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IMPACT OF BOARD GENDER DIVERSITY, ENVIRONMENT, SOCIAL, AND GOVERNANCE (ESG) & GREEN COMMITTEE TOWARD CARBON EMISSION PERFORMANCE WITH MEDIA EXPOSURE AS MODERATION

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ABSTRACT

This study aims to examine the effect of Board Gender Diversity (BGD), Environmental, Social, and Governance (ESG), and Green Committee on Carbon Emission Performance (CEP), as well as the moderating role of media exposure. The research objects consist of consumer goods, energy, and raw materials companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. The sample was selected using purposive sampling, resulting in 39 companies with 195 firm-year observations. This study employs a quantitative approach using panel data regression and Moderated Regression Analysis (MRA). The Hausman test indicates that the Random Effect Model is the most appropriate estimation model. The findings reveal that ESG has a positive and significant effect on carbon emission performance. In contrast, board gender diversity and the existence of a green committee do not significantly affect CEP. Furthermore, media exposure does not moderate the relationship between BGD and CEP, nor between ESG and CEP. However, media exposure strengthens the effect of the green committee on carbon emission performance. These results suggest that ESG implementation plays a crucial role in improving corporate carbon emission reduction performance, while the effectiveness of a green committee becomes more substantial when supported by adequate media exposure.

Kata Kunci: board gender diversity; ESG; green committee; carbon emission performance; media exposure

INTRODUCTION

The increasing global concern regarding climate change has intensified pressure on corporations to reduce carbon emissions and improve environmental performance. In Indonesia, the consumer goods sector plays a significant role in economic growth while simultaneously contributing to carbon emissions through resource-intensive production and distribution activities (Ardianto, 2025). As stakeholders increasingly demand corporate accountability for environmental impacts, Carbon Emission Performance (CEP) has emerged as an important indicator of corporate sustainability. President's Regulation No. 110 of Year 2025 emphasized attempts in carbon emission regulation by stating that it is mandatory for business owners to do carbon emission inventory and report them to the government (Government of Republic of Indonesia, 2025).

Within this context, corporate governance mechanisms such as Board Gender Diversity (BGD), Environmental, Social, and Governance (ESG) practices, and the existence of a Green Committee are expected to influence companies' efforts in reducing carbon emissions. Furthermore, media exposure may

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strengthen stakeholder scrutiny and encourage companies to enhance their environmental performance through greater transparency and accountability (Abdullah, Musriani, & Syariati, 2020).

The motivation of this study stems from the inconsistent findings of previous studies regarding the relationship between board gender diversity and carbon emission performance. While several past studies from Nuber & Velte (2021), Kyaw et al (2022), Liao et al (2015), , and Shakil et al (2025) report that female representation on corporate boards contributes positively to carbon emission reduction, other past studies from Konadu et al (2024), Macchioni et al (2022), Waheduzzman et al (2024), Oussii & Jeriji (2024) indicate that the relationship may depend on contextual factors such as environmental management practices, governance structures, and external monitoring mechanisms. In addition, limited empirical evidence exists regarding the moderating role of media exposure in the relationship between BGD, ESG, Green Committee, and CEP, particularly in the Indonesian context.

Accordingly, this study addresses the following research questions: Does Board Gender Diversity influence Carbon Emission Performance? Does ESG influence Carbon Emission Performance? Does the existence of a Green Committee influence Carbon Emission Performance? Does media exposure moderate the relationship between Board Gender Diversity and Carbon Emission Performance? Does media exposure moderate the relationship between ESG and Carbon Emission Performance? Does media exposure moderate the relationship between Green Committee and Carbon Emission Performance?

Therefore, the objectives of this study are to examine the effects of Board Gender Diversity, ESG, and Green Committee on Carbon Emission Performance and to investigate whether media exposure moderates these relationships among companies listed on the Indonesia Stock Exchange during the 2020–2024 period.

LITERATURE REVIEW

This study based its research in the following theories, : Critical Mass Theory, Stakeholder Theory, Gender Socialization Theory, and Upper Echelon Theory.

Critical mass theory is a theory established by Schelling and Granovetter (1970s) that refers to an attempt to predict the effectivity of a group's action in exceeding public expectation. Critical mass itself was defined as a point where the minimum number of adopters of an ideal is reached, to the point that the ideal in question is able to independently sustained itself (Lew et al, 2020). This theory is used to understand how a minority is able to impact a group decision. In this context, this theory is used as a threshold determinant of the effectivity of female members in a board of directors, stating that unless the numbers of female members reach a certain minimum, then they will not be able to present a significant impact in the firm's strategic policy.

Stakeholder theory is a theory crafted by Freeman (1984), stating that a firm must benefit all parties that has affect and be affected by the firm, such as the civil citizens, community, clients, employees, governing body, shareholders, and suppliers. In the context of this research, this theory suggest that organizations are encouraged to acknowledge and fulfill the needs of stakeholders in question, providing an encompassing and responsible framework that focus on more than just shareholder's profit, but also the personal value and morals of the stakeholders in the firm, especially when it comes to environmental sustainability and carbon emission performance, and therefore, support the forming of strategic value, long-term success, and sustainability.

Gender socialization theory is a theory that stems from the work of Oakley (1972) and Sandra Bem in 1981 through her gender schema theory, that state that men and women are being socialized differently than each other, and with different values and social visions ever since a young age, which direct them toward different social obligations in public. This theory suggested that women are often seen to be more

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community-oriented, full of empathy, and care for the well-being of others due to their roles as caretakers in the social system (Waheduzzaman, Pathiranage, & Jubb, 2024). In the context of this research, this theory is used to provide grounds on the argument that female members of board of directors could positively impact carbon emission performance, by suggesting that women cares more for others' wellbeing compared to men and their presence is seen as very strategic because they provide more diverse perspective, value, and experiences, which in turn, improve firm's sensitivity and responsiveness toward stakeholders' needs and values, especially when it comes to sustainability.

Upper echelon theory is a theory by Hambrick and Mason (1984), that refers to an observation that an upper management's characteristic shape the decision they make and the decision in question affects the result. This theory is based on limited rationality, which can be translated to an executive's limitation of access, processing, and usage of information that cause them to rely on their experience, value, and personality when interpretating a strategic situation (Wang, Holmes Jr, Oh, & Zhu, 2016). In the context of this research, this theory explain how the female members use the experiences, value, and personality shaped by socialization to make or influence strategic decisions within the board.

A growing body of literature suggests that board gender diversity (BGD) contributes positively to corporate environmental outcomes, particularly carbon emission performance (CEP). Konadu et al. (2022) found that greater female representation on corporate boards is significantly associated with lower carbon emissions, and that environmental innovation further strengthens this relationship. Similarly, Nuber and Velte (2021) reported a positive relationship between BGD and carbon performance, highlighting the importance of achieving a critical mass of at least two female directors. Kyaw et al. (2022) also documented that companies with a higher proportion of women directors exhibit superior emission reduction performance. Further evidence from Oussii and Jeriji (2024) and Shakil et al. (2025) confirmed that female board representation enhances carbon emission performance, although the latter identified a non-linear relationship with an optimal diversity threshold. Liao et al (2015) also confirmed that board gender diversity exhibits a significant and positive relationship toward the tendencies of a detailed GHG disclosure. Therefore, based on the previous studies,

Beyond board diversity, previous studies have emphasized the importance of ESG practices and sustainability governance mechanisms. Zhang et al. (2025) demonstrated that ESG performance significantly contributes to corporate carbon emission reduction. Likewise, Moreno-Ureba et al. (2022) found that gender-diverse boards foster environmental innovation when supported by sustainability-oriented governance structures. Meqbel et al. (2025) further reported that the existence of CSR or sustainability committees promotes environmental innovation, suggesting that specialized governance bodies play an important role in achieving environmental objectives. In addition, studies by Ulupui et al. (2020) and Sari and Sulfitri (2023) showed that media exposure positively influences environmental disclosure practices by encouraging greater transparency and accountability.

Additionally, there are also a number of past researches with contradictory results and conditional findings, such as Macchioni et al. (2022), who found that although board gender diversity improves carbon performance, CEO duality weakens this positive effect. Likewise, Waheduzzaman et al. (2024) reported that female directors contribute significantly to carbon emission reduction only when employees receive environmental management training, implying that board diversity alone may be insufficient to improve environmental outcomes.

Similar inconsistencies have been observed in ESG-related studies. Zhang et al. (2025) showed that although ESG performance enhances carbon emission reduction, the effect becomes weaker in firms with stronger market power. Furthermore, Abdullah et al. (2020) revealed that media exposure may not always strengthen environmental accountability, as it negatively moderates certain relationships related to carbon emission disclosure while failing to moderate others. Oussii and Jeriji (2024) also found that

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the positive effect of female directors on carbon performance is less pronounced in family-controlled firms.

The mixed findings suggest that the influence of board gender diversity, ESG performance, and sustainability governance on carbon emission performance may depend on organizational and external conditions. Moreover, limited studies have simultaneously examined BGD, ESG, Green Committee, and media exposure within a single framework, particularly in emerging markets such as Indonesia. This gap provides the foundation for the present study to investigate the direct effects of BGD, ESG, and Green Committee on CEP and to examine the moderating role of media exposure

Based on the employed theories, past researches and the research gaps, this study suggest the research hypotheses **H1.** Board gender diversity affects carbon emission performance. This hypothesis is based on the argument that the presence of female directors bring unique perspective, value, ethic, and leadership style that directly impact the firm's environmental sustainability policy, which aligns with critical mass theory, gender socialization theory, and upper echelon theory (Nuber & Velte, 2021). However, factors such as CEO duality, market position, and blood relations in upper echelon in firm can weaken this correlation (Ousii Atef & Jeriji, 2024) (Macchioni, Prisco, Santonastaso, & Zagaria, 2022) (Zhang, Li, & Chen, 2025). Additionally, there are also other factors that may affect board gender diversity's impact toward carbon emission performance, such as board member's tenure, board size, environmental innovation and environmental management training (Ulupui et al, 2020; Waheduzzaman et al, 2024; Konadu et al, 2022). Therefore causing inconsistencies in results of this topic that needs to be researched further.

H2. ESG affects carbon emission performance. In the context of this research, ESG serve as a framework in operational, transparency and resilience aspects of a firm's responsibility as an organization. A few past studies employed ESG as a variable, through the use of proxies, such as ESG controversy and environmental management training, and indicated varied results (Shakil et al, 2025; Waheduzzaman et al, 2024). Shakil et al (2025) suggests that ESG controversy does not significantly moderate board gender diversity and carbon emission performance, while Waheduzzaman et al (2024) suggests that environmental management training positively and significantly moderated the role of female board members and employees toward carbon emission. Therefore, this study decides to take the research gap of this inconsistency, and positioned ESG directly as an independent variable toward carbon emission performance, taking into account ESG's role as a framework to the firm when it comes to sustainability.

H3. Green committee affects carbon emission performance. Past studies by Moreno-Ureba et al. (2022) and Meqbel et al. (2025) indicate that the presence of a green committee is significantly associated with environmental innovation, including performance regarding emission reduction. The underlying argument stems from stakeholder theory, which posits that companies should generate value for all stakeholders, thereby driving them to address stakeholder needs (Mahajan, et al., 2023). This theory aligns with the establishment of sustainability committees, which companies create in response to stakeholder values and perspectives on sustainability issues (Gull, Hussain, Khan, Khan, & Saeed, 2023; Meqbel, Dwekat, Abdeljawad, & A. Zaid, 2025). However, few studies have directly examined the impact of "green committees" themselves on sustainability issues, including carbon emission performance, as most research focuses on CSR committees that integrate sustainability and governance functions (Moreno-Ureba, Bravo-Urquiza, & Reguera-Alvarado, 2022). Consequently, there is a lack of references regarding the actual impact of sustainability committees on sustainability performance, particularly concerning carbon emissions.

H4. Media exposure moderate the impact of board gender diversity toward carbon emission performance. On the topic of this relationship, previous studies have yielded mixed results. Research by Abdullah et al. (2020) indicates that media exposure, acting as a moderating variable, has a significant

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negative effect on carbon emission disclosure. Conversely, studies by Ulupui et al. (2020) and Sari & Sulfitri (2023) find that media exposure has a direct, significant positive effect on carbon emission disclosure. The arguments explaining this relationship posit that the media serves both as a monitoring instrument, by placing corporate environmental policies under the scrutiny of the public and interested evaluators and as a positive driver that motivates companies to be more transparent about their carbon usage in order to cultivate a positive public image (Sari & Sulfitri, 2023) (Ulupui, Maruhawa, Purwohedi, & Kiswanto, 2020). Disclosing carbon usage data to the media is part of a company's fulfillment of its responsibilities toward stakeholders, a practice consistent with stakeholder theory (Abdullah et al., 2020). However, a research gap exists regarding how media exposure influences the relationship between board gender diversity and carbon emission disclosure; findings vary depending on how media exposure is positioned within the research model. Further investigation into the impact of media exposure is warranted to clarify these existing results.

H5. Media exposure moderate the impact of ESG toward carbon emission performance. Previous research generally indicates that companies with better ESG performance tend to exhibit higher CEP as ESG implementation encourages companies to integrate sustainability aspects into their strategic decision-making processes (Zhang, Li, & Chen, 2025). Media exposure serves as an external monitoring mechanism that heightens public attention regarding a company's ESG implementation (Abdullah, Musriani, & Syariati, 2020). The greater the media exposure, the higher the pressure from investors, regulators, customers, and the public for the company not only to disclose its sustainability commitments but also to demonstrate tangible results in the form of improved carbon emission performance (Sari & Sulfitri, 2023) (Ulupui, Maruhawa, Purwohedi, & Kiswanto, 2020). This argument aligns with Stakeholder Theory by Freeman (1984), which posits that companies must meet the expectations of various stakeholder groups—not only shareholders but also the public, the government, customers, and investors. Most research on media exposure treats it as an independent or moderating variable in relation to Carbon Emission Disclosure (CED), rather than Carbon Emission Performance (CEP), which reflects the actual results of carbon emission reductions (Abdullah, Musriani, & Syariati, 2020) (Ulupui, Maruhawa, Purwohedi, & Kiswanto, 2020) (Sari & Sulfitri, 2023). Consequently, there is limited research examining whether media exposure can strengthen the influence of ESG on Carbon Emission Performance. Therefore, this study aims to fill this gap by examining the role of media exposure as a moderating variable in the relationship between ESG and CEP.

H6. Media exposure moderate the impact of green committee toward carbon emission performance. Previous research indicates that the presence of a green committee contributes positively to improving a company's environmental performance by strengthening sustainability governance, overseeing the implementation of environmental policies, and enhancing environmental innovation (Moreno-Ureba, Bravo-Urquiza, & Reguera-Alvarado, 2022; Meqbel, Dwekat, Abdeljawad, & A. Zaid, 2025). The argument that based this relationship is high levels of media exposure is expected to strengthen the nature of the relationship of green committee and carbon emission performance, as the media acts as an external monitoring mechanism that heightens public attention regarding the effectiveness of green committees in fulfilling their responsibilities (Sari & Sulfitri, 2023; Ulupui, Maruhawa, Purwohedi, & Kiswanto, 2020). This aligns with the stakeholder theory, where media expands stakeholder access to information regarding corporate environmental commitments, thereby encouraging the green committee to more actively oversee the implementation of sustainability strategies and ensure that environmental policies result in tangible improvements in CEP. However, most research on green committees still focuses on their impact on environmental innovation, ESG, or sustainability disclosure, whereas studies regarding the role of media exposure as a moderating variable in the relationship between green committees and CEP remain very limited. Therefore, this study aims to fill that gap by examining whether media exposure can

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strengthen the influence of green committees on CEP.

RESEARCH METHOD

This study employs a quantitative research design, which employs the use of statistical technique to research certain aspects that is the focus of the researched population or sample (Suárez, Calvo-Morab, Roldán, & Periá˜nez-Cristóbalc, 2017). The research utilizes secondary panel data collected from publicly listed companies in Indonesia over the 2020–2024 period. The population consists of all companies listed on the Indonesia Stock Exchange (IDX), while the sample comprises firms operating in the consumer goods, energy, and raw materials sectors. These sectors were selected because of their relatively high contribution to carbon emissions and the increasing importance of sustainability practices within their business activities (Ardianto, 2025). Some of these sectors were also stated in the President's Regulation No. 110 of Year 2025 to be among the sectors required to do carbon emission inventory and report them. The sample was determined using purposive sampling, which is a sampling technique where a researcher select participants based on a set of unique characteristics (Cooper & Schindler, 2014), based on the availability of carbon emission, governance, and sustainability disclosure data, resulting in 39 companies with 195 firm-year observations.

The dependent variable in this study is Carbon Emission Performance (CEP), measured by the ratio of total Scope 1 and Scope 2 carbon emissions to total revenue (Nuber & Velte, 2021). Board Gender Diversity (BGD) is measured by the proportion of female directors to the total number of board members (Romano, Cirillo, Favino, & Netti, 2020). ESG is proxied by the ratio of environmental expenditure to total assets (Abdelkader, Gao, & Elamer, 2024), while Green Committee is measured using a dummy variable, where a value of one indicates that the company has a sustainability or green committee and zero otherwise (Meqbel, Dwekat, Abdeljawad, & A. Zaid, 2025). Media exposure acts as the moderating variable and is measured by the volume of environmental-related media coverage (Angela & Rusmanto, 2025). In addition, Return on Assets (ROA), calculated as net income divided by average total assets (Nuber & Velte, 2021), and Leverage, measured by the debt-to-asset ratio, are included as control variables (Kyaw, Treepongkaruna, & Jiraporn, 2022).

The data were analysed using panel data regression and Moderated Regression Analysis (MRA). Descriptive statistics were first employed to provide an overview of the characteristics of the research variables (Denhere, 2024), followed by classical assumption tests, including normality and multicollinearity tests. Potential heteroskedasticity and autocorrelation issues were addressed by applying robust standard errors with clustered estimation. The Hausman test was then conducted to determine the most appropriate panel regression model, and the results indicated that the Random Effect Model (REM) was preferable (Mutl & Pfaffermayr, 2011). Finally, MRA was applied to examine whether media exposure strengthens or weakens the effects of Board Gender Diversity, ESG, and Green Committee on Carbon Emission Performance (Ghozali, 2016).

RESULT AND DISCUSSION

This study employs a sample of 195 firm-year observations from companies operating in the consumer goods, energy, and raw materials sectors listed on the Indonesia Stock Exchange during the 2020–2024 period, which can be observed in Table 1, as follows.

Anastasia Aritha
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Table 1. Sample Total

Criteria	Sample Total (As of 2024)
Consumer goods companies listed on the IDX as of 2024	295
Energy companies listed on the IDX as of 2024	91
Raw material companies listed on the IDX as of 2024	65
Companies that did not fulfill the criterias	413
Sample Total	39
Obs. Data (5 years)	194

Sources: Processed Data 2026

Table 2. Descriptive Statistic

Variable	Obs	Mean	Std.dev.	Min	Max
CEP_LNY	194	-1.866	2.042	-6.04	5.355
BGD_FEM	194	0.099	0.142	0	0.5
ESG_LNY	194	-2.944	1.36	-5.451	1.971
GREENCOM	194	.51	.501	0	1
LN_MEDIA	194	.169	.533	0	2.996
ROA	194	6.499	10.321	-9.4	44.84
LEV	194	.399	.383	0	1.694

Sources: Processed Data 2026

The descriptive statistics indicate that the study analysed 194 firm-year observations from companies operating in the consumer goods, energy, and raw materials sectors listed on the Indonesia Stock Exchange during the 2020–2024 period. The diagnostic tests confirm that the empirical model satisfies the classical assumptions required for panel data regression. In this research, the independent variables consist of: board gender diversity (BGD_FEM), environmental, social, and governance (ESG_LNY), which had gone through a log-transformation, and green committee (GREENCOM). The dependent variable of this research is carbon emission performance (CEP_LNY) with media exposure (LN_MEDIA) as the moderation variable, which had also gone through a log-transformation respectively. Additionally, profitability (ROA) and leverage (LEV) are used as control variables. A few variables, such as CEP, ESG, media exposure, ROA, and LEV had gone through transformation process such as log-transformation and winsorizing to reduce extreme data or outlier, which can affect the regression estimation result.

Table 3. Correlation Test

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CEP_LNY	1.000						
BGD_FEM	-0.080 (0.266)	1.000					

Anastasia Aritha
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ESG_LNY	0.025	0.176*	1.000				
	(0.731)	(0.014)					
GREENCOM	-0.001	0.001	-0.156*	1.000			
	(0.986)	(0.989)	(0.030)				
LN_MEDIA	0.072	0.338*	0.338*	-0.094	1.000		
	(0.317)	(0.000)	(0.000)	(0.194)			
ROA	0.027	0.106	0.134	-0.008	0.364*	1.000	
	(0.710)	(0.141)	(0.063)	(0.911)	(0.000)		
LEV	0.030	0.016	0.067	-0.046	0.087	0.295*	1.000
	(0.681)	(0.986)	(0.353)	(0.524)	(0.230)	(0.000)	

****p<0.01, **p<0.05, *p<0.1*
Sources: Processed Data 2026

The correlation test in Table 3 shows the correlation between each variables in this research. According to Table 3, the relationship between independent variables and the dependent variable, which is carbon emission performance, tends to be weak and not significant.

On the other hand, there are a few relationships between independent variables that are significant. ESG has a significant and positive relationship with board gender diversity, which suggest that a firm with high diversity in gender tends to have a more positive sustainability performance. Media exposure also has a significant and positive relationship with board gender diversity, ESG, and profitability, which indicates that a firm with good governance performance and characteristic tends to gain bigger media attention.

On the other hand, green committee displays a negative and significant relationship with ESG.

Table 4. Shapiro-Wilk Test

Variable	Obs	W	V	Z	Prob>z
ehat	194	0.991	1.269	0.547	0.292

Sources: Processed Data 2026

Table 5. Multicolinearity Test

Variable	VIF	1/VIF
BGD_FEM	1.138	.879
ESG_LNY	1.157	.864
GREENCOM	1.032	.969
LN_MEDIA	1.402	.713
ROA	1.256	.796
LEV	1.101	.909
Mean VIF	1.181	

Sources: Processed Data 2026

Table 6. Hausman Test

	Coef.	Chosen Method
Chi-squared test value	1.378	Random-Effect Model
P-value	0.927	

Sources: Processed Data 2026

Anastasia Aritha
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The Shapiro–Wilk test demonstrates that the residuals are normally distributed, while the Variance Inflation Factor (VIF) values indicate the absence of multicollinearity among the independent variables. These results indicate that the regression model provides reliable estimates for testing the proposed hypotheses.

Table 7. Hypothesis Test

	Model 1	Model 2	Model 3
BGD_FEM	-0.697	-0.786	-0.711
	(-0.51)	(-0.57)	(-0.46)
ESG_LNY	0.145**	0.144**	0.127**
	(2.20)	(2.21)	(2.09)
GREENCOM	-0.104	0.122	0.007
	(0.17)	(0.21)	(0.01)
LN_MEDIA		0.184	0.199
		(0.48)	(0.48)
BGD_MEDIA			-0.658
			(-0.41)
ESG_MEDIA			0.152
			(1.24)
GREENCOM_MEDIA			0.972*
			(1.68)
ROA	0.011	0.01	0.011
	(1.04)	(0.94)	(1.04)
LEV	0.165	0.155	0.123
	(0.35)	(0.33)	(0.25)
_cons	-1.539	-1.562	-1.551
	(-2.96)	(-2.99)	(-2.90)
R-Squared (Overall)	0.006	0.007	0.023
Observation	194	194	194

t-statistics in parentheses
**** p<.01, ** p<.05, * p<.1*
Sources: Processed Data 2026

The empirical findings reveal that Environmental, Social, and Governance (ESG) has significant effect on Carbon Emission Performance (CEP). This result suggests that companies with stronger ESG practices tend to achieve better carbon emission reduction performance. The finding supports Stakeholder Theory, which argues that organizations respond to stakeholder expectations by adopting sustainable business practices and improving environmental accountability. It is also consistent with the studies of Zhang et al. (2025), which demonstrate that ESG implementation contributes significantly to carbon emission reduction. From an empirical perspective, firms with stronger ESG commitments are more likely to allocate resources toward environmental management, cleaner technologies, and sustainability initiatives, ultimately leading to lower carbon emission intensity.

In contrast, Board Gender Diversity (BGD) does not exhibit a significant influence on Carbon Emission Performance. This finding differs from previous studies by Konadu et al. (2022), Kyaw et al. (2022), Nuber and Velte (2021), Liao et al (2015), and Shakil et al. (2025), which reported a positive relationship between female board representation and environmental performance. One possible explanation is that the average proportion of female directors in the sampled companies remains relatively low, limiting their ability to influence strategic environmental decisions. According to several previous findings, this phenomenon is called tokenism, a phenomenon where a minority group is pressured and controlled by a majority group due to its limited number (Galsanjigmed & Sekiguchi, 2023; Holgersson & Romani, 2020). This finding further strengthens the findings of Nuber & Velte (2021) and Kyaw et al. (2022), where it was stated that a firm needs at least two or more female members to give a significant influence in a board of directors. This finding is consistent with Critical Mass Theory, which argues that women directors can significantly affect board decisions only after reaching a sufficient representation within the board (Lew, Tan, Loh, Hew, & Keng-Boon, 2020). Therefore, the existence of female directors alone may not necessarily translate into improved carbon emission performance unless they possess adequate influence in corporate decision-making (Aryani, Mahendrastiti, Setiawan, Arifin, & Gantyowati, 2024).

Similarly, the Green Committee variable is found to have no significant direct effect on Carbon Emission Performance. Although sustainability committees are expected to strengthen environmental governance, the findings suggest that merely establishing such committees is insufficient to improve carbon performance. This may indicate that many committees perform symbolic or compliance-oriented functions rather than actively influencing environmental strategy and implementation. Consequently, the effectiveness of sustainability governance depends not only on the existence of a Green Committee but also on its authority, expertise, and integration into corporate strategic decision-making (Aryani, Mahendrastiti, Setiawan, Arifin, & Gantyowati, 2024) (González, Guzmán, Pablo, & Trujillo, 2020).

The moderating analysis further demonstrates that media exposure does not significantly moderate the relationships between Board Gender Diversity and Carbon Emission Performance or between ESG and Carbon Emission Performance. These findings imply that public attention through media coverage alone is insufficient to strengthen the effectiveness of female board representation or ESG implementation in reducing corporate carbon emissions. This result contrasts with studies by Ulupui et al. (2020) that suggested that media functions as an external governance mechanism capable of increasing corporate accountability through stakeholder pressure. In the Indonesian context, media attention may still focus more on corporate reputation than on evaluating the effectiveness of sustainability governance practices (Abdullah, Musriani, & Syariati, 2020).

However, media exposure significantly strengthens the relationship between Green Committee and Carbon Emission Performance. This finding indicates that sustainability committees become more effective when their environmental initiatives receive greater public visibility through media coverage. Under higher public scrutiny, companies are likely to implement environmental policies more consistently to maintain legitimacy and corporate reputation (Sari & Sulfitri, 2023) (Ulupui, Maruhawa, Purwohedi, & Kiswanto, 2020). This result supports Stakeholder Theory by demonstrating that external stakeholder monitoring complements internal governance mechanisms in encouraging environmental responsibility. Moreover, it provides empirical evidence that media exposure functions as an important governance mechanism only when accompanied by a formal sustainability structure within the organization.

The findings contribute to the existing literature by demonstrating that ESG represents the most influential governance mechanism for improving Carbon Emission Performance among Indonesian listed companies, whereas Board Gender Diversity and Green Committee alone do not automatically enhance environmental performance. More importantly, this study provides new empirical evidence that media exposure selectively moderates the effectiveness of Green Committee rather than all governance mechanisms simultaneously. Unlike previous studies that primarily investigated media exposure in relation to carbon disclosure, this study extends the literature by examining its moderating role on actual Carbon Emission Performance within an integrated framework involving Board Gender Diversity, ESG, and Green Committee. These findings enrich the corporate sustainability literature, particularly in

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emerging markets, by emphasizing that internal governance mechanisms require external stakeholder monitoring to produce meaningful environmental outcomes.

CONCLUSION

This study concludes that corporate governance mechanisms do not contribute equally to improving Carbon Emission Performance (CEP). Among the governance variables examined, Environmental, Social, and Governance (ESG) practices emerge as the most influential factor in enhancing corporate carbon emission performance. Companies that consistently integrate ESG principles into their business strategies demonstrate stronger commitments to environmental sustainability and carbon emission reduction. In contrast, Board Gender Diversity (BGD) and the existence of a Green Committee do not directly improve carbon emission performance, indicating that the presence of governance structures alone is insufficient without effective implementation and strategic influence. Furthermore, media exposure does not strengthen the relationship between BGD or ESG and carbon emission performance. However, media exposure enhances the effectiveness of Green Committees by increasing external stakeholder monitoring and encouraging greater organizational accountability for environmental initiatives.

The findings contribute to the development of Stakeholder Theory by demonstrating that external stakeholder pressure, represented by media exposure, complements internal sustainability governance rather than replacing it. This study also extends the literature on corporate environmental governance by showing that media exposure functions as a contingent governance mechanism whose effectiveness depends on the existence of formal sustainability structures within the company. From a practical perspective, the findings suggest that companies should prioritize strengthening ESG implementation and improving the effectiveness of sustainability governance rather than merely establishing formal governance structures. Green Committees should be empowered with sufficient authority, resources, and strategic involvement to effectively support environmental decision-making, while transparent communication through media should be utilized to reinforce corporate environmental accountability. For policymakers and regulators, the results highlight the importance of encouraging comprehensive ESG implementation and strengthening sustainability governance practices to support national carbon reduction targets.

This study is subject to several limitations, such as incomplete ESG data in Indonesia, lack of board gender diversity in Indonesian companies, ESG standards in Indonesia that has not yet been completely mandatory, the observation period covering 2020–2024 that might not be enough to determine the clear impact of the implemented ESG policies and some data that had been acquired from a third party that the author could not clearly trace back the calculation method. Future research may expand the sample to other industries or countries, employ alternative measurements of carbon performance and ESG quality, incorporate additional governance characteristics, or examine other moderating variables such as institutional ownership, environmental regulation, or corporate environmental innovation, as well as expanding the time period of observation data to more than five years for a more detailed observation data on ESG implementation dan improvements. Future studies may also integrated media exposure as a moderation or independent variable to further dissect the effectivity of Green Committee. Such studies are expected to provide a broader understanding of the factors influencing corporate carbon emission performance in emerging markets.

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