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Carbon emission report: a review based on environmental performance, company age and corporate governance

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Abstract. This research aims to explore the practice of carbon emission disclosure in the manufacturing company. This paper also examines the factors that influence the disclosure of carbon emissions. The factors tested are environmental performance, company age, managerial ownership, institutional ownership, and independent commissioners. This study uses a sample of 40 manufacturing companies listed on the Indonesia Stock Exchange in 2012 - 2015. The data analysis methods included were descriptive statistical analysis and panel data regression analysis. The carbon emission disclosure level in Indonesia's manufacturing companies is low because companies are less concerned about environmental reporting problems. The results of this study indicate that company age, institutional ownership, and independent commissioners have a positive effect on the disclosure of carbon emissions, while environmental performance and managerial ownership do not affect the disclosure of carbon emissions.

1. Introduction

In the past 160 years, a social institution that focuses on the environment, namely the World Resources Institute (WRI), has prepared a 185 countries map that supplies the highest CO_2. They report during the time of 1850 to 2011, the world most release 46 billion tonnes of CO_2. During this period, Indonesia occupied the sixth rank with a producer of 2.053 billion tons of CO_2 (teknologi.news.viva.co.id).

Reporting related to carbon emissions shows an important element of environmental report [1]. Companies are expected to provide information to the public regarding company activities and their responsibilities related to carbon emissions. Companies can prove transparency and accountability of carbon emission management by reporting CO_2 emission annually. In fact, only a few companies have complied with carbon emission reports. Manufacturers report emissions to get many objectives, including obtaining authenticity from stakeholders and avoiding intimidations for manufacturers that release glasshouse gases. These intimidations accommodate increasing operational price reduction, ask repute chance sound transactions and fines and penalties [2]. Another benefit of disclosing carbon emissions for companies is to fulfill stakeholder interests by increasing transparency and accountability [3]. However, many companies have not disclosed carbon emissions because this information may spend much money and reduce company profits.

The importance of disclosing carbon emissions has led many researchers to research the factors influencing carbon emissions disclosure. It is said that various factors influence companies to disclose carbon emissions [4]. The factors that affect the disclosure of carbon emissions, namely the type of

industry, carbon emission levels, company size, and corporate governance quality [5]. Meanwhile, Indonesia's research used media exposure, industry type, profitability, company size, environmental performance, and leverage as independent variables [6]. Variables examined the variables of firm size, company age, leverage, listing status, corporate governance, industry, ownership concentration [7].

Furthermore, it used the variable size, rising capital firms, leverage, ETS, ratification of the Kyoto protocol, the stringency of environmental regulation system, and common law country as independent variables [8]. Research conducted by Tauringana and Chitambo (2014)used DEFRA variables, the board size, director share ownership, and ownership concentration associated with carbon emissions [9]. Tested variable media coverage and profitability in 35 companies in the mining, energy, chemistry, pharmaceuticals, cosmetics, food and beverage sectors listed on the Indonesian Stock Exchange [10].

This study reveals several factors that are predicted to affect the disclosure of carbon emissions, namely environmental performance, company age, and corporate governance mechanisms, which are proxied by the ownership structure and the proportion of independent commissioners. These variables are still being debated among researchers, and there are still inconsistencies in the results.

This research is fundamental because of the increasing number of company activities that affect the damage to the surrounding environment, especially air pollution. Besides, this research is expected to be an addition to the literature related to carbon emission disclosures (CED). In this paper, calculate the disclosure of CO_2 emissions is using the Carbon Emission Disclosure Index. This measurement is an update where previous studies mostly used the Carbon Disclosure Project. The researcher also added an independent variable, namely the ownership structure. This ownership structure variable has been studied in the UK by [9], so the researchers want to reexamine it in Indonesia's developing countries.

Legitimacy theory argues that manufacturers should adapt to the value scheme implemented by society [11]. Research from [12] reveals the definition of legitimacy theory as a condition or status that exists when a firm's value system is in line with a broader social value system in which the company is a part of it. When a real or potential difference exists between the two value systems (firm value and social value), a threat to the company's legitimacy will arise. Through social and environmental disclosure, companies consider their existence and activities to be legitimate [13].

Environmental performance can be used to see the company's response to the environment [14]. The legitimacy theory explains that companies have a social contract with the community. Companies are expected to carry out activities following the values and norms prevailing in society to get legitimacy from the community. This can be achieved by aligning company activities with community values and norms, for example, by protecting the surrounding environment. Research conducted by Clarkson et al. (2008) argues that companies with superior environmental performance have a proactive environmental strategy [15]. Therefore, companies with good environmental performance will take actions that contribute to the environment, including reducing carbon emissions. In the next step, the company discloses environmental performance in an annual report and a sustainability report. The quality environmental performance of the company will encourage environmental disclosure and reporting of carbon emissions. Research by Dawkins and Fraas (2011) found that environmental performance significantly affects the disclosure of carbon emissions [16]. The hypothesis can be formulated as follows: H1 = Environmental performance positively affects carbon emission disclosure.

Company age is an essential company characteristic in disclosing carbon emissions because company age describes several aspects, such as stakeholder strength, strategic attitude, and financial performance [17]. Company maturity, company reputation, and company involvement in policy-determining environmental conservation activities and environmental disclosure can increase its added value. Previous research has shown that the company's age positively affects the disclosure of carbon emissions. Company age has a positive effect on greenhouse gas disclosure [7]. Companies of older age have more experience in voluntary reporting, including environmental disclosures. The second hypothesis is stated as follows: H2 = Company age positively affects carbon emission disclosure.

The corporate governance mechanism is one of the keys to maintaining business continuity. In this study, the corporate governance mechanism is proxied by the ownership structure and the proportion of independent commissioners. A high level of managerial ownership will play a significant role in

monitoring company activities related to the environment [18]. Institutional ownership is also a component that affects the disclosure of carbon emissions. Organizations/companies that own shares are expected to be able to optimize the supervision of management. Companies with high institutional ownership will disclose more information related to the environment [19]. Institutional ownership has a positive effect on disclosure of carbon emissions [20]. Greater institutional ownership will be associated with additional control over policies made by management. It is predicted that institutional ownership will increase management's pressure to conduct a wider carbon emissions disclosure. The board of commissioners is an essential part of the company component based on the good corporate governance mechanism. Based on the General Guidelines for Indonesian Good Corporate Governance, the board of commissioners has the duty and responsibility of supervising and providing advice to the directors and ensuring that the company implements GCG. The large proportion of independent commissioners makes supervision tighter to survive, carry out business activities, and develop. The independent board of commissioners has a positive relationship with environmental disclosure [21,20]. Therefore, the proportion of independent commissioners is thought to positively affect environmental disclosures, including disclosure of carbon emissions. The third hypothesis is formulated as follows: H3a = Managerial ownership has a positive effect on carbon emission disclosure; H3b = Institutional ownership has a positive effect on carbon emission disclosure; H3c = The proportion of independent commissioners has a positive effect on carbon emission disclosure.

Methodology

This study uses a sample of 40 manufacturing companies listed on the Indonesia Stock Exchange (IDX) for the period 2012 - 2015. The companies examined are limited to companies that report carbon emission management in annual reports and sustainability reports.

2.1. Variable measurement

The dependent variable in this study is the carbon emissions disclosure (CED). CED reports business activities related to carbon emissions, which the company communicates through annual reports and sustainability reports. The measurement of CED in this study employs 18 items established by [5]. They divide these indicators into five groups as follows: risks and opportunities of climate change (CC), greenhouse gas (GHG) emissions, energy consumption (EC), reduction of greenhouse gases and cost (RC) and accountability of emissions carbon (AEC) [5].

Environmental performance (EP) is the company's performance in creating a right (green) environment. Environmental performance in this study is measured by an ISO 14001 certificate owned by the company. If the company gets an ISO 14001 certificate, it will get a score of 1. Otherwise, it will get a score of 0. The age of the company (AGE) is calculated from the Initial Public Offering (IPO) date to the research period. The corporate governance mechanism uses a measure of managerial ownership (MO) as measured by the management's percentage of shares, namely commissioners and directors. Institutional ownership (IO) is the percentage of shares owned by financial institutions such as banks, insurance companies, pension funds, so forth. Institutional ownership is measured by the proportion of shares owned by financial institutions at the end of the year. An independent board of commissioners (IC) is a party that does not have a business and family relationship with the controlling shareholder, members of the board of directors, the board of commissioners, and the company itself.

2.2. Data analysis technique

This study's descriptive statistics include the mean, standard deviation, maximal, minimum, and table/chart. Before testing the hypothesis, a regression prerequisite test is carried out so that the regression model can become an unbiased estimator. The classical assumption test consists of normality test with Kolmogorof Smirnov analysis, multicollinearity with correlation matrix analysis, heteroscedasticity with the white test, and autocorrelation Breusch-Godfrey Serial Correlation LM Test. Furthermore, panel data regression testing for the research model was carried out using the E-Views tool.

3. Results and discussions

3.1 Descriptive statistical analysis

Table 1. Descriptive statistical test.

	CED	EP	AGE	MO	IO	IC
Mean	0.187	0.750	12.58	0.011	0.094	0.334
Median	0.166	1.000	13.95	0.000	1.007	0.371
Maximum	0.666	1.000	62.00	0.219	0.142	0.402
Minimum	0.056	0.000	4.00	0.000	0.000	0.221
Std. Dev.	0.124	0.434	2.41	0.039	0.003	0.573

The results of descriptive statistics in the study show a common CO_2 emission report of 18.79%. This indicates that the disclosure of carbon emissions in manufacturing companies in Indonesia is still low. The low degree of CO_2 emission report designates that the company has not fully implemented carbon emission disclosure. Another reason for the low disclosure of CO_2 emissions is that voluntary disclosure requires many funds. As a result, many companies are unable to report CO_2 emissions in a quality manner. The highest disclosure of CO_2 emissions was 66.67%. Table 1 shows the average environmental performance value of 75%, which means that most manufacturing companies in Indonesia have received ISO 14001 certification, meaning that the company has carried out environmental management. The second variable in this descriptive analysis is the age of listing on the Indonesia Stock Exchange, which shows that the average sample company has listed its shares on the Indonesian stock exchange board for 12.5 years.

3.2 Inferential analysis results

Based on panel data regression testing, the following mathematical equation is obtained:

$$CED = 0{,}352 - 0{,}007\ EP + 0{,}003\ AGE - 0{,}075\ MO + 0{,}142\ IO + 0.002\ IC + e$$

Table 2. Panel data regression results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Note
Constanta	0.352255	0.064456	5.465027	0.0000	
EP	-0.007252	0.044160	-0.164218	0.8698	H1 rejected
AGE	0.003309	0.001208	2.739407	0.0069	H2 accepted
MO	-0.075218	0.160915	-0.467436	0.6408	H3a rejected
IO	0.142785	0.044660	3.197143	0.0017	H3b accepted
IC	0.002441	0.001756	4.598687	0.0150	H3c accepted
Weighted Statistics					
R-squared		0.073501	Mean dependent var		0.037361
Adjusted R-squared		0.043419	S.D. dependent var		0.045175
S.E. of regression		0.044184	Sum squared resid		0.300638
F-statistic		2.443411	Durbin-Watson stat		1.735503
Prob(F-statistic)		0.036613			
Unweighted Statistics					
R-squared		0.159757	Mean dependent var		0.187936
Sum squared resid		2.066824	Durbin-Watson stat		0.252444

3.3 Discussion

Tests show that environmental performance does not affect the disclosure of carbon emissions. This result is in line with Jannah and Muid (2014) research, which states that there is no effect of environmental performance on the disclosure of carbon emissions [6]. The study results are also in line with Pradini and Kiswara (2013) research, which states that environmental performance, as measured by ISO 14001, does not affect the disclosure of carbon emissions [22]. Companies that have good environmental performance do not influence the company's decision to carry out more extensive carbon emissions disclosure. The company pays more attention to the company's performance to increase the company's profitability. Given that disclosure of carbon emissions is voluntary.

Company age is proven to have a positive effect on the disclosure of carbon emissions. The longer the company operates, the higher the disclosure of carbon emissions by the company. This is to get legitimacy from the community that the company participates in protecting the environment. Companies that have been listed on the stock exchange for a long time tend to have more resources and experience. The quality of voluntary disclosure will increase, including the disclosure of carbon emissions. The larger company will encourage to make voluntary disclosure [23].

The third hypothesis, which states that managerial ownership has a significant positive effect on carbon emission disclosure, is rejected. This study follows Jannah and Muid (2014) research, which states that there is no effect of managerial ownership on disclosure of carbon emissions [6]. These results do not support the research results by Ghomi and Leung (2013) and research by Tauringana and Chitambo, which states that ownership concentration affects the disclosure of carbon emissions [7,9]. Increasing managerial ownership does not encourage management to disclose carbon emissions. The existence of institutional monitoring encourages managers to use internal funds to finance company operational activities rather than to disclose carbon emissions. Management prefers to improve company performance in terms of evaluating their outcomes.

Institutional ownership has been shown to have a positive effect on disclosure of carbon emissions. The existence of institutional ownership is expected to be able to optimize the supervision of management. Companies with high institutional ownership will disclose more information related to the environment [19]. This research is in line with Nainggolan and Rohman (2015) study, which shows that institutional ownership has a positive effect on disclosure of carbon emissions [20]. The greater the institutional ownership, it is expected that the supervision of management will be tighter.

The Independent Commissioner has a positive effect on the disclosure of carbon emissions. These results are consistent with Ghomi and Leung (2013) findings, which state that there is a positive influence from independent commissioners on carbon emission disclosure [7]. These results are also in line with Jannah and Muid (2014) [6]. Research conduct by Liao L et al. (2015) proved that the independent board of commissioners has a positive relationship with environmental disclosure [21]. The higher the proportion of independent commissioners, the greater the environmental disclosure by the company. Proof that the proportion of independent commissioners positively affects environmental disclosure is also carried out by Nainggolan and Rohman (2015) [20].

4. Conclusion

The results show that the level of disclosure of carbon emissions in manufacturing companies in Indonesia is still low. This means that the company's concern for environmental disclosure has not been optimal. It is necessary to have control from the government and the community to be more aware of efforts to disclose carbon emissions. Nevertheless, environmental performance as a form of company concern for environmental management shows satisfactory value, as many as 75% of manufacturing companies have ISO 14001 certificates. Company age, institutional ownership and the proportion of independent commissioners are proven to be associated with the extent of carbon emission disclosure.

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