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CARBON EMISSION DISCLOSURE BY NON-FINANCIAL COMPANIES IN INDONESIA: A PERSPECTIVE OF STAKEHOLDER THEORY

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A B S T R A C T

This study aims to examine the determinant factors of carbon emission disclosure from the perspective of stakeholder theory. Stakeholder theory is the most commonly used literature in carbon emission research. Most studies only capture carbon emission disclosure based on stakeholder theory elements of economic performance and stakeholder power. This study examines comprehensively the perspective of stakeholder theory by considering economic performance, stakeholder power, and strategy posture. The research sample includes 67 non-financial companies listed on the Indonesia Stock Exchange 2017–2020. Data are accessed from the annual report and sustainability report. Economic performance is measured by return on assets and return on equity. Stakeholder power is measured by managerial ownership and leverage. Strategic posture is measured by ISO certification and environmental costs. The result shows that stakeholder power (proxied by leverage) and strategy posture (proxied by ISO certification) have effects on carbon emission disclosure.
Keywords: Carbon emission disclosure, stakeholder power, economic performance, strategic posture

Penelitian ini bertujuan mengembangkan Teori *Stakeholder* dalam menjelaskan determinan pengungkapan emisi karbon pada perusahaan yang terdaftar di Bursa Efek Indonesia (BEI). Literatur menunjukkan bahwa fenomena pengungkapan emisi karbon sebagian besar dijelaskan dengan perspektif Teori Legitimasi dan Teori *Stakeholder*. Meskipun perspektif Teori *Stakeholder* sudah beberapa kali diuji oleh para peneliti, namun sebagian besar masih berfokus pada kinerja ekonomi dan kekuatan *stakeholder* (khususnya investor), belum banyak yang mengeksplorasi determinan pengungkapan secara komprehensif dengan menggunakan perspektif Teori *Stakeholder*, terutama di negara berkembang seperti Indonesia. Sampel penelitian ini adalah 67 perusahaan sektor non-keuangan yang terdaftar di BEI pada 2017–2020. Data diekstrak dari laporan keuangan tahunan dan laporan keberlanjutan yang diperoleh dari BEI dan website resmi perusahaan. Selanjutnya dilakukan analisis regresi pada model penelitian. Hasil analisis data menunjukkan bahwa kekuatan stakeholder yang diproksikan dengan leverage dan postur strategi yang diproksikan dengan kepemilikan sertifikasi ISO terbukti berpengaruh signifikan terhadap pengungkapan emisi karbon. Selain itu, hasil penelitian ini juga menunjukkan bahwa ukuran perusahaan dan umur perusahaan memiliki pengaruh signifikan terhadap pengungkapan emisi karbon.
Kata kunci: Pengungkapan emisi karbon, kekuatan *stakeholder*, kinerja ekonomi, postur strategi

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INTRODUCTION

In the middle of climate and post-pandemic challenges, Indonesia commits to reducing climate change. To face the Conference of the Parties-26 (COP-26) United Nations Framework Convention on Climate Change (UNFCCC) in Glasgow, England, 31st October – 12th November 2021, Indonesia prepares the paper of Nationally Determined Contributions (NDC) for UNFCCC Secretary at 21st July 2021. Although Indonesia commits to reducing

carbon emissions by formulating policies and regulations, the carbon emission reduction is still far from the target of 314 million tons of CO2. Indonesia just reaches 29% of the target. Sectors of forestry, energy, agriculture, waste processing, and industry contribute most of the carbon emissions in Indonesia. In this case, the government of Indonesia made a policy that involved all stakeholders in the carbon emission-contributor sectors. In the context of funding mobilization for carbon emission reduction, the financial sector plays an important role in supporting the funding resource. The Indonesian Financial Service Authorization provides the roadmap for sustainable finance phase I (2015-2019) and phase II (2021-2025) as guidance to accelerate the implementation of environmental, social, and governance principles. The principle' guidance focuses on the creation of comprehensive sustainable finance ecosystem. However, carbon emission disclosure is still not optimal since it is a voluntary disclosure. Carbon emission disclosure in the annual report and sustainability report is a companies' commitment to provide transparency and accountability for all stakeholders. Carbon emission disclosure is also a companies' commitment to support government programs to achieve public legitimacy.

This study aims to develop stakeholder theory to explain the determinants of carbon emission disclosure by companies that are listed on the Indonesia Stock Exchange (IDX). It is important to examine the carbon emission disclosure. First, carbon emission production increases every year. The Indonesian Ministry of Energy and Mineral Resources reports that the level of carbon emissions is always increasing every year in various sectors. In 2021, based on the climate transparency report, Indonesia and other G20 countries have the potential to experience an increase in carbon emissions. Second, carbon emission disclosure is a voluntary disclosure that leads to less optimal carbon emission disclosure implementation. Third, there is a literature gap in the previous studies. Previous studies focused on examining the stakeholder theory only based on economic performance and stakeholder power (especially investors) (Blanco, Caro & Corbett, 2017; Caby, Ziane & Lamarque, 2020; Kalu, Buang & Aliagha, 2016). Studies in different countries also still have no conclusive results to explain stakeholder theory comprehensively. In this case, this study examines carbon emission disclosure from a stakeholder theory perspective with a more comprehensive investigation including economic performance, stakeholder power, and strategy posture by following Freeman (1984) and Ullmann (1985).

Freeman (1984) suggests that stakeholder theory explains the relationship between companies and individuals or groups to build trust and achieve companies' sustainability. Therefore, companies have to establish and maintain good relationships with stakeholders. One of the strategies to establish and maintain good relationships with stakeholders is by providing information that relates to companies' activities of social and environmental responsibility, such as reducing carbon emissions. Freeman (1984) and Ullmann (1985) suggest the framework of environmental disclosure, where the determinant factors are stakeholder power, economic performance, and strategy posture.

Determinant factors of emission carbon disclosure have been studied in some countries (Kalu et al., 2016; Karim, Albitar & Elmarzouky, 2021; Konadu, Ahinful, Boakye & Elbardan, 2022; Krishnamurti & Velayutham, 2018; Ott, Schiemann & Günther, 2017; Wang, Sun & Liu, 2019). Literature also captures that the phenomenon of carbon emission disclosure is mostly explained by legitimation and stakeholder theories (Qian & Schaltegger, 2017; Velte, Stawinoga & Lueg, 2020). Although the perspective of stakeholder theory has been examined, most studies only focus on economic performance and stakeholder power (especially investors) (Blanco et al., 2017; Caby et al., 2020; Kalu et al., 2016), while there is no study that

explores the determinant factors of carbon emission disclosure based on stakeholder theory comprehensively, especially in emerging markets such as Indonesia.

This study contributes to literature development. This study confirms the perspective of stakeholder theory in emerging markets such as Indonesia. In the context of emerging markets, carbon emission disclosure needs to be explained comprehensively since most environmental responsibility in emerging markets is still motivated by regulation fulfillment rather than awareness of business sustainability. This study also contributes to business practice. This study considers the strategy posture to explain carbon emission disclosure. In this case, companies can achieve the benefit of carbon emission disclosure by formulating the relevant strategy to perform and report on carbon emission responsibility.

This study consists of sections on introduction, literature review and hypothesis development, research methods, analysis and discussion, conclusion, implications, and suggestions. The introduction explains the issue of carbon emission disclosure, research objectives, and research contributions. Literature review and hypothesis development explain stakeholder theory and research hypotheses. Research methods explain samples, variables, and data analysis. Analysis and discussion explain the statistical output and its interpretation. A conclusion explains a research conclusion that answers the research objective. Implications and suggestions explain the research implications and suggestions for practitioners, regulators, and companies.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Freeman (1984) establishes stakeholder theory that explains the relationship between companies and stakeholders to build trust and business sustainability. Companies can take on environmental responsibility to build and maintain good relationships, such as by disclosing their carbon emissions. Good relationships between companies and stakeholders can help companies improve business sustainability. When a good relationship between companies and stakeholders occurs, conflicts of interest between companies and stakeholders will be reduced, and companies can reduce costs since they experience lower conflicts of interest. Lower costs of interest conflicts happen when companies can provide information that relates to environmental responsibility, including carbon emission disclosure. Freeman (1984) and Ullman (1985) explain that the relationship between companies and stakeholders can be improved by considering stakeholder power, economic performance, and strategy posture.

Previous studies examine the determinant factors of carbon emission disclosure (Alfi, Mohamad & Hussainey, 2024; Cormier & Beauchamp, 2021; Datt, Prasad, Vitale & Prasad, 2022; Kalu et al., 2016; Karim et al., 2021; Konadu et al., 2022; Krishnamurti & Velayutham, 2018; Ott et al., 2017; Oyewo, 2023; Wang et al., 2019) based on legitimation and stakeholder theories (Qian & Schaltegger, 2017; Velte et al., 2020). However, previous studies used stakeholder theory by considering only economic performance and stakeholder power (Blanco et al., 2017; Caby et al., 2020; Kalu et al., 2016; Núnez Chicharro, Mangena, Alonso Carrillo & Priego De La Cruz, 2024; Olatunde, 2021; Perrigot, Watson & Dada, 2021). This study considers strategy posture to complete the elements of economic performance and stakeholder power to capture stakeholder theory comprehensively.

Stakeholder power improves carbon emission disclosure

Stakeholder power refers to the power held by stakeholders to give controlling roles to companies (Ullmann, 1985), including to put pressure on companies to disclose carbon emissions (Bedi & Singh, 2024). Since carbon emissions aim to fulfill stakeholder interests, stakeholder power is needed to exert pressure on companies to disclose carbon emissions to the public. There are some studies where stakeholder

power can improve companies' behavior to fulfill stakeholder interests. Saeed, Noreen, Azam & Tahir (2021) find that stakeholder power can reduce companies' carbon footprint. Alessa, Akparep, Sulemana & Agyemang (2024) find that stakeholder power improves ESG disclosure.

In this case, this research determines stakeholder power from the power held by managers and creditors, which can give monitoring control to companies. Cho & Ryu (2022) find that managers with high power tend to reduce conflict, including conflict with the public, since managers have an interest in maintaining their reputations. This research determines managers' power through managerial ownership. Managerial ownership captures the power level held by managers since managers also act as shareholders. Cho & Ryu (2022) find that managerial ownership has an effect on corporate social responsibility. This research determines creditors power through leverage. Higher leverage shows that creditors have more power to oversee companies (Bedi & Singh, 2024). Bendi & Singh (2024) find that creditors can exert more pressure on companies to disclose carbon emissions.

H1a:Managerial ownership improves carbon emission disclosure

H1b:Leverage improves carbon emission disclosure

Economic performance and carbon emission disclosure.

Ullmann (1985) suggests that it is important to ensure that companies have good economic performance since social responsibility can be fulfilled if companies have better economic performance. High economic performance means that companies have enough financial resources to improve carbon performance, including carbon emission disclosure. Some studies find a relationship between economic performance and carbon emission disclosure (Adu, Flynn & Grey, 2023; Busch, Bassen, Lewandowski & Sump, 2022; Siddique, Akhtaruzzaman, Rashid & Hammami, 2021; Wang, Li & Zhang, 2021).

This research uses return on assets (ROA) as economic performance. ROA captures how effectively companies use assets as resources to generate earnings. More effective companies use assets as resources to generate earnings, and companies have more economic capability to improve carbon performance (Busch et al., 2022), including carbon emission disclosure. This research also uses return on equity (ROE) as economic performance. ROE captures how effectively companies use equity as a resource to generate earnings. More effective companies use equity as a resource to generate earnings, and companies have more economic capability to improve carbon performance (Busch et al., 2022), including carbon emission disclosure.

H2a:ROA improves carbon emission disclosure

H2b:ROE improves carbon emission disclosure

Strategy posture and carbon emission disclosure

Strategy posture captures companies responses to making decisions based on social interests (Ullmann, 1985). In this case, strategy posture refers to companies' strategies to maintain relationships with stakeholders by fulfilling their interests in carbon emission disclosure (Chicharro, Mangena, Carrillo & Cruz, 2024). Abdulrahim, Sukoharsono, Saraswati & Subekti (2020) find that strategy posture improves companies' sustainability. Chicharro et al. (2024) also find that strategy posture improves sustainability performance.

This research uses ISO certification as a strategy posture. Certification by ISO is a strategy used by companies to improve credibility (Sam & Song, 2022). Certification by ISO captures that companies have already implemented specific strategies in the minimum standard, such as environmental and carbon reduction activities. Sam and Song (2022) find that companies that have ISO certification reduce carbon emissions. Chariri, Januarti & Yuyetta (2023) also find that ISO certification improves carbon emission disclosure. This research also uses environmental costs as strategy posture.

Environmental costs capture the costs paid by companies to make environmental improvements (Chen, Nie, Wang & Meng 2019; Meng, Zang & Li, 2023). Higher environmental costs show that companies have a strategy to improve environmental performance, including carbon performance. Meng et al. (2023) and Chen et al. (2019) find that environmental costs reduce carbon emissions.

H3a: Certification of ISO improves carbon emission disclosure.

H3b: Environmental cost improves carbon emission disclosure.

RESEARCH METHODS

The research population includes all listed companies on the Indonesia Stock Exchange for 2017–2020. The research sample includes non-financial companies that provide sustainability reports and disclose carbon emissions. Research period of 2017–2020 based on the issue of regulation POJK 51/POJK.03/2017 about Implementation of Sustainable Finance for Financial and Listed Companies. POJK 51/ POJK.03/2017 obligates companies to disclose sustainability reports that include carbon emission disclosure. Although mandatory implementation will start in 2020–2021, POJK 51/POJK.03/2017 suggests early implementation in 2017–2020. In this case, there are more possibilities for this research to get more carbon emission disclosure data in 2017 than before 2017. A sample selection can be seen in Table 1.

Independent variables include stakeholder power, economic performance, and strategic posture. Stakeholder power refers to the power held by stakeholders to give controlling roles to companies

Table 1.
Sampel Selection

Criteria	Companies	Observation
All companies listed on the Indonesia Stock Exchange 2017-2020	556	2224
Financial companies	(105)	(420)
Companies do not disclose carbon emission		(1737)
Total		67

Table 2.
Items of Carbon Emission Disclosure

Category	Code	Item
Management Approach (GRI 103)	PM1	Why theme of emission is critical
	PM2	How companies manage the emission
	PM3	Statement of Management Objective
	PM4	Companies' policy or commitment description relate to emission
	PM5	Evaluation of management approach about emission
Emission (GRI 305)	CD1	Disclose emission in ton-metric
	CD2	Disclose source of emission factor
	CD3	Disclose base year of calculation
	CD4	Disclose standard, methodology, assumption, and/or calculation
	CD5	Ratio of emission gas
	CD6	Reduction of emission gas

(Ullmann, 1985). In this case, stakeholder power refers to the power held by managers and creditors (Bedi & Singh, 2024; Cho & Ryu, 2022). Managers' power is measured by managerial ownership, which is the number of shares held by managers divided by the outstanding share (Cho & Ryu, 2022). Creditors' power is measured by leverage, which is total debt divided by total assets (Bedi & Singh, 2024).

Economic performance refers to the ability of companies to generate economic value from business activities (Ullmann, 1985). In this case, economic performance includes the ability of companies to generate earnings from the use of resources of assets (ROA) and equity (ROE) (Adu et al., 2023; Busch et al., 2022; Siddique et al., 2021; Wang et al., 2021). ROA is measured by net income divided by total assets, while ROE is measured by net income divided by total equity (Busch et al., 2022).

Strategy posture refers to strategy choices made by companies that relate to social and environmental improvement (Ullmann, 1985). Strategy that relates to social and environmental issues can be indicated by whether companies have ISO certification or not (Sam & Song, 2022). Certification of ISO is measured by a dummy variable, where score 1 if companies have certification of ISO and score 0 if otherwise (Sam & Song, 2022). Strategy that relates to social and environmental factors can also be indicated by how much companies spend to improve the environment (Chen et al., 2019; Meng et al., 2023). Environmental cost is measured by the proportion of environmental costs to total assets (Chen et al., 2019; Meng et al., 2023).

This study also uses control variables, which are companies' size and age. Companies' size is measured by the logarithm of total assets. Companies' age is measured by the number of years since they were founded until years of observation. Details of the research variables can be seen in Table 3.

This research also performs a robustness test to examine whether stakeholder power, economic performance, and strategy posture can improve carbon emission disclosure in another scenario. In this case, this research uses media as an alternative measurement of carbon emission disclosure. Media mention is measured as the number of carbon emission disclosures on companies'

Table 3.
Variables Measurement

Variables	Code	Measurement
Dependent Variable		
Carbon Emission Disclosure	CED	Index of Global Reporting Initiative (GRI 305 dan 103). CED = total of disclosed items / total of items
Independent Variables		
Managerial ownership	MO	MO = shares held by management / outstanding shares
Leverage	LEV	LEV = total debt / total assets
Return on asset	ROA	ROA = net income / total assets
Return on equity	ROE	ROE = net income / total equity
Certifications of ISO	ISO	Score 1 if companies have certifications of ISO 14001 and ISO 14064, and score 0 if otherwise
Environmental costs	EC	EC = total of environmental costs / total costs
Control Variables		
Companies' size	SIZE	Logarithm of total assets
Companies' age	AGE	Number of years since companies have been founded until years of observation

websites and social media (twitter, facebook, and instagram).

Data analysis uses panel regression analysis. First, this study ran tests of the Chow Hausman and Lagrange Multiplier tests to assess model specification. Second, this research runs classical assumption tests, including normality, multicollinearity, autocorrelation, and heterocedasticity. The regression model can be seen in equation 1.

$$CED = \alpha 0 + \beta_1 MO + \beta_2 ROA + \beta_3 ROE + \beta_5 ISO + \beta_4 EC + \beta_7 SIZE + \beta_8 AGE + e \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

ANALYSIS AND DISCUSSION

Table 4 shows that, on average, the level of carbon emission disclosure is 40.29 percent. It indicates that carbon emission disclosure is still relatively low, especially for non-financial companies on the Indonesia Stock Exchange for 2017–2020. The average of managerial ownership is only 0.4 percent, which indicates that managerial ownership is also low for non-financial companies on the Indonesia Stock Exchange for 2017–2020. The level of leverage, on average, is 56.49 percent, which indicates that most non-financial companies listed on the Indonesia Stock Exchange for 2017–2020 have 56.49 percent of their assets that are funded by debt. On average, non-financial companies listed on the Indonesia Stock Exchange for 2017–2020 can generate 4.87 percent earnings from the use of assets and 9.24 percent earnings from the use of equity. Overall, there are 73.13 percent of non-financial companies on the Indonesia Stock Exchange for 2017–2020 that already have ISO certification. On average, non-financial companies on the Indonesia Stock Exchange for 2017–2020 spend 2.14 percent of their costs to improve environmental aspects relative to total assets.

Based on Table 5, managerial ownership (MO) has a coefficient value of 0.7633 with a t-statistic of 0.2048 (insignificant). It indicates that managerial ability has no effect on carbon emission disclosure. Leverage (LEV) has a coefficient value of -1.4906 with a t-statistic of -2.7643 (significant at 0.01). It indicates that leverage has a negative effect on carbon emission disclosure. Return on assets (ROA) has a coefficient value of -2.3202 with a t-statistic of -1.5130 (insignificant). It indicates that return on assets has no effect on carbon emission disclosure. Return on equity (ROE) has a coefficient value of 0.0082 with a t-statistic of 0.0182 (insignificant). It indicates that return on equity has no effect on carbon emission disclosure. ISO certification (ISO) has a coefficient value of 0.1983 with a t-statistic of 1.8589 (significant at 0.10). It indicates that ISO certification has a positive effect on carbon emission disclosure. Environmental cost (EC) has a coefficient value of 0.0612 with a t-statistic of 0.0747 (insignificant). It indicates that environmental costs have no effect on carbon emission disclosure.

Table 4.
Descriptive Statistics

	CED	MO	LEV	ROA	ROE	ISO	EC	SIZE	AGE
Mean	0.4029	0.0040	0.5649	0.0487	0.0924	0.7313	0.0214	30.8958	4.1207
Median	0.3636	0.0005	0.6159	0.0362	0.0973	1.0000	0.0063	30.8114	4.1967
Max	1.0000	0.0603	0.8429	0.2118	0.3295	1.0000	0.2594	32.454	4.3404
Min	0.0909	3.80e-	0.1571	-0.089	-0.572	0.0000	0.0000	28.691	3.1702
Std.Dev	0.2858	0.0090	0.1964	0.0581	0.1255	0.4466	0.0411	0.9814	0.2522
Obs	67	67	67	67	67	67	67	67	67

Discussion

Based on perspective stakeholder theory, stakeholder power, economic performance, and strategy posture become predictors of carbon emission disclosure. However, the result of this study finds that only stakeholder power (proxied by leverage) and strategy posture (proxied by ISO certification) have a significant effect on carbon emission disclosure.

Managerial ownership has no effect on carbon emission disclosure. It indicates that companies' management also has a certain consideration in determining which stakeholders can be priority stakeholders. Cho & Ryu (2022) explain that only in low-agency conflicts between manager and stakeholder can higher managerial ownership improve social and environmental responsibility.

This study also gives evidence that creditors have the power to have significant impacts on companies' management by deciding the level of carbon emission disclosure in sustainability reports. However, the predicted effect direction (which is a positive effect) is not fulfilled. The result shows the contrast result, which is a negative effect. It captures that creditors lead management to disclose less carbon emission reduction activities in the sustainability report. The result is consistent with Bendi & Singh (2024), who explain that creditors see carbon emission disclosures as having more costs for companies, and creditors also focus more on financial disclosures than carbon emission ones. There are also some arguments why creditors lead management to disclose less carbon emission reduction activities. First, carbon emissions are still not optimal for every company in Indonesia. In this case, there are no benchmark companies for creditors to use to determine the impact of an optimal disclosure policy, especially carbon emission disclosure. Second, carbon emissions can be disclosed in a sustainability report. There is a possibility that companies will disclose their carbon emission reduction activities on other platforms, such as websites and social media (Twitter, Facebook, and Instagram).

This study does not find the effect of ROA and ROE on carbon emission disclosure. This result is not consistent with Busch et al. (2022), who find a positive relationship between economic performance and carbon performance. However, this result is consistent with Adu et al. (2023) who find that there is no relationship between economic performance and carbon performance. Adu et al. (2023), explain that instead of using high economic performance to fulfill social and environmental responsibilities, companies will save their money to improve other business activities.

This study also finds that strategy posture is an important factor in determining the level of carbon emission disclosure. The result shows that

Table 5.
Regression Analysis

Variable	Coefficient	t-Statistics
Constant	-30.238	
MO	0.7633	0.2048
LEV	-1.4906	-2.7643***
ROA	-2.3202	-1.5130
ROE	0.0082	0.0182
ISO	0.1983	1.8589*
EC	0.0612	0.0747
SIZE	0.5969	2.3238**
AGE	3.1554	3.0673***
Adj R^2	0.6641	
F-Statistic	5.9786***	

***Sig 1%, **Sig 5%, *Sig 10%

companies with an active strategy posture (proxied by ISO certification) have more carbon emission disclosure than companies that have no ISO certification. It indicates that companies' management considers their strategy posture to disclose carbon emission reductions in their sustainability reports. The result of ISO certification confirms stakeholder theory, where companies with strategies that support social and environmental improvement tend to fulfill stakeholder interests (Ullmann, 1985), including interests in carbon emission disclosure.

On the other hand, the strategy posture proxy of environmental costs has no effect on carbon emission disclosure. This result is not consistent with Meng et al. (2023) and Chen et al. (2019), who find that environmental costs reduce carbon emissions. However, this result is consistent with Doda, Gennaioli, Gouldson, Grover & Sullivan (2016), who find that there is no relationship between environmental management and carbon emissions. Doda et al. (2016) explain that although companies have environmental responsibilities, not all companies precisely calculate carbon emission reduction and do not disclose it in their corporate reports.

In addition, other factors that have an effect on carbon emission disclosure are companies' size and age. Companies with larger assets have more carbon emission disclosure since larger companies give more attention to the public and government. In this case, bigger companies tend to show a good image to stakeholders by reducing carbon emissions (De Tommaso & Borini, 2024). Public legitimation is also a motivation for bigger companies to disclose more carbon emissions.

Companies' age also has an effect on carbon emission disclosure. A competitive business environment leads companies to maintain their existence and continue to develop competitive advantages. Companies' age is an indicator that measures the companies' existence in business and industry. Older companies prove that companies can survive and maintain their businesses in every situation and condition, even in crisis. Companies' experience to survive has become important knowledge to fulfill stakeholders' interests, including providing information about companies' commitment to environmental and social responsibility. In this case, older companies tend to disclose more carbon emission reductions.

Table 6.
Regression Analysis (Without Control Variables)

Variable	Coefficient	t-Statistics
Constant	-25.7648	
MO	0.5679	0.1909
LEV	-1.4889	-2.8999***
ROA	-2.1122	-1.4678
ROE	0.0059	0.1188
ISO	0.1789	1.8689*
EC	0.0567	0.0657
Adj R^2	0.5098	
F-Statistic	4.8998***	

***Sig 1%, *Sig 10%

Robustness Tests

To examine the robustness of the main result, this study also investigates the determinant factors of carbon emission disclosure in different scenarios. First, this study examines stakeholder power, economic performance, and strategy posture without control variables. The result of the first scenario can be seen in Table 6. Second, this study examines another measurement of carbon emission disclosure by using media mentions. The result of the first scenario can be seen in Table 7.

Based on Table 6, managerial ownership (MO) has a coefficient value of 0.5679 with a t-statistic of 0.1909 (insignificant). It indicates that managerial ownership has no effect on carbon emission disclosure. Leverage (LEV) has a coefficient value of -1.4889 with a t-statistic of -2.8999 (significant at 0.01). It indicates that leverage has a negative effect on carbon emission disclosure. Return on assets (ROA) has a coefficient value of -2.1122 with a t-statistic of -1.4678 (insignificant). It indicates that return on

assets has no effect on carbon emission disclosure. Return on equity (ROE) has a coefficient value of 0.0059 with a t-statistic of 0.1188 (insignificant). It indicates that return on equity has no effect on carbon emission disclosure. ISO certification (ISO) has a coefficient value of 0.1789 with a t-statistic of 1.8689 (significant at 0.10). It indicates that ISO certification has a positive effect on carbon emission disclosure. Environmental cost (EC) has a coefficient value of 0.056798 with a t-statistic of 0.0655 (insignificant). It indicates that environmental costs have no effect on carbon emission disclosure.

Based on Table 6, only leverage (LEV) and ISO certification (ISO) have a significant effect on carbon emission disclosure. This result is consistent with the main result, as shown in Table 6. The main result is robust if it is examined without control variables.

Based on Table 7, managerial ownership (MO) has a coefficient value of 0.7899 with a t-statistic of 0.3111 (insignificant). It indicates that managerial ability has no effect on carbon emission disclosure. Leverage (LEV) has a coefficient value of -1.5188 with a t-statistic of -2.7899 (significant at 0.01). It indicates that leverage has a negative effect on carbon emission disclosure. Return on assets (ROA) has a coefficient value of -2.4166 with a t-statistic of -1.5211 (insignificant). It indicates that return on assets has no effect on carbon emission disclosure.

Tabel 7.
Regression Analysis (Media Mention of Carbon Emission)

Variable	Coefficient	t-Statistics
Constant	-31.1117	
MO	0.7899	0.3111
LEV	-1.5188	-2.7899**
ROA	-2.4166	-1.5211
ROE	0.0100	0.0288
ISO	0.2099	1.8899*
EC	0.0878	0.0988
SIZE	0.6789	2.3555**
AGE	3.3998	3.1889***
Adj R^2	0.6899	
F-Statistic	6.0300***	

***Sig 1%, **Sig 5%, *Sig 10%

Return on equity (ROE) has a coefficient value of 0.0100 with a t-statistic of 0.0288 (insignificant). It indicates that return on equity has no effect on carbon emission disclosure. ISO certification (ISO) has a coefficient value of 0.2099 with a t-statistic of 1.8899 (significant at 0.10). It indicates that ISO certification has a positive effect on carbon emission disclosure. Environmental cost (EC) has a coefficient value of 0.087890 with a t-statistic of 0.0988 (insignificant). It indicates that environmental costs have no effect on carbon emission disclosure.

Based on Table 7, only leverage (LEV) and ISO certification (ISO) have a significant effect on carbon emission disclosure. This result is consistent with the main result, as shown in Table 6. The main result is robust if it is examined with carbon emission disclosure in media mentions.

CONCLUSION

This study aims to examine the determinant factors of carbon emission disclosure from the perspective of stakeholder theory. The result shows that stakeholder power (proxied by leverage) and strategy posture (proxied by ISO certification) have effects on carbon emission disclosure. Furthermore, companies' size and age also have significant effects on carbon emission disclosure. However, this study has limitations by not considering the quality of carbon emission disclosure. Future research can consider the disclosure quality to assess the information quality in the sustainability report so stakeholders can achieve higher-quality information, especially information on carbon emissions.

Research findings on carbon emission disclosure have several important implications for business practitioners and regulators. Research revealing carbon emission disclosure practices contributes to increased transparency and accountability in businesses regarding their environmental impacts. Companies that are more open about reporting their carbon emissions can build trust with stakeholders

and the wider public. Therefore, companies may pay more attention to Good Corporate Governance practices to strengthen the foundation of sustainability-related decision-making. Regulators can use the research findings as a basis for developing or adjusting regulations related to carbon emission disclosure. By understanding how disclosure practices can influence corporate management, regulators can create more effective policies.

LIMITATION AND SUGGESTIONS

Based on the findings of this research, the author provides recommendations to the company owners to enhance communication with creditors, ensuring the maintenance of a harmonious relationship. This is crucial because creditors wield the power to influence corporate management in decisions related to carbon emission disclosure. Additionally, company owners should review policies pertaining to environmental management strategies. The strategic posture of a company regarding environmental management is a significant factor influencing management decisions regarding carbon emission disclosure in sustainability reports. Another suggestion to company owners is to improve the quality of implementing good corporate governance (GCG), as this variable is the most crucial factor for management in making decisions about carbon emission disclosure in sustainability reports.

In addition to providing recommendations to company owners, the researcher also suggests that future researchers explore stakeholders beyond creditors and management. For instance, owners of institutions, customers, and government entities should be considered. It is crucial to provide empirical evidence regarding which stakeholders possess the greatest power in influencing corporate management to disclose carbon emission practices. Subsequent researchers may also delve into disclosure channels beyond sustainability reports, such as corporate websites and social media.

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