim to reduce negative impacts on the environment and improve resource use efficiency (Ghisellini et al., 2016). In the transition to a circular economy, green innovation is key to balancing sustainable environmental and economic systems (Ghisellini et al., 2016).

Kiefer et al. (2017) identified different types of green innovations based on technological, organizational, and market dimensions. They emphasized the importance of understanding the diversity of green innovations to support a more effective transition to sustainability. In addition, factors such as government policies, stakeholder pressure, and economic incentives also play an important role in firms' adoption of green innovations (Kiefer et al., 2017). Further research is needed to explore the impact of green innovations on firms' environmental and economic performance and the factors that influence their successful implementation.

Financial Performance

Corporate financial performance is one of the most important topics in financial management. Theories relevant to this topic include signaling theory and agency theory. Signaling theory states that companies with good financial performance will provide positive signals to the market, which will be reflected in the company's stock price. Meanwhile, agency theory explains a potential conflict of interest between managers (agents) and shareholders (principals), which can affect the company's financial performance.

Factors affecting the company's financial performance include capital structure, company size, and profitability. An optimal capital structure can improve the company's financial performance. Company size can also affect financial performance because large companies have better access to funding sources (Brealey et al., 2020). Profitability is an important indicator in assessing the company's financial performance because it shows its ability to generate profits (Brigham & Houston, 2019).

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H_0 : ESG Practices Negatively Affects the Company's Financial Performance

Companies adopting ESG (Environmental, Social, and Governance) practices will result a higher GRI (Global Reporting Index) scores, indicating better ESG performance. GRI provides globally accepted sustainability reporting standards, enabling organizations to report on their economic, environmental, and social impacts. The GRI standards include three main series: GRI Universal Standards, GRI Sector Standards, and GRI Topic Standards. This study uses the GRI Universal Standard as a benchmark for implementing the Company's ESG practices. On a scale of 0 to 1, the higher the GRI value of a company, the better the company's ESG performance. Good ESG performance indicates that the company has successfully organized the impact of its activities, such as waste reduction, more efficient use of resources, and sustainable product innovation. This, in turn, can increase the company's profitability in the long run. However, several ESG practices are required at a significant cost to achieve a high GRI score. This theoretical argument is in line with the results of previous research conducted by Zahid et al. (2022), who stated that ESG has a negative influence on the historical financial performance of companies. This may be because socially responsible businesses have a greater financial burden, resulting in deteriorating operational and financial performance.

H_1 : Green Innovation Moderates the Relationship between ESG Practices and Corporate Financial Performance

The relationship between ESG practices and corporate financial performance is influenced by the role of green innovation carried out by the company. Implementing ESG practices can encourage companies to achieve high GRI scores supported by green innovation, which can improve corporate financial performance through product differentiation, increased efficiency, and fulfilment of consumer preferences that are increasingly concerned about environmental issues. In other words, green innovation can be a mechanism through which the implementation of ESG practices impacts the financial performance of firms both negatively and positively represented by the firm's ROA (Return on Asset). Several empirical studies have demonstrated the mediating role of green innovation in the relationship between ESG practices and financial performance, such as research by Chouaibi et al. (2022) who found that green innovation mediates the relationship between environmental management practices and corporate innovation performance. Based on these theoretical and empirical arguments, the following hypothesis can be formulated:

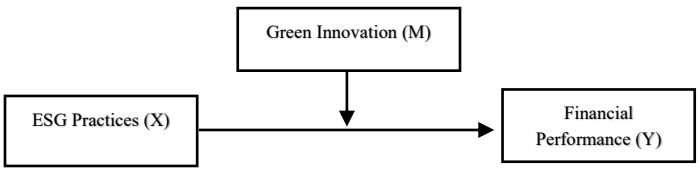

Figure 1. Conceptual Framework
Source: Processed Data, 2024

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Research Methode

The Return on Asset (ROA) value measures financial performance as the dependent variable. At the same time, GRI as an independent variable is used to measure ESG practices that the company has carried out. This study has three equation models used to test the effect of the independent variable (GRI) on the dependent variable (Financial Performance) with and without considering the moderating variable (GPIP). The first model only involves the independent variable (GRI) and the dependent variable (Financial Performance measured by ROA). This model is used to test the direct effect of GRI on Financial Performance without any moderating variables. The second model includes the equation's moderating variable (GPIP) but without the interaction between GPIP and GRI. This model is used to see the direct effect of GPIP on Financial Performance and the effect of GRI. Finally, the third model considers the interaction between the independent (GRI) and the moderating (GPIP) variables. This model is used to see if GPIP moderates the effect of GRI on Financial Performance.

$$(1)\quad ROA_{it} = \alpha + \beta_1 GRI_{it} + \beta_2 SIZE_{it} + \beta_3 AGE_{it} + \beta_4 LEV_{it} + \epsilon$$

$$(2)\quad ROA_{it} = \alpha + \beta_1 GRI_{it} + \beta_2 GPIP_{it} + \beta_3 GRI_{it}.GPIP_{it} + \beta_4 SIZE_{it} + \beta_5 AGE_{it} + \beta_6 LEV_{it} + \epsilon$$

ROA_{it} is a dependent variable of company i in year t, GRI_{it} as a independent variable of company i in year t, and $GPIP_{it}$ is a moderating variable i in year t. The control variables are $SIZE_{it}$, AGE_{it}, and LEV_{it}.

In this research, variables are measured as follows:

Variable X, representing ESG practices, is measured using the Global Reporting Initiative (GRI) standards. Specifically, GRI 300 addresses environmental issues with 32 disclosure indicators based on GRI G4, totaling 34 indicators. GRI 400 covers social issues with 40 disclosure indicators, and GRI G4 with 48 indicators. GRI 102 pertains to governance issues with 56 disclosure indicators, while GRI Standards 2021 includes 30 disclosure indicators, and GRI G4 encompasses 56 indicators. The ESG disclosure technique involves comparing the number of indicators disclosed by a company to the total number of indicators in the GRI modules for each ESG aspect. This calculation uses a dummy variable, assigning a score of 1 if an item is disclosed and 0 if it is not (Durlista & Wahyudi, 2023).

Variable Y, which denotes financial performance, is measured using the Return on Assets (ROA) metric. ROA is calculated by dividing Net Profit by Average Total Assets, providing a clear picture of a company's profitability relative to its total assets.

Variable M represents green innovation and is measured using the Green Product Innovation Performance (GPIP) index. This index includes several components: PROC1, which aims to reduce resource and energy consumption and improve efficiency; PROC2, which involves using recycled materials, recycling techniques, and environmental technologies; PROC3, which applies environmental campaigns; PROC4, which utilizes pollution-control equipment; and PROC5, which adopts pollution-control projects and technologies. These components

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collectively assess a company's commitment to green innovation and its impact on overall performance (Xie et al., 2019).

Result and Discussion

Multicollinearity Test

The Variance Inflation Factor (VIF) was employed in this research to investigate the existence of multicollinearity. A VIF value of less than ten implies no multicollinearity problem, thus demonstrating acceptable levels. Since Table 1 indicates that independent variable has VIF values lower than 10, the regression model used in this study does not exhibit any signs of multicollinearity among the independent variable.

Table 1. Multicollinearity Test Results

Model	Collinearity Statistics		Information
	Tolerance	VIF	
GRI	0.883	1.133	No Multicollinearity

Source: Processed Data, 2024

Heterocedasticity Test

Heteroscedasticity can be detected using the Glejser test. It regresses the independent variable on the absolute value of the residual. When the significance value (sig) of the test result is more than 0.05, then it is assumed that this model does not suffer from heteroscedasticity.

Table 2. Heterocedasticity Test Result

Model	Sig.	Information
GRI	0.420	No Heterocedasticity

Source: Processed Data, 2024

The result of the heteroscedasticity test using Glejser method is indicated in table 2. The data illustrates that independent variable GRI has a significance value greater than 0.05 or 5%. Hence, it can be noted that the independent variable in this research work does not face any heteroscedasticity problem.

Autocorrelation Test

The Durbin-Watson (DW) test can be employed for an autocorrelation examination. Variables that do not exhibit any signs of autocorrelation are those whose d values fall within the range of dU to (4-dU)

Table 3. Autocorrelation Test Result

Dependent	Durbin-Watson	N	dU	of	Information

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ROA	1.891	75	1.739	2.261	No Autocorrelation

Source: Processed Data, 2024

The results of the autocorrelation test in Table 3 show that the DW value for the dependent variable ROA with 75 samples is 1.891 at a 5% significance level. The DW value between (4 - dU) shows no autocorrelation in this study. The regression model in this study has no autocorrelation occurred.

The Influence of ESG Impact on Financial Performances

Table 4. Linear Regression Model Analysis

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	-0.706	0.245	
GRI	-0.256	0.212	-0.126
AGE	-0.102	0.048	-0.222
SIZE	0.133	0.025	0.571
LEV	-0.071	0.057	-0.130

Source: Processed Data, 2024

Based on table 4, the regression model equation can be found as follows: Y = -0.706 – 0.256 (GRI) – 0.102 (AGE) + 0.133 (SIZE) – 0.071 (LEV)

The explanation of the linear regression equation in this subsequent regression model runs as follows. The constant value α of -0.706 implies that when all independent variables here are equal to zero, ROA in the Indonesian Energy Industry would be -0.706. The GRI regression coefficient value of (-0.256) declares that when the company reaches point 1 in the GRI score, it will result in 0.256 or 25.6% decrease in ROA. Age, size, and lev are moderating variables employed to control the effect of GRI on ROA so that the research results become reliable.

Table 5. Determination Coefficient Test (Test Adjusted R2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.567[a]	0.321	0.283	0.38254

Source: Processed Data, 2024

According to the test results of the coefficient of determination in Table 5, this research model can indicate that the independent variable can influence the dependent variable as a percentage. The value results in Table 5 indicate that the adjusted R square is 0.283 or 28.3%. This implies that just 28.3% of the ROA is controlled by the independent variables used within the study; other independent variables are responsible for the remaining percentage that was not accounted for in the specific parts of the study being conducted.

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Table 6. T Test Result Statistic Analysis

Model	t	Sig.
(Constant)	-2.878	0.005
GRI	-1.207	0.232
AGE	-2.125	0.037
SIZE	5.372	0.000
LEV	-1.240	0.219

Source: Processed Data, 2024

According to the statistical tests conducted, the significance value for variable X: GRI is 0.232 > 0.10. Therefore, Hypothesis 1 stands rejected, which means GRI is not statistically significant to ROA.

The Influence of ESG Impact on Financial Performance after Moderated by GPIP

Table 7. Linear Regression Model Analysis

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	0.701	0.816	
GRI	-2.725	1.350	-1.347
GPIP	-1.927	1.094	-0.571
GRI.GPIP	3.138	1.694	1.456
AGE	-0.098	0.049	-0.214
SIZE	0.142	0.025	0.612
LEV	-0.091	0.058	-0.168

Source: Processed Data, 2024

Based on table 7, the regression model equation can be found as follows: Y = 0.701 – 2.725 (GRI) – 1.927 (GPIP) + 3.138 (GRI.GPIP) – 0.098 (AGE) + 0.142 (SIZE) – 0.091 (LEV)

The explanation of the linear regression equation in this subsequent regression model runs as follows. The constant value α of 0.701 implies that when all independent variables here are equal to zero, ROA in the Indonesian Energy Industry would be 0.701. The GRI regression coefficient value of (-2.725) declares that when the company reaches point 1 in the GRI score, it will result in a 2.725 or 272.5% decrease in ROA. Meanwhile, the GPIP regression coefficient value of (-1.927) means that when the company reaches point 1 in GPIP, it will result in a 1.927 or 192.7% decrease in ROA. When GPIP moderates the GRI variable, it has a coefficient regression value of (3.138). This means when the company reaches point 1 in the variable that has been moderated, there is an increase in ROA of 313.8%. Age, size, and lev are moderating variables employed to control the effect of GRI on ROA so that the research results become reliable.

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Table 8. F Test Result Statistic Analysis

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.343	6	0.891	6.210	.000[b]
Residual	9.751	68	0.143		
Total	15.094	74			

Source: Processed Data, 2024

The testing criteria in this research use a significance level of 10%; if the significance value is <0.10, there is a significant influence between all independent variables (simultaneously) on the dependent variable. In Table 6, the model feasibility test (F test) has a significance value of 0.000b, which is above 0.10, so it can be concluded the variables of GRI, GPIP and GRI.GPIP simultaneously have a significant influence on ROA.

Table 9. Determination Coefficient Test (Test Adjusted R2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.595[a]	0.354	0.297	0.37868

Source: Processed Data, 2024

According to the test results of the coefficient of determination in Table 9, this research model can indicate the independent variables can influence the dependent variable as a percentage. The value results in Table 9 indicate that the adjusted R square is 0.297 or 29.7%. This implies that 29.7% controls the independent variables used within this study about ROA. Other independent variables are responsible for the remaining percentage not accounted for in a specific part of the study.

Table 10. T Test Result Statistic Analysis

Model	t	Sig.
(Constant)	0.860	0.393
GRI	-2.019	0.047
GPIP	-1.761	0.083
GRI.GPIP	1.853	0.068
AGE	-2.018	0.048
SIZE	5.603	0.000
LEV	-1.583	0.118

Source: Processed Data, 2024

According to the statistical tests conducted, the significance value for variable X after moderating: GRI.GPIP is 0.068 < 0.10. Therefore, Hypothesis 2 stands accepted, which means GRI that already moderated by GPIP is statistically significant to ROA.

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Based on the results of the statistical tests, the significance value obtained by variable X: ESG is 0.232 > 0.10. Therefore, Hypothesis 1 stands rejected, which means ESG is not statistically significant to Financial Performance. This finding indicates that although it is essential from a social and environmental perspective, it is not necessarily from a financial perspective.

Based on the statistical test result, the significance value obtained by variable X: ESG moderating by Green Innovation is 0.068 < 0.10. Therefore, Hypothesis 2 stands accepted, which means that ESG, which Green Innovation has already moderated, is statistically significant to financial performance. Although no previous research has been found that directly examines this topic, the existing literature suggests a relationship between ESG, Green Innovation and Corporate Financial Performance separately. For example, research from Zahid et al. (2022) suggests a negative influence between the company's historical financial performance and ESG. Research from Chouaibi et al. (2022) suggested that Green Innovation is an essential factor that mediates the relationship between ESG practices and corporate financial performance.

Several mechanisms can explain how green innovation strengthens the influence of ESG on ROA. First, green innovation can help companies reduce operating costs through energy savings and waste recycling. Second, companies with good ESG performance tend to attract more investors and customers, which can also improve their financial performance. In addition, the adoption of green innovations can enhance corporate reputation, which in turn can increase customer loyalty and expand market share.

Conclusion

The study investigates the relationship between Environmental, Social, and Governance (ESG) practices and financial performance in the Indonesian Energy Industry, focusing on green innovation as a moderating factor. The findings indicate that while ESG practices alone do not significantly impact financial performance, their effect becomes significant when moderated by green innovation. This suggests that green innovation can enhance the positive effects of ESG practices on financial performance, likely through cost savings, improved efficiency, and better market positioning.

Limitation

The primary limitation of this research lies in its focus on the energy industry in Indonesia, which may limit the generalizability of the findings to other sectors or regions. Additionally, the study relies on secondary data, which may only capture some relevant variables influencing financial performance. The cross-sectional nature of the data also restricts the ability to infer causality. Future research should consider longitudinal data and explore other industries and regions to validate and extend these findings.

Sugestions

Future research should include a broader range of industries and geographical regions to enhance the generalizability of the findings. Longitudinal

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studies could provide deeper insights into the causal relationships between ESG practices, green innovation, and financial performance. Additionally, incorporating primary data collection methods, such as surveys and interviews, could provide a more comprehensive understanding of the internal mechanisms through which ESG practices and green innovation impact financial performance.

Implication

The findings of this study have significant implications for both corporate management and policymakers. The results highlight the importance of integrating green innovation with ESG practices for companies to maximize financial performance benefits. For policymakers, the study underscores the need to create supportive environments and incentives for green innovation, which can enhance the effectiveness of ESG initiatives. This integrated approach can lead to more sustainable business practices and contribute to broader environmental and economic goals.

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