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The Financial Implications of Carbon Transparency: Examining the Mediating Role of Emission Disclosure

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ABSTRACT

Purpose: The purpose of this research is to examine the relationship between carbon emissions disclosure as an intervening variable between corporate governance, capital expenditures, and financial performance.

Method: Companies listed on the Indonesia Stock Exchange (IDX) that are involved in manufacturing are the primary focus of the study. The research employs a purposive sampling technique to select 16 organizations, resulting in 80 data observations spanning the period from 2019 to 2023. The correlations among variables are examined using path analysis, which is conducted with IBM SPSS Statistics 26.

Findings: Gender diversity on boards has a favorable effect on a company's bottom line, according to the study's results. The business's financial performance is negatively affected by the size of the audit committee. Carbon emissions disclosure, on the other hand, is unaffected by factors like board size, gender diversity, or audit committee size. Capital spending, board size, and disclosure of carbon emissions do not substantially affect the financial success of firms. Carbon emissions disclosure also does not mediate the relationship between boards' size, gender diversity, capital spending, audit committee size, and business financial performance.

Novelty/Value: This study provides insights into the limited role of carbon emissions disclosure as a mediator in corporate financial performance, highlighting the complex interactions between governance factors and sustainability reporting, especially on carbon emission disclosure.

Keywords: Audit committee size, board gender diversity, board of commissioners' size, capital expenditures, carbon emissions disclosure, corporate financial performance.

INTRODUCTION

Investors, regulators, and customers all have higher expectations of companies when it comes to their environmental duties, and this has led to corporate sustainability becoming an integral part of contemporary business strategy. There is a lot of demand on businesses to be transparent about their carbon emissions, environmental effects, and sustainability initiatives as people become more worried about climate change. Companies must disclose their carbon emissions if they want to show that they are serious about lowering their emissions of greenhouse gases and if they want to be in line with international sustainability targets and legal requirements. Comprehensive carbon disclosure procedures are associated with greater financial performance, less regulatory risk, and more trust from stakeholders and investors, according to studies (Jaenudin et al., 2024).

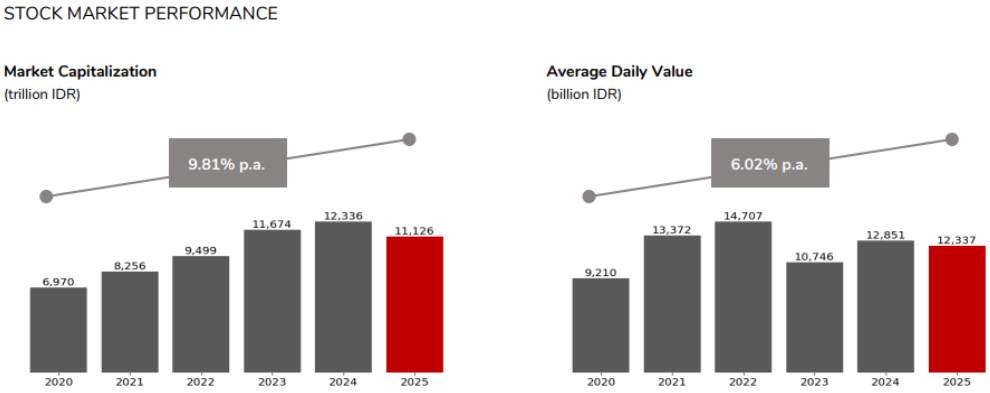

Figure 1. Stock Market Performance
Source: IDX Quarterly Statistic Equity Market Q1 2025, retrieved on May 19, 2025, from https://www.idx.co.id/id/data-pasar/laporan-statistik/statistik, number QS25Q1-E.

Based on the stock market performance in Figure 1, the Indonesia Stock Exchange (IDX) has exhibited interesting dynamics in its performance over the past five years, with various global and domestic economic factors influencing the movement of the Composite Stock Price Index (IHSG). In 2020, the stock market experienced pressure due to the COVID-19 pandemic, which led to a significant decline in the IHSG. However, recovery began to appear in 2021, driven by economic stimulus policies and increased business activity. 2022 recorded more stable growth, with the IHSG reaching its highest level throughout the year (Arizona, 2023). Entering 2023 and 2024, the Indonesian stock market remains volatile, influenced by global monetary policy, inflation, and domestic economic developments. In 2025, the IHSG reached a record high in September but then fell by 11.43% since the beginning of the year. Sectors such as banking, manufacturing, energy, and technology were the main drivers of stock market movements during this period. The Indonesia Stock Exchange has demonstrated its commitment to supporting the green economy by providing infrastructure for transparent and efficient carbon trading. With increasing corporate participation in carbon trading, it is expected that the Indonesian stock market will continue to develop towards a more sustainable ecosystem (IDXCarbon, 2022).

Corporate governance relies heavily on carbon emission disclosure since it shows how well a firm handles environmental concerns and incorporates sustainability into its operations. Research suggests that strong governance structures, including independent boards and sustainability committees, can positively influence carbon disclosure practices, ensuring that firms remain accountable for their environmental impact (Stefani, 2024). Additionally, companies that actively disclose their carbon emissions often benefit from access to sustainable investment opportunities, as investors increasingly prioritize firms with transparent environmental reporting (Kurnia et al., 2020). As global markets shift toward environmentally conscious investment strategies, businesses that prioritize carbon transparency are more likely to maintain a competitive edge and secure stakeholder support. This growing emphasis

on sustainability underscores the importance of integrating carbon disclosure into corporate strategy, ensuring that firms remain resilient in an era of heightened environmental awareness. Figure 2 shows the contribution of global greenhouse gas emissions in 2021.

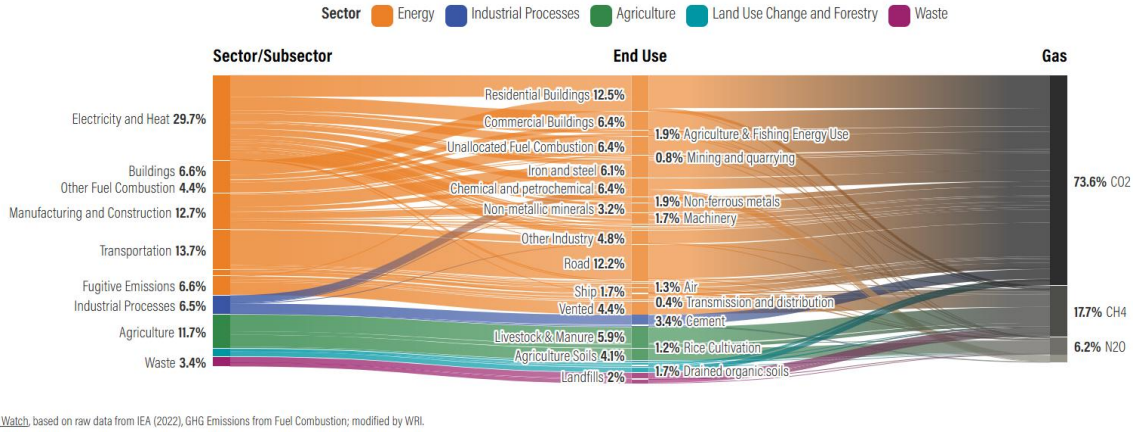

Figure 2. Distribution of Gas Emissions in 2021
Source: Where Do Emissions Come From? 4 Charts Explain Greenhouse Gas Emissions by Sector by Mengpin Ge, Johannes Friedrich and Leandro Vigna Retrieved on December 5, 2024 from https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors.

According to Figure 2, the electricity-heat sector accounted for 29.7 percent of all emissions in 2021, followed by transportation at 13.7 percent, and manufacturing and construction at 12.7 percent. Consequently, the purpose of this research is to investigate how manufacturing companies disclose their carbon emissions. Construction is not used in this research since it is not limited to only the building firm.

The interest of carbon emission disclosure has also increased in Indonesia. Over time, the view related to the purpose of a corporate's financial performance has become wider. As in 2010, PT. Sinar Mas Agro Resources and Technology lost its palm oil customers, namely Burger King, Unilever, Nestle and Kraft Food due to alleged unethical actions by PT. Sinar Mas, namely the destruction of tropical forests that threaten animal life, and reduce the absorption of carbon dioxide which is one of the main causes of climate change (Neviana, 2010). This phenomenon shows that currently in running a company, it is more than just thinking about profit, but also needs to pay attention to environmental aspects. Therefore, sustainable development is an important effort for society and companies.

Climate change is one of the popular sustainable development goals in the environmental field to date. One of the main causes of climate change is carbon emissions. Indonesia is among the top 10 countries with the highest emissions. Indonesia is ranked 8th as the country with the highest Greenhouse Gas (GHG) emissions in the world. In addition, Indonesia is also the 4th largest contributor of emissions for Asia below India and Japan (Ge et al., 2020). However, stakeholders have the right to expect enterprises to keep track of their emissions and report them. This is because reports on emission management help with climate change risk assessment and identify potential economic possibilities (Lash & Wellington, 2007). Companies must disclose their carbon emissions if they want their stakeholders to pay attention to the climate change problem and evaluate their performance. Unfortunately, carbon emission disclosure is only carried out by a few companies. Only 100 out of 525 companies make and report their sustainability reports. This is because carbon emission disclosure in Indonesia itself is still a non-mandatory or voluntary report. In addition, carbon emission disclosure requires its own costs. Companies that have sufficient funds tend to make their sustainability reports (Sudibyo, 2018).

Investment is one of the keys to reducing emissions, whether investment in technology, assets or others (Ayuningtyas, 2021) which of course requires relatively large funding. Thus, companies that are classified as having a large capital expenditure budget are more likely to disclose carbon emissions. Freeport Indonesia President Director Tony Wenas said that it takes a lot of money for the company to reduce carbon emissions. This investment is not only a matter of calculation in the present but also its

economics in the future (Safitri, 2022). This kind of condition is a dilemma for the company, between the company having to sacrifice large costs for financial benefits or the expenditure will actually put the company in a financial difficulty situation (Ruhiyat & Murwaningsari, 2019).

New fixed assets are considered to be able to help the company manage its emissions (Villiers & Staden, 2011) more than the use of old fixed assets which are likely to have lower quality. This is not only for the purpose of financial benefits but also to meet the needs of stakeholders. The cost sacrifice in the form of purchasing new equipment allows the company to consider that reporting the results of innovation and carbon efficiency on the purchase of new fixed assets is important. The decision on the cost sacrifice goes through the company's internal consideration process. There can be no separation between this and corporate governance, particularly internal corporate governance, which is crucial for oversight and decision-making (Karim et al., 2021).

The primary objective of corporate governance is to ensure that all stakeholders benefit from the company's activities. When disputes arise, good company governance could be useful. Also, it can make decision-making conversations better (Albitar et al., 2020). Efforts to enhance the company's financial performance, stakeholder interests, resource use (e.g., fixed asset utilization), and environmental responsibility (e.g., carbon emission disclosure) are all part of this decision-making process. Therefore, one of the crucial factors that might impact the degree to which a firm discloses its carbon emissions is the quality of its corporate governance (Choi et al., 2013).

Investment or funding decisions, namely capital expenditures, corporate governance systems and corporate management and disclosure related to environmental impacts are based on stakeholder theory. Stakeholder theory can function to ensure that stakeholder interests are considered in every decision taken by the company. Also included is a structure for relating financial results to disclosure of carbon emissions, corporate governance, and the like. Transparency and less information asymmetry are two outcomes that may be achieved via effective internal company governance. Carbon emission disclosure is positively correlated with capital spending and internal corporate governance, according to Karim et al. (2021). The mediating role of company governance in the relationship between ROA and voluntary disclosure was highlighted in a study by Al Hamadsheh et al. (2020).

Carbon emission disclosure is a key component of corporate transparency, reflecting an organization’s commitment to environmental responsibility and its potential influence on financial performance. The impact of carbon emission disclosure as a moderating element has received less attention than the long-established importance of capital expenditure and corporate governance in predicting financial performance. This research investigates the role that carbon emission disclosure may have in bridging the gap between capital spending, governance frameworks, and business financial performance. This study sheds light on how governance mechanisms like gender diversity on boards, audit committee size, and board structure affect sustainability reporting and financial results by analyzing manufacturing sector companies listed on the Indonesia Stock Exchange (IDX). Previous studies suggest that carbon emission disclosure can enhance corporate financial performance by reducing information asymmetry and improving investor confidence. Additionally, corporate governance mechanisms, such as independent boards and nationality diversity, have been found to positively influence carbon disclosure practices. Through the application of path analysis, the study evaluates whether environmental transparency contributes to financial performance or whether other governance-related factors hold more significance. Given the growing emphasis on environmental, social, and governance (ESG) considerations in modern business practices, this study offers a timely contribution to the discourse on corporate sustainability and financial strategy.

LITERATURE REVIEW

Stakeholder Theory

A corporation's communication strategy with those who have a vested interest in the company is outlined in stakeholder theory (Octoviany, 2020). According to Freeman & Dmytriyev (2017), developing connections and producing value for all stakeholders is the core of stakeholder theory. In this way, we may say that stakeholder theory is a framework for understanding how businesses interact

with their various stakeholder groups and how they generate value for those groups. Consequently, according to stakeholder theory, a company's long-term success depends on its ability to provide value for its many stakeholder groups. Companies must strike a balance between the demands of different stakeholders if they want to create sustainable value (Gooyert et al., 2017). In order to strike a balance, businesses must consider the diverse interests of its stakeholders. The idea that businesses should look out for both their shareholders' and other interested parties' best interests lends credence to this (Ghozali & Chariri, 2007:409)

In stakeholder theory, stakeholders are defined as those who have a vested interest in the success of a company's objectives and those who stand to gain or lose from those goals' realization (Freeman, 1984). This means that stakeholders are able to influence the results of achieving sustainable corporate performance and value. The form of corporate responsibility towards stakeholders varies, one of which is responsibility towards the environment and management of corporate resources. The company's efforts to create sustainable value can be done through reporting or delivering information to stakeholders (Jaka et al., 2018). Consequently, the corporation owes it to its stakeholders to be transparent about its practices in resource management and environmental responsibility. Included in this is the transmission of data relating to environmental impacts and investments.

Capital Expenditure and Carbon Emission Disclosure

Research by Karim et al. (2021) discovered that disclosure of carbon emissions is positively correlated with capital spending. Activities that are pertinent will be affected by the increase in capital expenditure. Since the business's operational operations are relevant here, the carbon footprint of the firm will also be relevant. Companies that spend a lot of money on capital projects are more likely to be transparent with their stakeholders. Consequently, data pertaining to carbon emissions are made public by the business.

H1: Capital expenditure has a positive effect on carbon emission disclosure.

Corporate Governance and Carbon Emission Disclosure

The corporation has a supervisor in the form of the board of commissioners. At the same time, the audit committee mediates disputes between the company's leadership and its constituents. They have the power to promote the disclosure of firm information, which includes information on environmental responsibility (Pasaribu et al., 2015). Similarly, the disclosure of a company's carbon emissions may be impacted by the gender diversity of its board (Ararat & Sayedy, 2019). The extent to which a corporation discloses its carbon emissions is contingent, among other things, on the caliber of its corporate governance (Choi et al., 2013).

H2a: The size of the board of commissioners has a positive effect on carbon emission disclosure
H2b: The gender diversity of the board has a positive effect on carbon emission disclosure
H2c: The size of the audit committee has a positive effect on carbon emission disclosure.

Capital Expenditure and Corporate Financial Performance

Based on the objectives of stakeholder theory, companies will be encouraged to maximize the management of the use of company resources. This is for the purpose of sustainable company performance in accordance with the expectations and needs of stakeholders. The use of resources or assets for capital expenditures is related to the purpose of obtaining economic benefits. The economic benefits obtained can be in the form of increased production capacity and long-term profits (Taipi & Ballkoci, 2017; Grozdic et al., 2020). Thus, capital expenditures affect the corporate's financial performance.

H3: Capital expenditures have a positive effect on corporate financial performance.

Corporate Governance and Corporate Financial Performance

The general consensus is that a bigger board of commissioners provides greater corporate oversight. This is because there is an increase in both input and ideas, leading to higher profitability (Hendratni et al., 2018). Members of a large audit committee bring a wider range of backgrounds and perspectives to

the table. As a result, the company's performance will improve and the audit committee's monitoring role will be more effective. Additionally, corporate financial performance may be impacted by the presence or absence of female board members. This is due to the perception that female board members are more involved in the oversight process (Carmo et al., 2022).

H4a: The size of the board of commissioners has a positive effect on the company's financial performance

H4b: Gender diversity of the board has a positive effect on corporate financial performance

H4c: The size of the audit committee has a positive effect on corporate financial performance.

Mediating Role of Carbon Emission Disclosure

Additional resources required for carbon emission disclosure may be funded by a financially stable corporation (Choi et al., 2013). Companies that spend a lot of money on capital will tell their stakeholders more. According to Karam et al. (2021), the objective is to get a competitive edge in the market. This shows that carbon emissions are considered when deciding where to put money. Ultimately leading to the corporate's financial performance.

H6: Carbon emission disclosure mediates the effect of capital expenditure on corporate financial performance

According to Hendratni et al. (2018), a bigger board of commissioners means greater oversight, more input and advice, and ultimately higher profits for the firm. A larger audit committee is associated with better business results, according to Tornyeva & Wereko (2012). Equally important to the company's financial success, namely return on assets (ROA), is the gender diversity of its board of directors (Carmo et al., 2022). When people in a group are very similar to one another, they are more likely to make the same mistakes or have the same limitations when it comes to accomplishing tasks. Greenhouse gas emissions are more likely to be disclosed when there are female board members. In addition, the audit committee will use its authority and position as a conduit between stakeholders and management to promote transparency in the company's operations (Pasaribu et al., 2015).

H7a: Carbon emission disclosure mediates the effect of board size on corporate financial performance

H7b: Carbon emission disclosure mediates the effect of board gender diversity on corporate financial performance

H7c: Carbon emission disclosure mediates the effect of audit committee size on corporate financial performance

The study framework is shown in Figure 3 based on the link between variables. According to the framework, the three variables used in this research are capital expenditure, corporate governance, disclosure of carbon emissions, and financial performance of corporations.

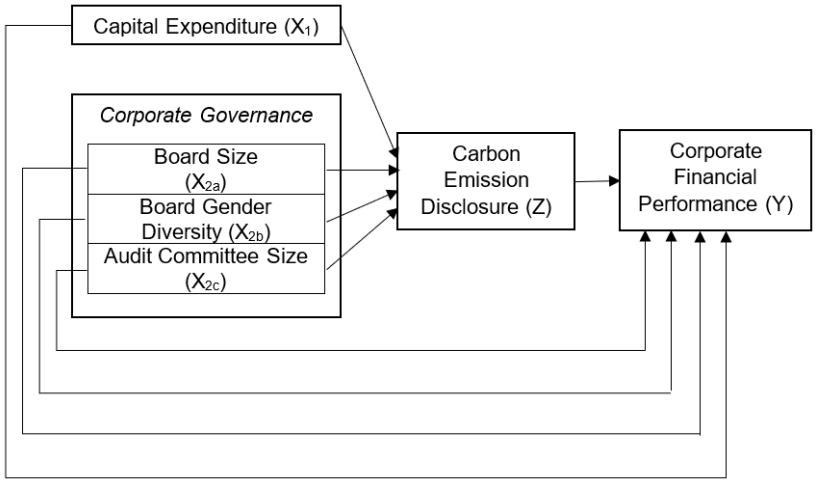

Figure 3. Research Framework

The size of the audit committee, the diversity of the board's members, and capital spending are the three measures of corporate governance that make up the independent variables (X) shown in Figure 3. Carbon emission disclosure acts as the mediating variable. Finally, the financial success of corporations serves as the dependent variable.

RESEARCH METHOD

Population and Sample

For the years 2019–2023, this study's population consisted of manufacturing sector enterprises listed on the IDX. A specific reason for focusing on businesses in the manufacturing sector is that they are known to be a major source of carbon emissions (Choi et al., 2013).

Table 1. Purposive Sampling Technique

Criteria	Yes	No
1. Manufacturing sector companies listed on the IDX consecutively in the 2019-2023 period.	149	
2. Companies that publish annual reports and/or sustainability reports for the period 2019-2023.	137	12
3. Companies that consistently and explicitly disclose carbon emissions in their annual reports and/or sustainability reports for the 2019-2023 period, with at least one disclosure item.	28	109
4. Companies that use the rupiah currency in their financial reports.	23	5
5. Companies with positive capital expenditures.	19	4
6. Companies that did not experience losses in their financial reports for the 2019-2023 period.	15	4
Total of research data (2019-2023=5 years)	75	

Source: IDX – processed (2025)

The year 2019 was chosen because Indonesia ratified the Paris Agreement on the Framework Convention on Climate Change, which aims to reduce emissions of greenhouse gases. This ratification was made in Law No. 16 of 2016, which was passed at the end of the year, on October 24, 2016. The assumption is that the law's effects, such as carbon emission disclosure and mitigation efforts, will be felt in the next two years. Researchers utilized a purposive sampling strategy based on predetermined criteria to choose study participants. Table 1 displays a synopsis of the outcomes obtained from the sample selection process. Quantitative research using secondary data is also the research method used in this study. The data sources for this study were obtained from the official website of the Indonesia Stock Exchange (IDX) (www.idx.co.id) and company websites in of annual reports and sustainability reports. The data was culled from the company's annual report covering the years 2019–2023. It includes financial details, information about the board of commissioners, the gender of board members, and details about the audit committee. Both the annual report and the sustainability report include information on the disclosure of carbon emissions.

Operationalization and Measurement of Variables.

Taking research ideas and turning them into observable research variables via operationalization and measurement using predefined units and techniques of measurement is how research is conducted. There are three types of variables in this research: independent, dependent, and mediating/moderating. In this research, the size of the board of commissioners, the diversity of board members, and the audit committee are indicators of corporate governance and capital spending, which are the independent variables. Here, financial success as measured by ROA (Return on Assets) indicators serves as the dependent variable. Another factor that acts as a mediator is the disclosure of carbon emissions. As shown in Table 2, the variables have been operationalized and measured.

Table 2. Operational Definition and Measurement

Variables	Operational Definition	Measurement
Independent		
Capital Expenditure	Capital expenditure is an expenditure made by a company in order to acquire, replace, and increase the productive capacity and operational efficiency of fixed assets that provide benefits for more than 1 year or 1 accounting period.	$CAPEX = Ln\ (PP\&E_t - PP\&E_{t-1} + Depreciation\ Expense_t)$ PP&E = property, plant and equipment of the company in the current and previous periods. (Karim et al., 2021)
Corporate Governance:		
1. Board Size	The size of the board of commissioners refers to the total number of members on the company's board of commissioners.	Total of board commissioner member (Lumbanraja, 2021).
2. Board Gender Diversity	Board gender diversity refers to the representation of men and women on the board of commissioners and directors.	$Blau\ Index = 1 - \sum_{i=1}^{n} P_i^2$ The Blau Index score range is 0 to 0.5. (Kılıç & Kuzey, 2019).
3. Audit Committee Size	The size of the audit committee is the total number of members of the company's audit committee.	Total number of audit committee members (Lumbanraja, 2021).
Mediating		
Carbon Emission Disclosure	Carbon emission disclosure refers to the disclosure of a company's carbon emission assessment, target setting, and reduction strategies, as well as its carbon emission accountability.	Measurement of carbon emission disclosure using the content analysis method by giving a score of 1 for companies that make disclosures and a score of 0 for otherwise, measured based on the carbon information request sheet by the Carbon Disclosure Project (CDP) (Choi et al., 2013)
Dependent		
Corporate Financial Performance	Proxied by Return on Asset (ROA). ROA is the ratio of net profit to assets which is used to show a company's ability to generate profits through the use of its assets.	$ROA = \frac{EAT}{Total\ Aset} \times 100\%$ (Lumbanraja, 2021).

Source: Previous Research

Data Analysis and Hypothesis Testing

Descriptive statistics for data analysis. The goal of descriptive statistical testing is to provide a picture or description of the data by examining the minimum, maximum, average, and standard deviation values. These values are used as benchmarks for future analysis and are obtained by evaluating study items using sample data. The factors that will be examined in this research are return on assets (ROA), capital expenditure, carbon emission disclosure, board of commissioners' size, board gender diversity, and audit committee size. It is standard practice to verify the data's normalcy and classical assumptions before testing any hypothesis.

The hypothesis test was run after making sure the data was normal and not affected by any classical assumptions. It is standard practice to verify the data's normalcy and classical assumptions before testing any hypothesis. This research uses route analysis for its hypothesis testing. A kind of multiple linear regression analysis, path analysis was developed. The purpose of a path analysis is to determine whether a group of independent factors has an indirect or direct effect on a dependent variable. An illustration of the relationship between independent and dependent variables, as well as the factors that mediate their effects (see Figure 4). Capital expenditure, gender diversity on the board, size

of the audit committee, disclosure of carbon emissions, financial performance (ROA), and path analysis are the factors that will be investigated in this research.

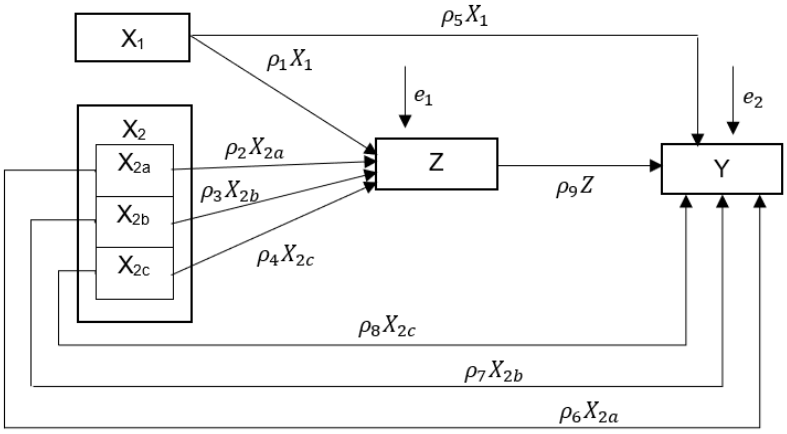

Figure 4. Path Diagram of the Influence of Capital Expenditure and Corporate Governance Variables on Company Financial Performance through Carbon Emission Disclosure

Path analysis regression equation model:

$Z = \alpha + \rho_1 X_1 + \rho_2 X_{2a} + \rho_3 X_{2b} + \rho_4 X_{2c} + e_1$ ..... (1)

$Y = \alpha + \rho_5 X_1 + \rho_6 X_{2a} + \rho_7 X_{2b} + \rho_8 X_{2c} + \rho_9 Z + e_2$ ..... (2)

Legend:
α: constant
β: regression coefficient
ρ: path coefficient
Y: Company financial performance/ROA (Dependent variable)
X: Capital expenditure (Independent variable)
X2a: Board of commissioners' size (Independent variable)
X2b: Board of commissioners' gender diversity (Independent variable)
X2c: Audit committee size (Independent variable)
Z: Carbon Emission Disclosure (Mediating Variable)
e: error

Additionally, the t-test examines the impact of mediating factors on the relationship between the independent and dependent variables. The t-value is compared to the predetermined significance threshold of 5% to establish the criterion for accepting or rejecting the hypothesis. If the p-value is less than 0.05, we may reject H0 and accept Ha, which means that the independent variable does in fact affect the dependent variable. There is no relationship between the independent and dependent variables if the significance level is higher than 0.05, which means that H0 is accepted and Ha is rejected.

RESULTS AND DISCUSSION

Results

Descriptive Statistic Analysis

A summary of the study variables, including their lowest, maximum, average, and standard deviation values, may be provided via descriptive statistical tests. A thorough examination of the study data was carried out. Capital expenditure (CAPEX), board of commissioner size (COMMSIZE), board gender diversity (B_GENDDIVERSE), and audit committee size (AUDITCOMSIZE) are all factors that are considered independent in the analysis. Additional information presented in the form of carbon emission disclosure, also known as Carbon Emission Disclosure (CED), where ROA serves as the dependent

variable and other variables serve as mediating variables. Table 3 displays the results of the descriptive statistical test conducted on the study variables.

Table 3. Descriptive Statistic Test Results

Variable	N	Minimum	Maximum	Average	Std. Deviation
CAPEX	75	23.78	30.89	27.430	1.476
COMMSIZE	75	3	13	6.133	1.920
B_GENDDIVERSE	75	0.00	0.49	0.168	0.142
AUDITCOMSIZE	75	3	4	3.227	0.421
CED	75	2	16	7.200	4.562
ROA	75	0.09	52.67	11.353	12.084

Source: Data Processed (2025)

According to Table 3, capital expenditure may range from 23.78 to 30.89, with a standard deviation of 1.476 and an average of 27.430. The board of commissioners' size is a corporate governance variable with a range of values from 3 to 13, an average of 6.133, and a standard deviation of 1.920. In addition, the gender diversity of the board ranges from 0.00 to 0.49. The audit committee size is shown with a range from 3 to 4, an average of 3.23, and a standard deviation of 0.421. With a range from 2 to 16, an average of 7.20, and a standard deviation of 4.562, the research found that disclosure of carbon emissions as a mediating variable had a minimum value of 2. Return on investment (ROI), the dependent variable in this research, ranged from a minimum of 0.09 to a high of 52.67. The ROA standard deviation is 12.084, while the average is 11.35.

Normality testing using the asymptotic approach fails to provide accurate or reliable results when the data set is small, unbalanced or poorly distributed. Therefore, in such situations it is better to use the exact approach to obtain accurate results (Mehta & Patel, 2013:1). The exact sig. value of each regression equation in the normality test is obtained through the transformation of the dependent variable, namely ROA, into the form of a natural logarithm. Both numbers are more than 0.05, coming in at 0.273 and 0.548, respectively. Additionally, autocorrelation, heteroscedasticity, and multicollinearity are not issues in any of the regression equation models.

Hypothesis Testing Results

There are two steps to use the route analysis approach to test if carbon emission disclosure is a mediating variable. The first set of tests focused on the relationship between carbon emission disclosure and the independent variables—capital expenditure, board of commissioner size, board gender diversity, and audit committee size—and the mediating variable. The second step is to examine the relationship between ROA and the independent variables and mediation. In addition, examining direct and indirect impacts is how route analysis is carried out. Path analysis was used to test hypotheses, and the findings can be seen in Figure 5, Tables 4 and 5.

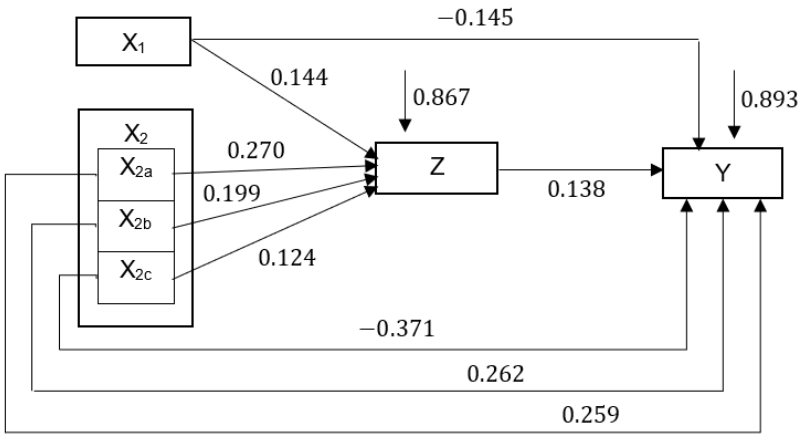

Figure 5. Path Diagram Results

Source: Data Processed (2025)

Table 4. Path Analysis Results (First)

Variables	Coefficient	t-count	Sig.
CAPEX	0.144	1.025	0.309
COMMSIZE	0.270	1.953	0.055
B_GENDDIVERSE	0.199	1.887	0.063
AUDITCOMSIZE	0.124	1.094	0.278
R Square	*0.249*		

**Sig. at 0.05 level (p<0.05)
**Dependent variable: CED (Carbon Emission Disclosure)
Note:
CAPEX= Capital expenditure, COMMSIZE= Board of commissioner size, B_GENDDIVERSE= Board gender diversity, AUDITCOMSIZE= Audit committee size.
Source: Data Processed (2025)

Table 5. Path Analysis Results (Second)

Variables	Coefficient	t-count	Sig.
CAPEX	-0.145	-0.988	0.327
COMMSIZE	0.259	1.755	0.084
B_GENDDIVERSE	0.262	2.333	0.023
AUDITCOMSIZE	-0.371	-3.114	0.003
CED	0.138	1.116	0.268
R Square	*0.202*		

**Sig. at 0.05 level (p<0.05)
**Dependent variable: ROA
Note:
CAPEX= Capital expenditure, COMMSIZE= Board of commissioner size, B_GENDDIVERSE= Board gender diversity, AUDITCOMSIZE= Audit committee size, CED= Carbon emission disclosure.
Source: Data Processed (2025)

The first regression model based on the results of the path analysis regression test in Figure 5 and Table 4 is as follows.

CED = 0.867 + 0.144 CAPEX + 0.270 COMMSIZE + 0.199 B_GENDDIVERSE + 0.124 AUDITCOMSIZE……...……. (3)

Figure 5 and Table 4 show that the regression test yielded an R-squared value of 0.249, corresponding to 24.9%, for regression model 2. It follows those factors such as capital spending, board of commissioners' size, board gender diversity, and audit committee size account for 24.9% of the variance in carbon emission disclosure, while other variables account for the remaining 75.1%.

The second regression model based on the results of the path analysis regression test in Figure 5 and Table 5 is as follows.

CED = 0.893 -0.145 CAPEX + 0.259 COMMSIZE + 0.262 B_GENDDIVERSE – 0.371 AUDITCOMSIZE + 0.138 CED……... (4)

The R-squared value for regression model 2 is 0.202, which is equivalent to 20.2%, according to the regression test findings in Figure 5 and Table 5. This suggests that variables such as capital expenditure, gender diversity on the board, audit committee size, and carbon emission disclosure can account for 20.2% of the variance in ROA, a measure of a company's financial performance. Explanations for the remaining 79.8% of the variance come from factors not included in the regression model.

Discussion

The Effect of Capital Expenditure on Carbon Emission Disclosure

The capital expenditure coefficient is 0.144, which is positive. Also, 0.309 is the value that the significance value displays. More than 0.05 is the significance level (see Figure 5 and Table 4).

Therefore, capital spending has little impact on the disclosure of carbon emissions. As a result, we can rule out hypothesis 1. This study's findings corroborate those of Chithambo & Tauringana (2014), who found no statistically significant relationship between capital spending and disclosure of carbon emissions. Businesses often provide qualitative information on their carbon emissions. Companies engage in capital expenditures when they purchase tangible assets such as technology, infrastructure, and machines. These expenditures have the potential to increase operational efficiency and production capacity, but they may not have an effect on the disclosure of carbon emissions. Reasons for this include the fact that capital expenditures are more concerned with increasing profits and expanding businesses than they are with ensuring environmental transparency. Growth and improvement may take precedence over sustainability reporting and carbon disclosure efforts when companies set their budget priorities.

Studies indicate that corporate governance, stakeholder pressure, and regulatory requirements—rather than direct asset investment—are the main forces for environmental disclosure. According to Kurnia et al. (2020), because businesses might not consider environmental reporting to be a direct financial priority, capital expenditure had no discernible impact on carbon emission disclosure. Rather, institutional ownership, governance frameworks, and environmental performance are more important determinants of carbon disclosure policies. While capital expenditure is a quantitative aspect. Therefore, the results of carbon emission disclosure should also be measured quantitatively, so companies need to invest in equipment and systems to be able to collect, measure and report carbon emissions quantitatively (Karim et al., 2021). Likewise, in fact, in this study sample, most companies actually disclose carbon emissions qualitatively.

The Effect of Corporate Governance – board size, board gender diversity, and audit committee size – on Carbon Emission Disclosure

Figure 5 and Table 4 displays the results of the second hypothesis test, which states that the disclosure of carbon emissions is unaffected by the size of the board of commissioners. This conclusion is supported by the result of the size coefficient, which is 0.270 with a significance value of 0.055, leading to the rejection of hypothesis 2a. Regardless of the size or number of members on the board of commissioners, the disclosure of carbon emissions is still not guaranteed by the corporation. Therefore, the size of the board of commissioners has no bearing on this matter. Disclosure of carbon emissions will not take place until the board of commissioners decides to do so, regardless of how many members there are on the board. In a similar vein, if the firm's board of commissioners decides to report carbon emissions despite the relatively small number of members, then the corporation is required to publish the emissions.

The results agree with those of Astuti & Setiany (2021). A company's carbon emissions declaration should not be based on the size of its board of commissioners. Since carbon emission disclosure is still optional in Indonesia, the board of commissioner’s members of the firms included in this research are anything but cautious when it comes to sharing this information with stakeholders. Since bigger boards often encounter coordination issues, resulting in inefficiency in decision-making about sustainability efforts, the results reported by Astuti et al. (2025) suggest that board size may not have a substantial impact on carbon emission disclosure. External pressures, rather than internal governance structures, are often the driving forces behind sustainability reporting, so just because a board has more members doesn't mean it will have greater environmental disclosure standards. Nonetheless, according to Nasih et al. (2019), disclosure of carbon emissions is significantly affected by the size of the board of commissioners. The management of environmental challenges and the pursuit of environmental projects and innovations may be better accomplished with a bigger board.

Figure 5 and Table 4 reveals that there is a positive correlation between board gender diversity and a coefficient value of 0.199, which is statistically significant at 0.063. Therefore, hypothesis 2b is rejected since gender diversity on boards does not significantly affect carbon emission disclosure. Consistent with the findings of Astuti & Setiany (2021), who also showed that disclosure of carbon emissions is unaffected by gender diversity on boards. Due to their insignificance and lack of influence, women on corporate boards are unable to strengthen stakeholder relations or hold the corporation accountable for its carbon emissions. The modest percentage of female board members is consistent with the tiny proportion of female individuals in this research. The average value obtained for gender

diversity is only 0.17 with a maximum value of 0.50. Thus, the power of influence possessed by female boards tends to be smaller than the power of influence possessed by men even though female boards are considered to understand ethical and social demands better. However, their small capacity makes female boards unable to bring about change (Astuti & Setiany, 2021). In addition, the nature of carbon emission disclosure is not yet a major urgency for companies or is still voluntary, so that the influence that female board members can have in companies is even smaller.

Board gender diversity, despite its potential to enhance corporate decision-making and ethical considerations, does not always lead to improved carbon disclosure. Some studies indicate that while gender-diverse boards may prioritize sustainability, their influence on disclosure practices is limited unless supported by regulatory frameworks or stakeholder demands (El-Deeb & Mohamed, 2024). In contrast, the findings in the study by Ararat & Sayedy (2019) revealed the opposite. Their research shows that disclosure of carbon emissions is significantly enhanced when there is gender diversity on the board. By adding specific remarks, female board members may affect how a firm discloses its carbon emissions. In order to effectively oversee and administer corporate governance, board members need to possess the necessary professional qualifications.

The 2c hypothesis test yielded a positive coefficient value and a significant value of 0.278, as shown in Figure 5 and Table 4. Hypothesis 2c was rejected according to the findings. A larger or smaller audit committee does not impact the disclosure of carbon emissions in this way. If the majority or even all members of the audit committee in the firm do not see carbon emissions as an urgent matter, then the disclosure committee's size becomes irrelevant when it comes to influencing disclosure. This may be the result of regulators' and stakeholders' lack of interest in and demands for action on carbon emission concerns.

Consistent with findings by Sari et al. (2021) that the audit committee does not impact disclosure of carbon emissions. The publication of carbon emission information is not impacted by the number of audit committee members since policies or reporting relating to carbon emissions are not yet mandated. Therefore, if a company's carbon emission disclosure is not a critical or pressing problem, the amount of audit committee members does not impact the disclosure. Carbon emission disclosure is not happening in Indonesia because it is not seen as a threat, a demand, or even an effect on the interests of stakeholders and capital market actors.

While audit committees may review corporate disclosures, their focus is typically on financial accuracy and regulatory compliance rather than voluntary sustainability disclosures. Research suggests that unless audit committees have specific environmental expertise or mandates, their influence on carbon reporting remains minimal (El-Deeb & Mohamed, 2024). The results, however, contradicted this, according to Gerged et al. (2022). Disclosure of carbon emissions is positively and significantly affected by the size of the audit committee. With the introduction of the company's carbon emission declaration comes an increase in the number of audit committees. Disclosure of carbon emissions is more common in companies with larger or more numerous audit committees.

The Effect of Capital Expenditure on Corporate Financial Performance

The findings of testing hypothesis 3 indicate that capital expenditure does not affect ROA, as seen in Figure 5 and Table 4. The capital expenditure coefficient is -0.145, which is negative. At the same time, 0.327 is a number higher than 0.05 in the significance value. This leads us to reject hypothesis 3. Dovita et al. (2019) states that this finding could happen if a company's fixed-asset capital expenditures end up being inefficient or making poor choices. This would lead to higher product costs per unit, which would make the product less competitive in the market and, eventually, reduce ROA. The fact that the business invests in fixed assets at an unsuitable period is another contributing element.

As is well known, this research period of 2019 and 2020 was conducted when the Covid-19 pandemic hit Indonesia. Because capital expenditure is not something that can be enjoyed in the same period, so that the capital expenditure made by the company in previous years actually caused a decrease in the company's ROA in the following years. On the other hand, the presence of the Covid-19 pandemic itself cannot be predicted. Therefore, quite a few companies from the samples collected in this study actually carried out fixed asset efficiency, one of which was by selling their assets. capital investments often require a long gestation period before yielding financial returns. Companies may allocate significant resources to infrastructure or equipment, but the benefits may not be immediately reflected

in financial performance metrics such as profitability or return on assets. capital expenditure does not guarantee improved financial performance if investments are not strategically aligned with market demand or operational efficiency. Poor investment decisions, misallocation of resources, or economic downturns can lead to underutilized assets, reducing the expected financial benefits. Research on Indonesian firms suggests that capital expenditure alone does not drive financial success unless accompanied by effective management strategies and market responsiveness (Kwistianus & Juniarti, 2022). This finding contradicts the findings of Taipi & Ballkoci (2017), who found that capital spending significantly affected the ROA of the firm.

The Effect of Corporate Governance – board size, board gender diversity, and audit committee size – on Corporate Financial Performance

Figure 5 and Table 5 illustrates that there is a positive coefficient value for the board of commissioners' size. The significance value, meanwhile, is 0.084. This demonstrates that ROA is unaffected by the number of commissioners on the board. The return on investment (ROI) of a corporation cannot be improved by assembling a large board of commissioners. Our results disprove hypothesis 4a.

This study's results corroborate those of Wilar et al. (2018) and Mahendra & Widajantie (2021), which found that the number of commissioners on a board does not significantly affect return on assets (ROA) for corporations. The company's performance might still be lacking, no matter how big the board of commissioners is. Another consideration is that a larger pool of commissioners inside the organization is sure to provide a wide range of viewpoints and ideas, some of which might be really intriguing. On the other side, more and more people are voicing their ideas and perspectives, which leads to new choices. Wilar et al. (2018) found that this ultimately affects the stability of the company's profitability, which prevents it from increasing optimally. Contrary to what one may expect, this study's results contradict those of Hendratni et al. (2018). More boards of commissioners, in his view, means greater oversight. The operational operations of the organization become healthier as a result of this. Moreover, it has the potential to forestall managerial immorality. A key indicator of a company's financial health, return on assets (ROA) has gone up.

With a significant value of 0.023 and a positive coefficient value, the findings of the 4b hypothesis test were deemed acceptable according to Table 5. This demonstrates that the ROA of the firm is positively and significantly impacted by gender diversity on the board. The board benefits from having members of both sexes because it increases the variety of thought, experience, and expertise. As a result, the company's financial performance improves and decision-making becomes more inventive. The viewpoints, ideas, and views of female board members will also have a greater impact on decision-making due to their relevance to the company's profitability, which is of paramount importance.

Consistent with the findings of Carmo et al. (2022), this research confirms that gender diversity on boards significantly improves business financial performance as assessed by ROA. According to Kirsch (2018), female directors have the power to impact stakeholders both inside and outside of the organization. The corporate's financial performance is affected by this, which in turn influences the activities of stakeholders. On the other hand, Marquez-Cardenas et al. (2022) found no evidence supporting hypothesis 4a. He claims that ROA is unaffected by gender diversity on boards.

Return on Assets (ROA) is negatively affected by the size of the audit committee. Table 5 displays the analytical findings, which reveal a negative coefficient value and a significance level of 0.003. Therefore, we may exclude hypothesis 4c. When a company's audit committee becomes larger, return on assets (ROA) gets worse. On the other hand, the return on assets (ROA) is actually increased with a smaller audit committee.

Results from Musdalifah & Himmati (2021) corroborate this, showing that ROA is negatively impacted by the size of the audit committee. They argue that having more audit committees makes it harder to divide up tasks, which in turn increases the likelihood of misunderstandings and, in turn, less effective decision-making, which in turn leads to a drop in the company's financial performance. An increase in the number of audit committees will lead to greater oversight and control, which in turn will cause decision-making to be more laborious and meticulous. Protecting shareholder interests and

ensuring reliable financial reporting is actually best accomplished by reducing the number of audit committees.

On the other hand, Mahendra & Widajantie (2021) and Ashari & Krismiaji (2020) found a favorable correlation between the size of the audit committee and the financial performance of the corporation. They claim that various cultures and settings may lead to diverse outcomes. Consequently, research in industrialized nations yields different outcomes than research in developing countries, such as Indonesia. There is little doubt that human resources, pay scales, and laws vary from one nation to the next. The audit committee's requirements are impacted by these distinctions.

The Effect of Carbon Disclosure on Corporate Financial Performance

Figure 5 and Table 5 reveals that the coefficient value of carbon emission disclosure is 0.138, which is positive. In addition, with a value of 0.268, the significance level is higher than the threshold of 0.05. As a result, it is clear that disclosure of carbon emissions does not significantly impact ROA. Disclosure of a company's carbon emissions will not substantially improve its financial success. Thus, reject hypothesis 5.

The results may be the result of the fact that, from a regulatory and economic standpoint, the firm has not yet been able to reap any direct financial benefits from Indonesia's implementation of carbon emission disclosure. Indonesia itself does not have any regulations regarding fines or sanctions imposed on companies in Indonesia. So far, both in Law No. 16 of 2016, Presidential Regulation No. 98 of 2021, regulations or decrees of the Minister of Environment and Forestry and various other regulations regarding carbon emissions generally contain rules for the implementation and procedures for reporting carbon emissions.

Some studies suggest that carbon disclosure does not significantly influence financial performance because firms may use it primarily for impression management rather than substantial operational changes (Phatak, 2023). Similarly, Larasati et al. (2020) found no statistically significant relationship between ROA and disclosure of carbon emissions. Especially when the assets held from debt are substantial, companies would rather fulfill their commitments or debts than choose for voluntary disclosure. On the other hand, a favorable correlation between carbon emission disclosure and ROA was found by Alifiani & Suryaningrum (2020).

The Mediating Role of Carbon Emission Disclosure on the Effect of Capital Expenditure on Corporate Financial Performance

A positive indirect impact of 0.020 (0.144 x 0.138) is revealed in Figure 5, Tables 4 and 5, which pertain to the findings of testing hypothesis 6 on the mediating role of carbon emission disclosure on the effects of capital spending on the corporate's financial performance. The direct impact, meanwhile, is 0.145 negative. Hypothesis 6 is therefore rejected since the direct impact is larger and the indirect effect is lower. Testing hypothesis 6 reveals that carbon emission disclosure, even when acting as a mediator, does not significantly improve the impact of capital spending on the financial performance of the company.

Disclosure of carbon emissions as an intermediary variable is unable to bridge the effect of capital expenditure on ROA. It should be realized that in increasing assets, the company must consider the impacts caused both on the environment and especially on the corporate's financial performance. Disclosure of carbon emissions as an impact of an increase in inefficient assets will actually cause a decrease in the company's ROA. Therefore, when a company decides to reduce and disclose carbon emissions through increasing assets, the company needs to think carefully. This is to consider the financial impacts caused in the long term. Why? Because a decline in corporate profitability follows an increase in failing assets (Dovita et al., 2019).

While capital expenditure involves investments in physical assets such as infrastructure, technology, and equipment, its primary focus is on business expansion and operational efficiency rather than environmental transparency. Companies may allocate significant resources toward growth without necessarily prioritizing carbon disclosure, which is often driven by regulatory requirements and stakeholder expectations rather than direct financial investments (Karim et al., 2021). Financial performance is influenced by multiple variables beyond carbon disclosure, including market conditions, corporate governance, and operational strategies. Research suggests that while carbon disclosure

enhances corporate transparency, it does not necessarily translate into improved financial outcomes unless accompanied by strong environmental policies and investor confidence (Al-Mari & Mardini, 2024).

Providing more carbon emission information is not able to provide a significant impact on the market. This shows that more disclosure of information related to carbon emissions is more suitable to be associated with other stakeholders, such as the government (Luo et al., 2012). Carbon emission notification is still entirely voluntary in Indonesia, and the government has failed to impose any stringent restrictions on the matter. Since the advantages gained with the cost of disclosure are irrelevant, the company's profitability does not move in tandem with capital expenditure and carbon emission disclosure. However, according to Silva-Gao (2012), high capital intensity and improved financial success of the firm are factors that impact carbon emission disclosure.

The Mediating Role of Carbon Emission Disclosure on the Effect of Corporate Governance on Corporate Financial Performance

Figure 5 and Table 5 displays the results of the testing of hypothesis 7a, which states that the influence of the size of the board of commissioners on the financial performance of a corporation cannot be mitigated by carbon emission disclosure. The direct impact of carbon emission disclosure as a mediator is 0.259, whereas the indirect effect is 0.037 (0.270 x 0.138). As a result, we may dismiss 7a. Despite carbon emission disclosure's best efforts, it has not been able to significantly improve the correlation between board size and ROA for companies. A lengthier time is required to make a judgment when the number of commissioners on the board is high. This can happen because the number of heads and thoughts that are increasingly diverse make agreements more difficult to reach. This difficulty causes the performance of the board of commissioners to be less effective in making strategic decisions, one of which is related to carbon emission disclosure (Trufvisa & Ardiyanto, 2019). Therefore, the stability of the company's profitability is disrupted (Wilar et al., 2018).

Board size, while contributing to diverse perspectives, may lead to inefficiencies in decision-making, reducing its effectiveness in driving sustainability initiatives. Larger boards often struggle with coordination, making it difficult to implement consistent carbon disclosure practices that directly impact financial outcomes. According to Kurnia et al. (2025), suggests that board size does not significantly influence carbon disclosure, as environmental reporting is often driven by external pressures rather than internal governance structures.

Results from testing hypothesis 7b show that gender diversity on boards has an impact on return on assets (ROA), and that this effect is unmediated by carbon emission disclosure factors (Table 5). There is an indirect impact value of 0.027 (0.199 x 0.138) for carbon emission disclosure as a mediator between gender diversity and financial success. At the same time, the value of the indirect impact is 0.262. In reality, the direct influence is more valuable than the indirect one. So, we can exclude out 7b. Astuti and Setiany (2021) found that the company's decision-making, including its carbon emission disclosure activities, remains mostly unchanged due to the lack of gender diversity on the board or the limited number of female board members. Another view is that female board members are more likely to actively supervise (Carmo et al., 2022) and so impact the behavior of stakeholders both within and outside the organization (Kirsch, 2018).

The success or failure of a business is dependent on the activities of its stakeholders. Carbon emission disclosure is not likely to be a major consensus among board members if gender diversity or the number of women on the board cannot impact the implementation of this policy in a way that improves the company's profitability and meets the needs of stakeholders. Thus, it is not about the number of boards but the power of influence. Board gender diversity, despite its potential to enhance ethical decision-making and sustainability awareness, does not always lead to improved carbon disclosure or financial performance. While gender-diverse boards may prioritize environmental responsibility, their influence on disclosure practices is limited unless supported by regulatory frameworks or investor expectations. Studies indicate that gender diversity alone is insufficient to drive comprehensive carbon reporting, as firms may disclose emissions primarily for compliance rather than financial benefits (Jaenudin et al., 2024).

Based on Figure 5 and Table 5, hypothesis 7c testing states that the carbon emission disclosure variable as a mediator is unable to mediate the effect of audit committee size on the corporate's financial performance. The indirect effect value shows a figure of 0.017 (0.124 x 0.138). This result is smaller than the direct effect, which is 0.371 with a negative coefficient. Carbon emission disclosure is in fact unable to mediate the effect of audit committee size on ROA. Therefore, hypothesis 7c is rejected.

Musdalifah & Himmati (2021) state that the increasing number of audit committees actually results in less effective decision-making, including decisions related to carbon emission disclosure activities. The effects on the company's bottom line are noticeable. Suppose the audit committee, in its capacity to report on corporate disclosures, determines that carbon emission disclosure does not have an impact on financial and market performance. In that case, the committee will not prioritize carbon emission disclosure in its efforts to improve the company's financial performance. Various risks that are detrimental to many parties can occur if the company does not pay attention to environmental aspects in carrying out its operational activities or even influences investor decisions. The primary role of audit committees is financial oversight rather than environmental reporting, meaning their influence on carbon disclosure is minimal unless they possess specific sustainability expertise. Research highlights that audit committees focus more on financial accuracy and regulatory compliance rather than voluntary sustainability disclosures, limiting their impact on financial performance (Aprizal et al., 2024).

CONCLUSION

This study focuses on the mediating function of carbon emissions disclosure while highlighting the complex interactions among corporate governance, capital expenditure, and financial performance. The results show that the size of the audit committee has a negative effect on business financial performance, whereas board gender diversity has a beneficial effect. The study does, however, also highlight the shortcomings of carbon emissions disclosure as a mediating variable, since it has no discernible impact on financial performance and is ineffective at mediating the connections between business results and governance issues. This implies that a more thorough investigation of other mediating elements or mechanisms may be necessary to fully understand the expected integration of sustainability practices into financial performance, which may be more complicated than previously thought.

This study stresses the limitations of carbon emissions disclosure as a mediating variable, as it does not significantly affect corporate financial performance nor effectively mediate the relationships between governance factors and corporate outcomes. This suggests that the anticipated integration of sustainability practices into financial performance might be more complex than previously assumed, requiring deeper exploration of other mediating factors or mechanisms. Beyond these findings, the study presents several inherent limitations. The relatively small sample size of 16 companies and 80 observations, confined to the manufacturing sector on the Indonesia Stock Exchange, restricts the generalizability of the results to other industries or geographic regions. Additionally, the use of purposive sampling may introduce selection bias, potentially limiting the representation of diverse corporate practices. The reliance on secondary data from financial and sustainability reports may also pose issues of accuracy or completeness, as such disclosures might vary significantly across companies or be subject to managerial discretion. Another limitation lies in the timeframe of 2019–2023, which may not capture long-term trends or the evolving nature of corporate governance and environmental disclosure practices. Lastly, the study's focus on a single mediating variable—carbon emissions disclosure—excludes other possible mediators or moderators that could provide a more comprehensive understanding of the dynamics between governance factors, sustainability, and financial performance. These limitations open avenues for future research to adopt broader samples, longitudinal designs, and multifaceted analytical approaches.

From a theoretical perspective, the research contributes to the ongoing discourse by emphasizing the nuanced effects of governance characteristics on corporate financial outcomes, thereby challenging the simplified assumptions of direct causal relationships. Practically, the findings encourage companies to focus on board diversity and reassess the role of their audit committees, while also considering alternative pathways to enhance sustainability reporting's relevance to financial

performance. In terms of policy, the study advocates for regulatory bodies to develop more robust frameworks that align corporate governance and sustainability reporting standards, fostering more effective environmental disclosure practices. The relatively low carbon emission disclosure in the manufacturing sector in Indonesia can be used as a reference for regulators to build a legal basis or law that specifically discusses accounting standards or carbon emission disclosure reporting policies by focusing on economic and financial aspects as well as other policies that may have a financial impact on the company. That way, transparency in financial and non-financial reporting can be integrated with each other. In addition, through this policy, it is hoped that the quality of handling carbon emission problems will be better and the interests of the community, investors, creditors and companies will be protected. Future research could benefit from expanding the sample size and examining additional sectors to validate the generalizability of these findings, as well as exploring alternative mediators that might bridge governance factors with enhanced corporate financial performance.

Authors' Contribution

CKD and JA analyzed and interpreted the data. CKD and AI performed a statistical data analysis and helped create the final manuscript.

Conflict of Interest

The authors declare no competing interests.

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Availability of Data and Materials

The data and materials can be accessed from the Indonesian Stock Exchange (https://www.idx.co.id/id) and the company's websites, which provide annual reports and sustainability reports.

REFERENCES

Al Hamadsheh, I. M., Bardai, B. Bin, & Al Jounaidi, A. R. M. (2020). The Mediating Effect of Voluntary Disclosure on the Relationship between Corporate Governance and Financial Performance among Listed Jordanian Companies. *International Journal of Research and Scientific Innovation (IJRSI), VII*(VII), 150–157. https://www.rsisinternational.org/journals/ijrsi/digital-library/volume-7-issue-7/150-157.pdf

Al-Mari, J.R. & Mardini, G.H. (2024), Financial performance and carbon emission disclosure, *Journal of Business and Socio-economic Development, Vol. 4* No. 4, pp. 293-307. https://doi.org/10.1108/JBSED-03-2024-0023.

Albitar, K., Hussainey, K., Kolade, N., & Gerged, A. M. (2020). ESG Disclosure and Firm Performance Before and After IR: The Moderating Role of Governance Mechanisms. *International Journal of Accounting and Information Management, 28*(3), 429–444. https://doi.org/10.1108/IJAIM-09-2019-0108.

Alifiani, I. I., & Suryaningrum, D. H. (2020). Carbon Emission Disclosure as Mediation of Factors Affecting Firm Value. *Proceedings of the 2nd International Conference of Business, Accounting and Economics*. https://doi.org/10.4108/eai.5-8-2020.2301146.

Aprizal, M. D., Rosini, I., & Suripto, S. (2024). Good Corporate Governance dan Media Exposure Terhadap Carbon Emission Disclosure dengan Pemoderasi Kinerja Lingkungan, *J-CEKI: Jurnal Cendekia Ilmiah, 4*(1), 137-149. https://ulilalbabinstitute.id/index.php/J-CEKI/article/view/6158.

Ararat, M., & Sayedy, B. (2019). Gender and climate change disclosure: An interdimensional policy approach. *Sustainability, 11*(24), 1–19. https://doi.org/10.3390/su11247217.

Arizona, D. (2023). *Performa Pasar Modal Indonesia: Analisis 5 Tahun Terakhir untuk Investor.* Retrieved on May, 19, 2025, from Performa Pasar Modal Indonesia: Analisis 5 Tahun Terakhir untuk Investor

Ashari, S., & Krismiaji. (2020). Audit Committee Characteristics and Financial Performance: Indonesian Evidence. *Equity, 22*(2), 139–152. https://doi.org/10.34209/equ.v22i2.1326.

Astuti, T. W., & Setiany, E. (2021). The Effect of Board Characteristics on Carbon Emission Disclosure. *International Journal of Management Studies and Social Science Research, 3*(5), 207–216. https://www.ijmsssr.org/paper/IJMSSSR00537.pdf

Astuti, W., Septianingrum, V., Mirojiah, S., Nahriah, S., & Nofryanti, N. (2025). Pengaruh Dewan Direksi, Komite Audit, dan Keberagaman Gender Terhadap Kinerja Keuangan (Studi Kasus: Perbankan Syariah di Indonesia dan Malaysia). *Jurnal Revenue: Jurnal Ilmiah Akuntansi, 6*(1), 40-54. https://doi.org/10.46306/rev.v6i1.918

Ayuningtyas, R. (2021). *Investasi Jadi Kunci Upaya Pemangkasan Emisi Karbon.* Investor.Id. Retrieved June 8, 2022 from https://investor.id/bumee/268611/investasi-jadi-kunci-upaya-pemangkasan-emisi-Karbon.

Carmo, C., Alves, S., & Quaresma, B. (2022). Women on Boards in Portuguese Listed Companies: Does Gender Diversity Influence Financial Performance? *Sustainability, 14*(6186), 1–21. https://doi.org/10.3390/su14106186.

Choi, B. B., Lee, D., & Psaros, J. (2013). An Analysis of Australian Company Carbon Emission Disclosures. *Pacific Accounting Review, 25*(1), 58–79. https://doi.org/10.1108/01140581311318968.

Chithambo, L., & Tauringana, V. (2014). Company Specific Determinants of Greenhouse Gases Disclosures. *Journal of Applied Accounting Research, 15*(3), 323–338. https://doi.org/10.1108/JAAR-11-2013-0087.

Dovita, Y. G., Rokhmawati, A., & Fathoni, A. F. (2019). The Effect of Sales Growth, Capital Expenditure, and Working Capital Efficiency on Indonesian-Listed-Consumer-Goods Firms' Financial Performance with Capital Structure as Moderating Variable. *Indonesian Journal of Economics, Social, and Humanities, 1*(1), 1–15. https://doi.org/10.31258/ijesh.1.1.1.

El-Deeb, M.S., & Mohamed, L. (2024), The moderating role of board gender diversity on the association between audit committee attributes and integrated reporting quality. *Futur Bus J 10*, 85. https://doi.org/10.1186/s43093-024-00340-6.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach.* Pitman.

Freeman, R. E., & Dmytriyev, S. (2017). Corporate Social Responsibility and Stakeholder Theory: Learning From Each Other. *Emerging Issues in Management, 2*, 7–15. https://doi.org/10.4468/2017.1.02freeman.dmytriyev.

Ge, M., Friedrich, J., & Vigna, L. (2020). *4 Charts Explain Greenhouse Gas Emissions by Countries and Sectors*. World Resources Institute. Retrieved June 8, 2024, from https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors

Ge, M., Friedrich, J., & Vigna, L. (2024). *Where Do Emissions Come From? 4 Charts Explain Greenhouse Gas Emissions.* World Resources Institute. Retrieved January 28, 2025, from https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors

Gerged, A. M., Chijoke-Mgbame, A. M., Konadu, R., & Cowton, C. J. (2022). Does The Presence of an Environmental Committee Strengthen the Impact of Board Gender Diversity on Corporate Environmental Disclosure? Evidence from sub-Saharan Africa. Business Strategy and the Environment, 1–17. https://doi.org/10.1002/bse.3257.

Ghozali, I., & Chariri, A. (2007). *Teori Akuntansi.* Badan Penerbit Universitas Diponegoro.

Gooyert, V. De, Rouwette, E., Kranenburg, H. Van, & Freeman, E. (2017). Reviewing The Role of Stakeholders in Operational Research: A Stakeholder Theory Perspective. *European Journal of Operational Research, 262*(2), 402–410. https://doi.org/10.1016/j.ejor.2017.03.079.

Grozdic, V., Maric, B., Radišic, M., Šebestová, J., & Lis, M. (2020). Capital Investments and Manufacturing Firms' Performance: Panel-Data Analysis. Sustainability (Switzerland), 12(4), 1–18. https://doi.org/10.3390/su12041689.

Hendratni, T. W., Nawasiah, N., & Indriati, T. (2018). Analisis Pengaruh Corporate Governance Terhadap Kinerja Keuangan Sektor Perbankan yang Terdaftar di BEI Tahun 2012-2016. *Jurnal Riset Manajemen dan Bisnis (JRMB) Fakultas Ekonomi UNIAT, 3*(1), 37–52. https://doi.org/10.36226/jrmb.v3i1.83.

IDXCarbon (2022). Indonesia's Commitment on a Low-Emissions Future, Retrieved on May 19, 2025, from https://www.idxcarbon.co.id/

Jaenudin, J., Ruhiyat, E., & Sugiyanto. S. (2024). Factors Affecting Carbon Emission Disclosure: Good Corporate Governance as A Moderating Variable, *EKUITAS (Jurnal Ekonomi dan Keuangan), 8*(4), 613-631. https://doi.org/10.24034/j25485024.y2024.v8.i4.6670.

Jaka, E. Z., Arondo, L. A., & Igor, A. E. (2018). Corporate Social Responsibility and Corporate Governance and Corporate Financial Performance: Bridging Concepts for a More Ethical Business Model. *Business Strategy and Development, 1*(3), 214–222. https://doi.org/10.1002/bsd2.29.

Karim, A. E., Albitar, K., & Elmarzouky, M. (2021). A novel measure of corporate carbon emission disclosure, the effect of capital expenditures and corporate governance, Journal of Environmental Management, Volume 290, 112581. https://doi.org/10.1016/j.jenvman.2021.112581.

Kirsch, A. (2018). The gender composition of corporate boards: A review and research agenda. *Leadership Quarterly, 29*(2), 346–364. https://doi.org/10.1016/j.leaqua.2017.06.001.

Kurnia, P., Agustia, D., Soewarno, N. and Ardianto, A. (2025), The mediating role of carbon emission disclosure in the relationship between structure of corporate governance and firm performance, *Journal of Applied Accounting Research, Vol. ahead-of-print* No. ahead-of-print. https://doi.org/10.1108/JAAR-01-2023-0015.

Kurnia, P., Darlis, E., & Putra, A. A. (2020). Carbon Emission Disclosure, Good Corporate Governance, Financial Performance, and Firm Value, *The Journal of Asian Finance, Economics and Business, 7*(12), 223-231. https://doi.org/10.13106/jafeb.2020.vol7.no12.223.

Kwistianus, H., & Juniarti. (2022). The Long-Term Performance of Capital Expenditure from a Fundamental Perspective: Evidence from Indonesia. *Asian Economic and Financial Review, 12*(12), 1027–1040. https://doi.org/10.55493/5002.v12i12.4667.

Larasati, R., Seralurin, Y. cores, & Sesa, P. V. S. (2020). Effect of Profitability on Carbon Emission Disclosure. *The International Journal of Social Sciences World, 2*(02), 182–195. https://doi.org/10.5281/zenodo.4248320.

Lash, J., & Wellington, F. (2007). Competitive Advantage on a Warming Planet. *Harvard Business Review, 85*(3), 94–102. Retrieved July 23, 2022 from http://courseresources.mit.usf.edu/sgs/geb6930/module_3/read/competative_advantage.pdf

Lumbanraja, T. (2021). Pengaruh Good Corporate Governance (Dewan Direksi, Dewan Komisaris, dan Komite Audit) Terhadap Profitabilitas. *Jurakunman (Jurnal Akuntansi dan Manajemen), 14*(2), 159. https://doi.org/10.48042/jurakunman.v14i2.80.

Luo, L., Lan, Y. C., & Tang, Q. (2012). Corporate Incentives to Disclose Carbon Information: Evidence from the CDP Global 500 Report. Journal of International Financial Management and Accounting, 23(2), 93–120. https://doi.org/10.1111/j.1467-646X.2012.01055.x.

Mahendra, P. R., & Widajantie, T. D. (2021). The Effect of Good Corporate Governance Mechanisms on Financial Performance in Conventional Commercial Banks Listed in Indonesia Stock Exchange Period 2015-2019. *Jurnal Ilmiah Edunomika, 5*(02), 1371–1382. https://doi.org/10.29040/jie.v5i2.2597.

Marquez-Cardenas, V., Gonzalez-Ruiz, J. D., & Duque-Grisales, E. (2022). Board Gender Diversity and Firm Performance: Evidence from Latin America. *Journal of Sustainable Finance and Investment, 12*(3), 785–808. https://doi.org/10.1080/20430795.2021.2017256.

Musdalifah, I., & Himmati, R. (2021). The Influence of the Size of the Board of Commissioners, Size of the Board of Directors, Size of the Audit Committee, and Company Size on Banking Performance at Indonesian Regional Development Banks in 2015-2020. *Annual International Conference on Islamic Economics and Business (AICIEB), 1*, 311–322. https://doi.org/10.18326/aicieb.v1i0.37.

Nasih, M., Harymawan, I., Paramitasari, Y. I., & Handayani, A. (2019). Carbon Emissions, Firm Size, and Corporate Governance Structure: Evidence from the Mining and Agricultural Industries in Indonesia. *Sustainability (Switzerland), 11*(9), 1–14. https://doi.org/10.3390/su11092483.

Neviana. (2010). *Triple Bottom Line: Lebih dari Sekadar Profit.* SWA Online. Retrieved June 10, 2022, from https://swa.co.id/swa/my-article/triple-bottom-line-lebih-dari-sekadar-profit

Octoviany, G. (2020). Corporate Governance, Stakeholder Power, Komite Audit dan Sustainability Reporting. *Jurnal Magister Akuntansi Trisakti, 7*(2), 121–144. https://doi.org/10.25105/jmat.v7i2.7574.

Pasaribu, R. B. F., Kowanda, D., & Kurniawan, D. (2015). Pengaruh Earning Management dan Mekanisme Good Corporate Governance terhadap Pengungkapan Corporate Social Responsibility Pada Emiten Manufaktur di Bursa Efek Indonesia. *Jurnal Riset Manajemen dan Bisnis, 10*(2), 97–121. http://e-journalfb.ukdw.ac.id/index.php/jrmb

Phatak, P. (2023). The impact of carbon disclosure on corporate financial performance: an empirical study of Indian firms. *Economics and Finance, 2023. Master Thesis in Finance.* https://dumas.ccsd.cnrs.fr/dumas-04402507v1.

Ruhiyat, E., & Murwaningsari, E. (2019). Environmental Disclosure, Board of Commissioners, Board of Directors and Company Value. *International Journal of Business, Economics and Law, 19*(5), 328–333. https://www.ijbel.com/wp-content/uploads/2019/12/IJBEL19_278.pdf.

Safitri, K. (2022). *Penurunan Emisi Karbon, Bos Freeport: Ada Biaya yang Tidak Kecil yang Harus Dikeluarkan*. Kompas.Com. Retrieved June 10, 2024, from https://money.kompas.com/read/2022/07/07/142258226/penurunan-emisi-karbon-bos-freeport-ada-biaya-yang-tidak-kecil-yang-harus.

Sari, K. P., Yuliani. N. L., & Susanto, B. (2021). Green Strategy, Corporate Social Responsibility Disclosure, Good Corporate Governance terhadap Pengungkapan Emisi Karbon. *The 4th Business and Economics Conference in Utilizing of Modern Technology*, 642–657. https://journal.unimma.ac.id/index.php/conference/article/view/6006.

Silva-Gao, L. (2012). The Disclosure of Environmental Capital Expenditures: Evidence from the Electric Utility Sector in the USA. *Corporate Social Responsibility and Environmental Management, 19*(4), 240–252. https://doi.org/10.1002/csr.277.

Stefani, J. G. (2024). Sustainability in Business: How Green Accounting, Carbon Emission Disclosure, and Green Transformational Leadership Influence Firm Value with Eco-Efficiency as a Moderator, *International Research Journal of Economics and Management Studies, Vol. 3*, No. 12, pp. 185-195. https://irjems.org/irjems-v3i12p122.html.

Sudibyo, Y. A. (2018). Carbon Emission Disclosure: Does it Matter. *IOP Conference Series: Earth and Environmental Science, 106*(1). https://doi.org/10.1088/1755-1315/106/1/012036.

Taipi, E., & Ballkoci, V. (2017). Capital Expenditure and Firm Performance Evidence from Albanian Construction Sector. *European Scientific Journal, ESJ, 13*(28), 231. https://doi.org/10.19044/esj.2017.v13n28p231.

Tornyeva, K., & Wereko, T. (2012). Corporate Governance and Firm Performance: Evidence from the Insurance Sector of Ghana. *European Journal of Business and Management, 4*(13), 95–113. https://iiste.org/Journals/Index.php/EJBM/article/view/2708

Trufvisa, U. S., & Ardiyanto, M. D. (2019). Pengaruh Karakteristik Dewan Komisaris Terhadap Pengungkapan Emisi Karbon. *Diponegoro Journal of Accounting, 8*(3), 1–11. http://ejournal-s1.undip.ac.id/index.php/accounting.

Villiers, C. de, & Staden, C. J. Van. (2011). Where Firms Choose to Disclose Voluntary Environmental Information. *Journal of Accounting and Public Policy, 30*(6), 504–525. https://doi.org/10.1016/j.jaccpubpol.2011.03.005.

Wilar, F. F., Mangantar, M., & Tulung, J. E. (2018). Pengaruh Corporate Governance terhadap Return on Asset (ROA) pada Lembaga Pembiayaan Terdaftar di BEI Tahun 2012-2016 the Effect of Corporate Governance on Return on Asset At Financing Companies Listed in BEI 2012-2016. *Jurnal EMBA, 6*(4), 2698–2707. https://doi.org/10.35794/emba.v6i4.21051.