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Environmental Performance and Carbon Emission Disclosure: The Moderating Role of Profitability in Energy Sector Companies

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Abstract

Purpose – From 2020 to 2024, this inquiry assesses the association between environmental performance and the transparency of corporate carbon emissions among energy enterprises in Indonesia that are listed on the capital market. Furthermore, this study investigates if profitability affects the relationship between environmental performance and the quantity of information revealed by businesses regarding their carbon emissions.
Design/Methodology/Approach – Employing a quantitative methodology, the study used publicly available data, based on annual and sustainability reports produced by energy-related firms. The sampling process applied predetermined criteria and produced 155 firm-year observations from 31 companies covering the 2020-2024 period. Data examination and hypothesis assessment were performed using Moderated Regression Analysis (MRA).
Results – The test findings demonstrate that environmental performance, assessed by PROPER, positively and significantly influences carbon emission disclosure. Profitability, assessed by ROA, does not influence this relationship.
Originality – This study provides empirical evidence on the moderating role of profitability in the relationship between environmental performance and carbon emission disclosure in Indonesia's energy sector. The findings show that profitability does not strengthen this relationship, highlighting the greater role of environmental accountability and legitimacy considerations.
Research limitations/Implications – The results corroborate legitimacy theory, which asserts that environmental transparency is employed to attain public legitimacy. The absence of substantial profitability indicates that non-economic elements are more influential. The study's constraints encompass a limited sample size and the application of GRI indicator 305. Future investigations should augment the sample size and duration, while also incorporating supplementary factors and measuring criteria.

Keywords: Carbon Emissions Disclosure, Environmental Performance, Profitability

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Introduction

The challenge of climate change has swiftly ascended to become one of the most critical ecological dilemmas currently facing the planet. Human-caused greenhouse gas emissions have a considerable impact on global temperature rise and environmental damage (Lasmiati et al., 2024). Industrial manufacturing and the utilization of fossil fuels are regarded as the primary contributors of carbon emissions (Puteri & Inawati, 2023). As economic and industrial activities continue to expand, concerns regarding environmental sustainability are also increasing in many countries.

Relative to other sectors, the energy industry presently constitutes a significant share of carbon emissions worldwide. The International Energy Agency (IEA) projects that global emissions from the energy and industrial sectors will approximate 37.6 gigatons (Gt) in 2024, signifying a continual rise compared to previous years (Ahdiat, 2025). This scenario amplifies the significance of revealing carbon emissions as a means to mitigate climate change and heightens the demand on corporations, particularly in the energy sector, to demonstrate their commitment to environmental transparency.

Indonesia is recognized as a significant contributor to worldwide carbon emissions. According to the Global Carbon Project, the current year is 2024. This indicates that Indonesia is engaging in global initiatives to achieve the Net Zero Emissions (NZE) goal by 2060 or before (Lasmiati et al., 2024). The primary source of carbon emissions (CO_2) is the energy sector, succeeded by waste management, forestry, agriculture, and the Industry and Product Use sector (IPPU) (Kementerian Lingkungan Hidup dan Kehutanan, 2024). The high level of carbon emissions is mainly associated with industrial activities and energy generation processes that still rely extensively on fossil fuels (Pangestu & Hati, 2024).

The lack of stringent and mandatory regulatory requirements has contributed to the limited reporting of carbon-related emissions by firms operating within Indonesia's energy industry. CDP Disclosure data for 2023 shows that only about 180 out of 637 businesses in the mining and energy industries released data regarding environmental risks and impacts, with a participation rate of only about 21% among fossil fuel companies, indicating the minimal degree of business dedication to the disclosure of environmental information. Carbon emission disclosure serves as an essential standard in the development of environmental management policies and laws, especially with the control of carbon emissions (Rahmawati & Robertus, 2023).

The Indonesian government issued Presidential Regulation No. 98 of 2021 to promote the mitigation of greenhouse gas emissions in accordance with the carbon economic value strategy. As part of its effort to reduce the effects of climate change. This regulation was issued as part of Indonesia's Nationally Determined Contribution and reflects a global movement urging companies to take greater responsibility for carbon emission reductions. The plan is consistent with the global push to increase corporate efforts to reduce carbon emissions. In contrast to nations such as the United States, China, the United Kingdom, and Australia that mandate carbon emission reporting, Indonesia's approach is voluntary and devoid of legal obligations (Bahriansyah & Ginting, 2022).

Previous research shows that good environmental performance can provide significant financial benefits for companies (Maulidiah et al., 2025). However, managing and disclosing carbon emissions comes at a very significant expense. As a result, some businesses believe that disclosing carbon emissions could lower profits. Such a difference of opinion suggests that, in addition to economic factors, businesses must safeguard their public image, which affects disclosure choices.

Research on carbon emissions transparency is essential as national and international pledges to reach the Net Zero Emission (NZE) objective grow. In order to assess the reduction in emissions and establish more efficient regulations, corporations are required to openly reveal their carbon emission data. Generally, companies are inclined to reveal their carbon emissions to build enduring reputation and secure public backing, according to legitimacy theory.

Investigations into carbon emissions reporting in Indonesia have produced contradictory results. Ika et al. (2022) identified a favorable correlation when assessing environmental performance through standards like PROPER and ISO 14001 certification. Ratmono et al. (2020), Solikhah et al. (2021), and Wahyuningrum et al. (2022) found that ecological performance had no impact on carbon emission reporting.

Profitability is frequently regarded as a crucial factor influencing carbon emission reporting, since financially robust companies typically have enhanced resources to support environmental projects and are more predisposed to disclose these initiatives through carbon emission reports (Wahyuningrum et al., 2024). Furthermore, providing financial information enhances investor confidence in environmental accountability and transparency. According to credibility theory, successful organizations are more likely to release carbon-related statistics in order to demonstrate their commitment to environmental stewardship

and corporate integrity. As a result, profitability could increase the link between environmental performance and carbon emission reporting, as companies with significant financial resources are better at communicating their environmental triumphs to stakeholders.

Previous research has produced conflicting results about the impact of profitability on carbon emission disclosures. Ramlawati et al. (2022), Wahyuningrum et al. (2024), and Widyastuti et al. (2023) contend that profitability has a favorable impact on the transparency of carbon emissions. This indicates that firms with greater financial assets are more inclined to offer extensive environmental disclosures (Dewi et al., 2023). These findings suggest that adequate financial resources may enhance the communication of environmental achievements and strengthen the link between environmental performance and carbon emissions reporting.

In contrast, Abdullah et al. (2020) and Riantono & Sunarto (2022) did not identify any significant relationship, indicating that judgments about disclosure might be swayed more by external influences, such as regulatory demands and stakeholder anticipations, rather than solely by financial status. This inequality accentuates the requirement for future inquiries to evaluate whether profitability affects the link between environmental and carbon emission reports, notably in the energy sector of Indonesia. The assorted findings reveal the critical need to assess profitability as a facilitator in the link between environmental performance and carbon emission disclosure within Indonesia's energy domain. This research seeks to enhance existing knowledge and improve the clarity of carbon emissions reporting by analyzing its impacts through the lens of legitimacy theory.

Literature Review & Hypothesis Development

Legitimacy Theory

The incongruity between a corporation's behavior and its societal standing is elucidated by legitimacy theory (Dowling & Pfeffer, 1975). Corporate sustainability relies not solely on economic outcomes but also on societal views concerning the alignment of company practices with current social norms and environmental standards. When companies are viewed as socially responsible, they are more likely to gain support from stakeholders and maintain operational continuity.

Conversely, if a company fails to meet societal expectations, it risks facing social sanctions that could disrupt its operational sustainability. As a result, businesses try to match their policies and operations with accepted societal norms. Environmental disclosure can therefore be interpreted as one of the strategies used by companies to maintain public trust (Nurjanah & Mulyandini, 2024). By means of sustainability reporting and carbon emission transparency, corporations strive to exhibit their commitment to environmental matters and convey their adherence to societal norms (Brown & Deegan, 1998). In this scenario, carbon disclosure serves as a medium of communication and a strategic initiative to bolster business trustworthiness. In this regard, Abdullah et al. (2020) claim that disclosing carbon emissions is a corporate legitimacy tactic to show adherence to sustainability requirements and environmental concerns. In this regard, businesses use carbon emissions disclosure procedures to try to strike a compromise between social duty and economic goals. Since more profitable businesses have more money to invest in environmental reporting and management systems, profitability is seen as a factor that can increase legitimacy (Saadah et al., 2024).

Carbon Emission Disclosure

Businesses can reveal environmental information by informing stakeholders and the general public about their operations and how they affect the environment. Global warming is now a business and political issue in many nations. Ensuring that all entities understand and communicate their contributions to global warming, particularly those caused by carbon emissions, is a difficulty.

According to legitimacy theory, this disclosure demonstrates that companies are aware of the public's desire for sustainability and act as a tactical instrument for gaining social legitimacy. A company's dedication to environmental sustainability may be strongly correlated with its level of carbon emission transparency, according to Ratmono et al. (2020) research suggests that a company's commitment to environmental sustainability may be determined in large part by its disclosure emissions of carbon. According to Wahyuningrum et al. (2024), different sectors in Indonesia produce different amounts of openness when it comes to the country's voluntary carbon emission disclosure framework.

Environmental Performance on Carbon Emissions Disclosure

The ability of a company to efficiently handle the environmental impacts that result from its activities is referred to as environmental performance according to Abdullahi et al. (2025). In order to assess

companies' environmental performance, the Indonesian Ministry of Environment and Forestry uses a grading system called PROPER. Investigations of Indonesia's carbon emission reporting have produced varied outcomes. Improved environmental performance is associated with more openness about carbon emissions, according to studies by Jannah & Narsa I Made (2020), Hidayat et al. (2022), and Wahyuningrum et al. (2023). The disclosure of carbon emissions was found to be minimally affected by environmental performance, according to Ratmono et al. (2020), Solikhah et al. (2021), and Wahyuningrum et al. (2022). Entities that conduct assessments of their environmental performance typically choose to reveal more extensive data on carbon emissions to maintain their corporate image and bolster stakeholder trust (Putra & Utami, 2018). Legitimacy theory posits that environmental disclosure signifies a corporation's commitment to harmonizing its operations with societal standards of sustainability and ecological responsibility.

H_1: Environmental performance has a positive influence on carbon emission disclosure.

The Moderating Role of Profitability in Environmental Performance on Carbon Emission Disclosure

One of the most important measures of a company's financial health is its profitability, which shows how well it can run its operations and generate value over time. According to Nurhayati & Dasmaran (2022), profitability reflects management effectiveness in generating income and returns on investment. As noted by Miranatha & Wirawati (2021) argue that a company's financial state, operational effectiveness, and capacity for profit can all be assessed using financial measures. With respect to carbon emission transparency, profitable companies generally possess enhanced financial resources to allocate toward carbon assessment technologies, environmental monitoring instruments, and the development of comprehensive sustainability reports, which jointly improve the precision and transparency of carbon emission reporting methodologies (Wahyuningrum et al., 2024). Organizations with superior profitability frequently confront increased stakeholder expectations for environmental transparency, which generates stronger institutional pressure to publish carbon-related information as an element of their accountability strategy (Ramlawati et al., 2022).

Profitability is expected to moderate the relationship between environmental performance and disclosure of carbon emissions, according to the legitimacy theory. Increased profitability grants firms the financial resources and reputational motivations to expand their carbon emissions disclosures based on their environmental performance, therefore enhancing their legitimacy among stakeholders (Dharma et al., 2024).

H_2: Profitability strengthens the positive effect of environmental performance on carbon emission disclosure.

Methods

This study employs a quantitative technique to test the theory under examination. It focuses on a specific population or sample, collects data using research tools, and analyzes quantitative and statistical data (Sugiyono, 2021). Companies involved in the energy sector that were listed on the IDX from 2020 to 2024 were considered for this study. To determine the research sample, a purposive sampling strategy was employed. This strategy took into consideration a wide range of characteristics that were pertinent to the objectives of the study. One or more of the following factors was considered for selection: In the years 2020–2024, energy-related companies trading on the Indonesia Stock Exchange. During the whole observation period from 2020 to 2024, the entities are obligated to distribute annual or sustainability reports through the IDX website or their official channels. Companies that disclose carbon emissions information at least once from 2020 to 2024. A final sample size comprised 31 businesses, including 155 observations during a five-year timeframe (2020-2024).

Variable Measurement

Dependent Variable

Carbon Emissions Disclosure is the study's dependent variable. Information on a company's emissions during an accounting period is known as carbon emissions disclosure and is included in sustainability and yearly reports. This study used CED based on GRI-305 data to measure carbon emissions disclosure. GRI-305 data is used since it was the main indication used by businesses to disclose carbon emissions.

$$\text{CED} = \frac{\text{Total Disclosure}}{\text{Maximum Disclosure}}$$

Table 1
Global Reporting Initiative - 305

GRI 305	Scope
305-1	Direct (Scope 1) GHG Emissions
305-2	Energy Indirect (Scope 2) GHG emissions
305-3	Other Indirect (Scope 3) GHG emissions
305-4	Energy intensity
305-5	Reduction of GHG emissions
305-6	Emissions of ozone-depleting substances (ODS)
305-7	Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions.

Data Source: Global Reporting Initiative

Independent Variable
The study's independent variable is ecological performance. The PROPER evaluations were provided by the Indonesian Ministry of Forestry and Environment. There are five distinct groups into which the ratings fall: gold (5), green (4), blue (3), red (2), and black (1). Entities that were not assessed under the PROPER initiative throughout the observation timeframe receive a score of 0 to signify the lack of a formal environmental performance evaluation. This approach distinguishes companies without a PROPER evaluation from those that receive an official rating, including the lowest rating black. Therefore, environmental performance scores range from 0 to 5.

Moderating Variable
This study uses the Return on Assets (ROA) statistics to quantify profitability, which acts as a moderating variable. This ratio measures how effectively a firm generates revenue from its total assets (Rahmawati et al., 2024).

$$ROA = \frac{\text{Net Income}}{\text{Total Asset}} \text{ x } 1$$

Research Results

Descriptive Statistic

Table 2
Descriptive Statistical Test Results

Variable	N	Min	Max	Mean	Std. Dev
PROPER (X)	155	0.000	5.000	2.316	1.902
CED (Y)	155	0.142	1.000	0.569	0.269
ROA (Z)	155	-0.242	0.987	0.083	0.143
XZ	155	-0.267	2.370	0.274	0.460

Data Source: EViews 12 (2026)

Table 2 presents a summary of the statistics for the variables that were used in the research presented in Table 2. Based on the descriptive statistics, the disclosure of carbon emissions had values ranging from 0.142 to 1, with an average of 0.569 and a standard deviation of 0.269, as shown. The findings indicate that, on average, enterprises disclose 56.95% of their comprehensive carbon emission disclosure data. Descriptive statistical results indicate that environmental performance varied between 0.000 and 5.000, while the mean and standard deviation were reported at 2.316 and 1.902, respectively. The findings reflect that most sampled firms demonstrate environmental performance within a moderate category. Based on the findings of a descriptive statistical analysis, the profitability variable was found to have a standard deviation of 0.143, a mean of 0.083, and a range of -0.242 to 0.987. These statistics reveal that firms produced earnings amounting to 8.39% of their total assets on average. A low standard deviation value reflects that profitability among the observed firms was relatively consistent, despite the presence of several companies reporting negative returns. The range of values for environmental performance x profitability interaction variable is from -0.267 to 2.37. These are the two extremes, the lowest and highest values, respectively. A mean of 0.46 and a standard deviation of 0.46 are both presented. The mean and standard

deviation are 0.274 and 0.460, respectively. Considering the study's findings, it seems that profitability has a rather significant impact.

Selection of the Panel Data Regression Model

To determine the best model, this research ran a battery of model selection evaluations using three distinct panel data regression frameworks. Specifically, these models included the Common Effect Model, the Fixed Effect Model, and the Random Effect Model. Three tests mainly, the Chow, the Hausman, and the Lagrange Multiplier test, were used for the evaluations.

Table 3
Panel Data Regression Selection Results

Chow Test	Hausman Test
Fixed Effects Model (FEM) is the most suitable model due to its probability value of 0.00 which is less than 0.05.	The most appropriate model is the Fixed Effects Model (FEM), because its probability value is 0.028 < 0.05.

Data Source: EViews 12 (2026)

Because of this, the Fixed Effect Model is the best regression model to use for this study, and the Lagrange Multiplier (LM) test is unnecessary.

Classical Assumption Tests

Table 4
Summary of Classical Assumption Tests Results

Test Type	Indicator	Value	Criterion	Conclusion
Normality	Jarque-Bera Probability	0.518 0.772	Probability > 0.05	**Normally distributed**
Multicollinearity	VIF – PROPER VIF – ROA VIF – XZ	1.088 1.845 1.959	VIF < 10	**No Multicollinearity**
Heteroscedasticity	Prob. –PROPER Prob. – ROA Prob. – XZ	0.446 0.172 0.833	> 0.05	**Free Heteroscedasticity**
Autocorrelation	Durbin- Watson	1.623	1.495< 1.623 < 2.504	**No Autocorrelation**

Data Source: EViews 12 (2026)

The results of classical assumption tests presented in Table 4 indicate that the regression model satisfies all required assumptions. The normality test produces a Jarque-Bera probability value of 0.772, which is higher than the threshold of 0.05 value, indicating that the residuals are normally distributed. The multicollinearity test shows VIF values of 1.088 for environmental performance (PROPER), 1.845 for profitability (ROA), and 1.959 for the interaction variable (XZ), all of which are below the threshold of 10, indicating no evidence of multicollinearity among the independent variables. Furthermore, the heteroscedasticity test yields probability for PROPER, ROA, XZ, respectively, all exceeding 0.05, indicating that the model is free from heteroscedasticity. The Durbin-Watson statistic is 1.623, which falls within the specified range 1.495<1.623<2.504 indicating that the model does not exhibit autocorrelation. Overall, these results confirm that the regression model meets the classical assumptions and is therefore appropriate for further hypothesis testing.

Panel Data Regression Analysis

Table 5
Panel Data Regression Analysis Results

	Coefficient	Std. Error	t-Statistic	Prob
C	0.4809	0.044	10.806	.000*
PROPER	0.038*	0.018	2.079	0.039*
ROA	0.084	0.183	0.459	0.648
XZ	-0.024	0.063	-0.381	0.703
F-Statistic	**5.808**			**.000***
R-squared	**0.613**			
Adjusted R-squared	**0.508**			

Data Source: EViews 12 (2026)
Note: * Indicates significance at the 5% level $p< 0.05$

Moderated Regression Analysis (MRA)
According to the findings from the Moderated Regression Analysis (MRA) test, the moderated regression equations for the panel data model are delineated as follows:

Carbon Emission Disclosure (Y) = 0.4809 + 0.038X + 0.084Z – 0.024XZ

From the equation above, it can be explained that:
1. The fixed value of 0.4809 signifies that carbon emissions disclosure is 0.4809 when the independent variable is presumed to be zero.
2. The environmental performance coefficient is positively valued at 0.038. According to this, there will be a 0.038 rise in the disclosure of carbon emissions for every one-unit improvement in environmental performance, if all other parameters stay constant.
3. The profitability coefficient indicates a positive value of 0.084 for each unit increase in profitability, provided that other factors are held constant.
4. The interaction coefficient linking environmental performance and profitability is -0.024, suggesting that an increase of one unit in environmental performance, influenced by profitability, leads to a decrease in carbon emission disclosure by -0.024.

Model Fit Test (Goodness of Fit)
In accordance with the data shown in Table 5, the fit test results show an F-statistic of 5.808 with a probability value of 0.000, which is less than the accepted significance level of 0.05. The results indicate that the regression model demonstrates a statistically significant overall fit, suggesting that the variables included in the model collectively provide explanatory information for carbon emission disclosure. Therefore, the regression model is considered adequate for examining the relationship between environmental performance, profitability, and carbon emission disclosure including the moderating effect of profitability.

Coefficient of Determination Test (R^2)
The coefficient of determination test shows an adjusted R-squared value of 0.508. This value indicates that 50.8% of the variation in carbon emission disclosure can be explained by environmental performance, profitability, and the interaction between environmental performance and profitability included in the regression model. The remaining 49.2% is explained by other factors outside the model that are not examined in this study.

Partial Test (T-Test)
The hypothesis test results indicate that:
1. Outcomes of the initial hypothesis test results (H_1)
   Environmental performance is linked to a probability value of 0.039, which is less than 0.05.and it is accompanied by a positive direction of 0.038. This suggests that environmental performance is essential and beneficial in the documentation of carbon emissions. Consequently, the preliminary hypothesis (H_1), asserting that environmental performance positively influences carbon emission disclosure concerning carbon emissions is recognized, is validated.

2. Outcomes of the Second Hypothesis test results (H_2)
   Environmental performance and profitability have a probability value of 0.703, which is greater than the significance level of 0.05. A negative result of -0.024 for the correlation coefficient further confirms that it is a negative correlation. The results show that profit does not improve the relationship between environmental performance and disclosure of carbon emissions. The second hypothesis (H_2), which asserts that profitability strengthens the positive effect of environmental performance on carbon emission disclosure may be influenced by profitability, is rejected.

Discussion & Conclusion

Discussion

The Effect of Environmental Performance on Carbon Emissions Disclosure

The results of the hypothesis testing show that the disclosure of carbon emissions is significantly affected by environmental performance. The first hypothesis (H_1) is supported by a positive coefficient of 0.038 and a probability value of 0.039, both of which are less than the threshold of 0.05. The result indicates that firms with stronger environmental performance tend to provide more extensive information concerning their carbon emissions. This finding is in line with Abdullah et al. (2020), Jannah & Narsa (2021), Hidayat et al. (2022), and Wahyuningrum et al. (2023), have found a positive correlation between environmental performance and the degree to which carbon emission disclosure was made.

These findings can be understood from the perspective of legitimacy theory. Companies operating in environmentally sensitive industries face expectations from regulators, investors, communities, and other stakeholders regarding responsible environmental practices. Firms that achieve better environmental performance have an incentive to communicate such achievements through environmental and carbon-related disclosure as a means of demonstrating that their activities are consistent with prevailing social and environmental expectations. Carbon emission disclosure significantly serves not only an informational function but also a legitimacy-building mechanism. Through greater transparency, companies can demonstrate their environmental accountability and strengthen stakeholder confidence in their operations.

Companies with strong environmental performance according to the PROPER framework have greater incentives to report their carbon emissions in detail as a means of demonstrating compliance with applicable environmental regulations and societal expectations (Handono et al., 2025). In this context, carbon emission disclosure acts as a form of legitimization that enables businesses to demonstrate environmental responsibility to stakeholders, regulators, and the general public. According to Itan et al. (2023), companies that have received high PROPER ratings are more likely to produce extensive carbon emissions reporting. Such disclosure can enhance corporate legitimacy and maintain positive stakeholder perceptions. Therefore, the positive and significant relationship found in this study suggests that environmental performance is not only an indicator of a company's environmental responsibility but also an important factor supporting greater transparency in carbon emission disclosure.

The Moderating Influence of Profitability on Environmental Performance and Carbon Emissions Disclosure

The results of the moderation study show that profitability did not increase the association between environmental performance and carbon emission disclosure. The interaction coefficient is -0.024 and a significance level of 0.703, which is higher than the 0.05 significant level. This result indicates that differences in profitability do not significantly change the effect between environmental performance and carbon emission disclosure. Therefore, the second hypothesis (H_2), which proposes that profitability strengthens the relationship between environmental performance and carbon emission disclosure, is rejected.

This result implies that greater financial profitability does not necessarily lead environmentally responsible firms to increase their carbon-related disclosure. Within the Indonesian energy sector, disclosure practices may be influenced by considerations that extend beyond financial capacity, including regulatory requirements, stakeholder expectations, environmental assessment mechanisms, and institutional pressure. From the perspective of legitimacy theory, firms have incentives to maintain social acceptance by demonstrating responsible environmental conduct irrespective of their level of profitability. Consequently, environmental disclosure may remain relevant for both highly profitable and less profitable firms when environmental legitimacy becomes an important consideration in corporate activities.

The finding contradicts the studies conducted by Narindi & Trisna (2025) and Ramlawati et al. (2022), which established a good relationship between profitability and carbon emission disclosure. The findings suggest that financially stronger firms may have greater resources to support environmental

transparency. The discrepancy may reflect differences in industry characteristics and institutional environments. Energy-sector companies in Indonesia operate under relatively strong environmental scrutiny, while mechanisms such as PROPER provide an additional institutional framework for evaluating corporate environmental performance. Under these circumstances, disclosure may be shaped more strongly by environmental and institutional expectations than by variations in profitability. Therefore, the results of this study suggest that financial performance does not necessarily function as a condition that strengthens environmental transparency. Instead, the disclosure of carbon emissions appears to be more closely related to environmental accountability and the need to maintain corporate legitimacy. This interpretation is consistent with the broader institutional perspective discussed by Dharma et al. (2024) and Ramlawati et al. (2022).

Conclusion

This study provides empirical evidence that environmental performance has a positive and significant effect on carbon emissions disclosure among energy-sector companies in Indonesia. Firms with stronger environmental performance tend to disclose more carbon-related information, indicating that environmental performance is associated with greater corporate transparency. The finding supports legitimacy theory by suggesting that environmental disclosure can be used by companies to communicate their environmental responsibility and maintain alignment with stakeholders and societal expectations.

In contrast, profitability does not significantly moderate the relationship between environmental performance and carbon emissions disclosure. This result indicates that differences in profitability do not substantially alter the association between environmental performance and carbon disclosure. The findings imply that carbon emissions disclosure in the Indonesian energy sector may be influenced more strongly by legitimacy considerations, regulatory requirements, and institutional pressures than by financial performance alone. The study therefore contributes to the existing literature by highlighting the importance of environmental and institutional considerations in explaining carbon emissions disclosure and by demonstrating that profitability does not necessarily strengthen the relationship between environmental performance and environmental transparency.

Limitation & Future Research

This study focused on only one sector, namely energy companies, during the observation period from 2020 to 2024. Subsequent research should broaden its focus by incorporating a diverse array of industries and extending the duration of observation to facilitate more thorough cross-sector analysis. Subsequent research might also take into account supplementary elements like organizational scale and eco-friendly investments, integrating GRI 305 with alternative carbon emission reporting systems, such as the Carbon Disclosure Project (CDP) and ESG metrics, to achieve a more holistic assessment of carbon emission disclosure.

Declaration of Generative AI Use

The authors utilized generative artificial intelligence (AI), namely ChatGPT, exclusively to assist in refining the manuscript's language, grammar, and overall readability during the writing process. All suggestions generated by the AI were thoroughly evaluated, revised, and approved by the authors, who assume full responsibility for the accuracy, interpretation, and conclusions presented in this manuscript. The application of generative AI was confined solely to language improvement and did not encompass data gathering, data examination, or the formulation and interpretation of research results.

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