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Carbon Emission Disclosure: Strategies for Addressing External Pressures in Indonesia

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Abstract

Carbon emission disclosures present both opportunities and risks for companies amid the challenges posed by climate change. Efficient disclosure can be leveraged by companies as a marketing strategy to attract and maintain stakeholder trust. This study aims to analyze the influence of external pressures—namely regulatory pressure, customer and supplier pressure, and carbon performance—on corporate carbon emission disclosures. A purposive sampling method was used to identify 66 companies in Indonesia over the 2021 to 2023 period. Secondary data for this study were obtained from companies' annual and sustainability reports. Analysis was conducted using multiple linear regression. This research contributes to corporate sustainability literature by illustrating the impact of various forms of external pressure on carbon emission disclosures. The findings indicate that regulatory pressure and pressure from customers and suppliers influence carbon emission disclosures, whereas carbon performance does not show a significant impact on disclosure practices.

Keywords: regulatory pressure, customer and supplier pressure, carbon performance, carbon emission disclosures

INTRODUCTION

Environmental pollution has become an increasingly debated issue in recent years. Environmental protection, particularly concerning the impact of carbon emissions (Bui, Moses, et al., 2020), is now regarded as a critical foundation for economic development (Gerged et al., 2021; Karim et al., 2021). In 2019, ASEAN countries collectively emitted 1.76 Gt of CO2 from energy-related sources, with the highest emissions coming from Indonesia, Vietnam, Thailand, the Philippines, and Malaysia (Lau, 2022). Indonesia alone ranks as the fifth-largest carbon emitter globally, mainly due to forest fires and carbon-rich peatland burning (Saraswati et al., 2021). The increase in greenhouse gas (GHG) emissions aligns with growing research on carbon disclosure (He et al., 2022; Shui et al., 2023), as corporate transparency and accountability for carbon emissions are viewed as essential steps in reducing GHG emissions (Chithambo et al., 2020; Majid et al., 2023).

This study aims to examine whether external pressures—regulatory pressure, pressure from customers and suppliers, and carbon performance—can influence corporate decisions to disclose carbon emissions. Regulatory pressure is measured through company size, represented by total assets, reflecting the company's visibility and scale of operations. Larger companies are generally expected to pay greater attention to pollution disclosures and to report to regulatory bodies (Chithambo et al., 2022) as well as to the public. Pressure from customers and suppliers is assessed based on company revenue and industry affiliation, reflecting their relationships with the company. Meanwhile, carbon performance is measured by carbon emission intensity, represented by the total greenhouse gases produced by the company, indicating the efficiency level of their carbon emission performance.

This study is motivated by several key factors. Firstly, although research on corporate carbon disclosure is expanding, the literature remains in a formative stage (He et al., 2022), and empirical evidence on the impact of regulatory pressure on carbon emission disclosures is still limited (Liu et al., 2017; Rahman et al., 2019), making conclusions less convincing. For instance, prior studies have found that regulatory pressure has a positive effect in London (Chithambo et al., 2020, 2022), China

(Shen et al., 2020), and Malaysia (Majid et al., 2023). In some countries, such as the United Kingdom, Australia, France, New Zealand (Houqe & Khan, 2023; Wahyuningrum et al., 2024), and Malaysia (Majid et al., 2023), carbon emission disclosure is already a mandatory requirement, whereas in most other countries, this disclosure remains voluntary.

Secondly, in the context of pressure from customers and suppliers, previous research has indicated that the effects on carbon emission disclosure vary. Some studies have found positive effects (Bedi & Singh, 2024; Guenther et al., 2016), while others have reported negative effects (Shen et al., 2020), or even no effect at all (Chithambo et al., 2020). The gap in this research reflects a growing concern among stakeholders regarding the need for further information on carbon emission behaviors (Saha et al., 2021). This creates pressure on management to be more transparent in disclosing their environmental responsibilities, particularly concerning carbon emission disclosures (Alsaifi et al., 2020).

Thirdly, previous research has indicated that carbon performance has varying impacts on carbon emission disclosure, with some studies reporting negative effects (Luo, 2019; Putri & Arieftiara, 2023) , while others have found no impact at all (Ratmono et al., 2021). The gap in this research reflects diverse perspectives regarding carbon emission intensity. This creates pressure on management to improve efficiency in their carbon emission intensity, which, in turn, will demonstrate better carbon performance. Companies with strong environmental performance are highly likely to disclose more information related to their environmental policies and practices (Ratmono et al., 2021), particularly concerning carbon emission disclosures (Alsaifi et al., 2020).

Empirical evidence indicates that research on the strength of regulatory pressure, pressure from customers and suppliers, and carbon performance in the context of carbon emission disclosure remains limited, with varied results. Therefore, this study is motivated to address this gap by investigating whether the strength of regulatory pressure, pressure from customers and suppliers, and carbon performance can encourage companies to be more transparent in disclosing their carbon emissions. The contributions of this research not only enhance knowledge about greenhouse gas emissions but also encourage companies to reduce carbon emissions, while providing implications for legitimacy theory.

The focus of this research is on companies in Indonesia, which serve as examples of publicly listed firms in a developing country and are significant contributors to greenhouse gas emissions, with a total of 965.3 Mt CO2e (Rahmatika et al., 2024). This study selects the energy sector due to its sustained reliance on coal, natural gas, and oil, which significantly contribute to the carbon footprint (Siregar, 2024). Reducing CO2 emissions from the energy sector has been identified as a critical strategy in the effort to address climate change. Therefore, voluntary disclosures in the energy sector should reflect how companies innovate by utilizing renewable energy, which is a primary concern for corporate and environmental sustainability (Mahmudah et al., 2023). The characteristics of the energy sector make it an appropriate context for investigating the influence of external stakeholder pressure as one of the forces affecting carbon emission disclosure.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Legitimacy Theory

Legitimacy theory, as explained by Luthans (1985), encompasses three types of legitimacy. First, legitimacy that arises from accepted social structures. Second, legitimacy that emerges from the designation of an individual as an agent or representative of those in power; these two types of legitimacy tend to be associated with individuals. Third, legitimacy that is derived from the cultural values prevalent in society or within a group, which is more closely related to organizations. Legitimacy theory elucidates the concept of the social contract that connects companies with the broader community. This social contract represents an agreement whereby society grants rights and authority to companies to manage resources, including both natural and human resources (Mathews, 1993). Consequently, companies must strive to meet societal expectations in order to gain legitimacy in accordance with the principles of the social contract.

Regulatory Pressure and Carbon Emission Disclosure

As noted by Zameer et al. (2021), Regulatory pressure can serve as a primary motivation behind the adoption of green practices by companies. Chithambo et al. (2022) emphasize the critical role of government in influencing corporate greenhouse gas (GHG) disclosure. Governments can affect corporate activities through the implementation of various environmental regulations and the enforcement of stringent penalties for non-compliance. The establishment of environmental regulations and standards is a strategic measure that can encourage companies to transition to more environmentally friendly practices (Ren et al., 2022). Zeng et al. (2022) explain that managers will report the environmental activities of their companies in response to existing regulations. Furthermore, Chithambo et al. (2020) assert that regulatory pressure significantly influences greenhouse gas disclosure. In line with these findings, Shen et al. (2020) affirm that larger companies tend to enhance their greenhouse gas disclosures to alleviate public pressure. Based on the existing literature, this study proposes the following hypothesis:

H1. Regulatory pressure has an impact on carbon emission disclosure.

Customer and Supplier Pressure and Carbon Emission Disclosure

Customers and suppliers play a crucial role as stakeholders in the value chain, demonstrating a commitment to climate change, particularly in the reduction of greenhouse gas (GHG) emissions from suppliers (Duan et al., 2021). Customer behavior can generate reinforcement or punishment effects on future purchasing decisions; reinforcement can encourage repeat purchases, while punishment can inhibit buying decisions (Shen et al., 2020). Song et al. (2024) argue that customers are increasingly demanding certifications of environmental practices from suppliers to mitigate reputational risks associated with sourcing products from environmentally irresponsible companies. In this context, companies will strive to maintain positive relationships within their upstream and downstream supply chains, which can motivate them to reduce information asymmetry and disclose more information, both financial and non-financial. Companies that are heavily reliant on their supply chains will fulfill the environmental demands of their suppliers to avoid disruptions in operational activities (Chithambo et al., 2020). Based on the existing literature, this study proposes the following hypothesis:

H2. Customer and supplier pressure has an impact on carbon emission disclosure.

Carbon Performance and Carbon Emission Disclosure

Companies with high carbon emission intensity exhibit poor carbon performance, indicating that the use of resources in their operational activities is considered inefficient. Conversely, companies with low carbon emission intensity reflect good carbon performance (Ratmono et al., 2021). Good carbon performance can motivate companies to disclose more information to stakeholders regarding emission control, thereby gaining their support and legitimacy. Carbon emission intensity also reflects a company's ability to comply with effective emission control policies, which is regarded as a social and environmental responsibility that impacts the company's legitimacy (Luo, 2019). This statement aligns with research findings indicating that carbon performance influences carbon emission disclosure (Luo, 2019; Putri & Arieftiara, 2023). Based on the existing literature, this study proposes the following hypothesis:

H3. Carbon performance has an impact on carbon emission disclosure.

METHODS

This study focuses on energy sector companies listed on the Indonesia Stock Exchange (IDX). The sample was obtained using a purposive sampling method with the following criteria: there are 66 energy sector companies registered on the IDX during the period from 2021 to 2023, resulting in a total of 198 observations over three years. However, after eliminating observations that lacked complete annual reports or sustainability reports, 32 observations were discarded. Therefore, the final number of observations utilized in this research is 166. Data regarding the sample size determination can be found in Table 1.

Table 1. Sample Size Determination

Description	Total
Total observations of companies in the energy sector listed on the Indonesia Stock Exchange from 2021 to 2023.	198
Observations that do not include companies without annual reports or those with incomplete sustainability reports.	32
Total final observations	166

A detailed explanation of the variables and their measurements can be found in Table 2. This study employs multiple regression methods to test the hypotheses, with the testing conducted through t-tests at a significance level of 5%. Data analysis is performed using SPSS version 24 software.

Table 2. Variables and Measurements

Variables	Operational Definitions	Measurements
Carbon emission disclosure /CED	Carbon emission disclosure is the process by which an organization conveys the measurement, reporting, and verification of data related to carbon emissions produced, both directly and indirectly. The level of carbon emission disclosure is measured using a carbon emission disclosure index score, which is adopted and modified from the CDP questionnaire in the study by Choi et al. (2013).	$\text{CED} = \frac{\text{Total disclosure item}}{\text{Total CDP Index}}$ (Choi et al., 2013; Mahmudah et al., 2023; Putri & Arieftiara, 2023; Wahyuningrum et al., 2024)
Regulatory pressure /RP	Regulatory pressure refers to the pressure exerted by regulators on companies (Bedi & Singh, 2024).	RP = Ln total asset (Chithambo et al., 2020; Freedman & Jaggi, 2005; Rankin et al., 2011)
Customer and supplier pressure /SCP	Pressure from customers and suppliers reflects the expectations that drive companies to maintain positive business relationships (Bedi & Singh, 2024).	$\text{SCP} = \frac{\text{Total Revenue}}{\text{Total revenue in the same Industry}}$ (Chithambo et al., 2020)
Carbon performance /CP	Carbon performance represents a quantitative depiction of greenhouse gas emission activities that contribute to climate change, along with the measures undertaken by companies to reduce carbon emissions (Velte et al., 2020).	$\text{CP} = \frac{\text{Total carbon emission}}{\text{Total revenue}}$ (Bui et al., 2020; Datt et al., 2019; Putri & Arieftiara, 2023; Ratmono et al., 2021)

RESULT AND DISCUSSION

This study employs descriptive statistical tests to collect and present data, which includes standard deviation, mean, as well as the minimum and maximum values for each variable, including both independent and dependent variables.

Table 2. Results of the descriptive statistical analysis

Description	N	Minimum	Maximum	Mean	Std. Deviation
RP	166	24.89148	41.78868	29.22954	2.43122
SCP	166	0.00000	0.36128	0.00602	0.04449
CP	166	0.00000	27.00409	0.43626	2.87025
CED	166	0.00000	0.61111	0.28146	0.17907

Source: Data analyzed using SPSS 24

The Adjusted R Square value is 0.390, as indicated by the provided data processing results. This value illustrates the extent to which the independent variables—namely regulatory pressure, pressure from customers and suppliers, and carbon performance—can explain the variability observed in the dependent variable, which is carbon emission disclosure, with a contribution of 39.00%. Thus, additional variables that are not included in this study or have been evaluated account for 61.00% (100% - 39.00%) of the variation in the dependent variable.

The data provided indicates that the statistical significance (Sig.) supports the validity and appropriateness of the regression model that we utilized. The Sig. value of 0.000, which is well below the conventional threshold of 0.05, confirms that these results are highly significant. The findings from the F-test overall demonstrate that all the variables examined in this study—including independent variables such as regulatory pressure, pressure from customers and suppliers, and carbon performance—simultaneously exert a significant influence on the dependent variable, which is carbon emission disclosure. Therefore, the results of this study enhance the understanding of the relationship between these factors and carbon emission disclosure in a broader context.

Table 4. Results of the Hypothesis Test

Hypothesis	B	Std. Error	Beta	t	Sig.	Result
(Constant)	-1.610	0.183		-8.814	0.000	
RP → CED	0.065	0.006	0.885	10.369	0.000	H1: Supported
SCP → CED	-2.564	0.343	-0.637	-7.468	0.000	H2: Supported
CP → CED	0.004	0.004	0.066	1.077	0.283	H3: Not Supported
F Value	= 36.110					
Sig. F	= 0.000					
Adjusted R^2	= 0.390					

Source: Data analyzed using SPSS 24

Based on the data analysis conducted using SPSS version 24, we conclude that the results of the t-test indicate a significant influence between the independent and dependent variables, as shown in Table 6. The table indicates that regulatory pressure, proxied by company size, has an impact on carbon disclosure with a significance level of less than 5%. These findings support the acceptance of the hypothesis (H1), which states that regulatory pressure influences carbon disclosure. The implications of these results suggest that larger companies possess higher organizational visibility, making them more likely to comply with significant public pressure. Larger firms tend to disclose more carbon-related information to mitigate public criticism. In the energy sector, companies are beginning to respond to public pressure by voluntarily reporting carbon emission disclosures in sustainability reports, a practice that became mandatory in 2019. Furthermore, large companies in several developed countries have also adjusted their operations to comply with regulations set forth

by the government (Chithambo et al., 2020; Shen et al., 2020). This underscores the important role of regulatory pressure as a key factor contributing to carbon emission disclosure.

The results presented in Table 6 indicate that the pressure exerted by customers and suppliers, proxied by company revenue, has a significant impact on the company's carbon disclosure, with a significance level of less than 5%. These findings support the acceptance of hypothesis (H2), which states that pressure from customers and suppliers influences carbon disclosure. Additionally, the results suggest that concerns about the negative repercussions of disclosing carbon emissions in the market may arise, particularly for companies that are still in the early stages of addressing carbon emission issues and have not yet achieved optimal outcomes. This finding is consistent with previous research by Shen et al. (2020). Furthermore, suppliers are inclined to reduce emissions to meet the expectations of customers who are increasingly expanding their environmental policies and programs in order to avoid risks and penalties, thereby maintaining competitiveness in the market (Dai et al., 2021). Consequently, companies are willing to disclose more carbon-related information to fulfill the informational needs of customers and suppliers.

According to Table 6, carbon performance, as proxied by carbon intensity, does not have a significant impact on carbon emission disclosure, with a significance level exceeding 5%. This finding leads to the rejection of hypothesis (H3), which posits that carbon performance influences carbon disclosure. This study contradicts previous research by Luo (2019) and Putri & Arieftiara (2023), which indicated that carbon performance does affect carbon emission disclosure. The discrepancy suggests that high carbon performance is insufficient to drive an increase in carbon emission disclosure. Similar results were also found by Ratmono et al. (2021). The findings of this research indicate that Indonesia continues to prioritize voluntary carbon emission disclosure, which poses challenges for researchers seeking comprehensive information regarding carbon emission disclosure in financial reports. The significant costs associated with implementing internal measurement systems, along with the complexities involved in monitoring carbon emissions, often hinder companies from disclosing their carbon emissions.

CONCLUSION

Based on the results and discussions, we come to the following conclusions: 1) Regulatory pressure has an influence on carbon emission disclosure. 2) Pressure from customers and suppliers also affects carbon emission disclosure. 3) Carbon performance does not have an impact on carbon emission disclosure. Like other studies, this research has its limitations. First, the study was conducted solely within the energy sector, which is the largest contributor to carbon emissions. Future research would benefit from exploring sectors beyond energy that also impact carbon emissions, thereby providing a broader perspective. For instance, the transportation, materials, and utilities sectors, which are more intensive in carbon emissions, could be examined (Ulupui et al., 2020). Second, this study utilized a carbon emission measurement developed from Choi et al. (2013), which is a modification of the CDP questionnaire. This approach resulted in carbon emission disclosures being limited to predetermined parameters. Future research should seek more recent sources of carbon emission measurement and consider employing interview methods to enhance relevance to real-world conditions. Subsequent studies could test the latest carbon emission disclosure measurement methods (Bedi & Singh, 2024; Zhu & Zhao, 2022)

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