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Carbon Emission Report: A Review Based on Environmental Performance, Company Age and Corporate Governance

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Abstract. The aim of this research is 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 the proportion of 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 level of carbon emission disclosure in manufacturing companies in Indonesia is in the low category. This means that 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 disclosure of carbon emissions, while environmental performance and managerial ownership have no effect on disclosure of carbon emissions.

Keywords: Carbon Emission Disclosure, Environmental Performance, Managerial Ownership, Institutional Ownership, Independent Commissioners, Panel Data Regression.

1. Introduction

A social institution that focuses on the environment, namely the World Resources Institute (WRI), has made maps of the countries that have contributed the most to carbon dioxide in the last 160 years. The social institution then researched by making the world's first map of worldwide carbon dioxide emissions, which were observed from 1850 to 2011. At least in that time period, the world almost produced 46 billion tonnes. During this period, Indonesia was in the sixth position by producing 2.053 billion tonnes of carbon dioxide. The following are the 10 countries that produced the most carbon dioxide in the past 160 years. Data were taken from 185 countries as can be seen in table 1 (teknologi.news.viva.co.id).

Table 1. List of Ten Countries that Produce the Most Carbon Dioxide

Nu	Countries	Total Carbon Dioxide
1	China	10,26 billion ton
2	United States of America	6,135 billion ton
3	Europe	4,263 billion ton
4	India	2,358 billion ton
5	Russian Federation	2,217 billion ton
6	Indonesia	2,053 billion ton
7	Brazil	1,419 billion ton
8	Japan	1,17 billion ton
9	Canada	847 million ton
10	German	806 million ton

Disclosure of carbon emissions is part of environmental disclosure (Majid & Gozhali, 2015). 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 disclosing information in their annual reports. Disclosure of carbon emissions in Indonesia is voluntary. In fact, only a few companies have complied with carbon emission reports. Companies that disclose carbon emissions have several objectives, including obtaining legitimacy from stakeholders, avoiding threats, especially for companies that produce greenhouse gases. These threats include increasing operating costs, reducing demand, reputation risk, legal proceedings, and fines and penalties (Berthelot and Robert, 2011). Another benefit of disclosing carbon emissions for companies is to fulfill stakeholder interests by increasing transparency and accountability (Solikhah et al., 2020[a]). However, many companies have not made disclosure of carbon emissions because this information may require large costs and is considered to reduce company profits.

The importance of disclosing carbon emissions has led many researchers to conduct research on the factors that influence the disclosure of carbon emissions. Solikhah, et al (2020)[b] b argue that there are various factors that influence companies to disclose carbon emissions. Choi et al. (2013) mentions the factors that affect the disclosure of carbon emissions, namely the type of industry, carbon emission levels, company size, and corporate governance quality. Meanwhile, research in Indonesia by Jannah and Muid (2014) used media exposure, industry type, profitability, company size, environmental performance and leverage as independent

variables. Ghoma and Leung (2013) examined the variables of firm size, company age, leverage, listing status, corporate governance, industry, ownership concentration. Furthermore, Luo, et al (2012) used the variable size, rising capital firms, leverage, ETS, ratification of the Kyoto protocol, stringency of environmental regulation system, and common law country as independent variables. Research conducted by Tauringana and Chithambo (2014) used DEFRA variables, board size, director share ownership, and ownership concentration associated with carbon emissions. Solikhah and Subowo (2020) tested variable media coverage and profitability in 35 companies in the mining, energy, chemistry, pharmaceuticals, cosmetics, food and beverages sectors that are listed on the Indonesian Stock Exchange.

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. The reasons for these variables are still being debated among researchers and there are still inconsistencies in the results.

This research is very important because the increasing number of company activities that affect the damage to the surrounding environment, especially the problem of air pollution. In addition, this research is expected to be an addition to the literature related to carbon emission disclosures (CED). In this study, the disclosure of carbon emissions was measured using the Carbon Emission Disclosure Checklist. 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 Tauringana and Chithambo (2014), so the researchers want to reexamine it in the context of developing countries in Indonesia.

2. Literature Review

Teori Legitimasi

Legitimacy theory states that companies must be able to adapt to the value system that has been implemented by society (Belkaoui, 2006). Ghozali and Chariri (2007) reveal the definition of legitimacy theory as a condition or status that exists when a firm's value system is in line with a larger 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 society value), a threat to the legitimacy of the company will arise. Through social and environmental disclosure, companies consider their existence and activities to be legitimate (Deegan, 2002).

The Effect of Environmental Performance on Carbon Emission Disclosure

Environmental performance can be used to see the company's response to the environment (Titisari & Alviana, 2012). The legitimacy theory explains that companies have a social contract with the community. Companies are expected to carry out activities in accordance with the values and norms prevailing in society so that the company gets legitimacy from the community. This can be achieved by aligning company activities with community values and norms, for example by protecting the surrounding environment. Clarkson et al. (2008) argue that companies with superior environmental performance have a proactive environmental strategy. Therefore, companies that have good environmental performance will take actions that contribute to the environment, including reducing carbon emissions. The next step, the company discloses environmental performance in an annual report as well as a sustainability report. Quality environmental performance of the company will encourage environmental

disclosure and reporting of carbon emissions. Research by Dwankins and Fraas (2011) found that environmental performance has a significant effect on disclosure of carbon emissions. So that the hypothesis can be formulated as follows:

H1: Environmental performance has a positive effect on carbon emission disclosure.

The Effect of Company Age on Carbon Emission Disclosure

Company age is one of the important company characteristics in disclosing carbon emissions. Roberts (1992) argues that company age describes several aspects such as stakeholder strength, strategic attitude, and financial performance of the company concerned. Robets (1992) also reinforces the opinion that company maturity, company reputation, and company involvement in policy-determining activities such as environmental conservation activities and environmental disclosure can increase added value for the company. Previous research has shown that company age has a positive effect on disclosure of carbon emissions. Ghomi and Leung (2013) found that company age has a positive effect on greenhouse gas disclosure. Companies with older age have more experience in voluntary reporting including environmental disclosures. So that the second hypothesis is stated as follows:

H2: Company age has a positive effect on carbon emission disclosure.

The Effect of Corporate Governance Mechanisms on 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. Uwuigbe (2011) proves that a high level of managerial ownership will play a big role in monitoring company activities related to the environment. 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 supervision of management. Research by Chang and Zhang (2015) shows that companies with high institutional ownership will disclose more information related to the environment. This is in line with the research of Nainggolan & Rohman (2015) which shows that institutional ownership has a positive effect on disclosure of carbon emissions. Greater institutional ownership will be associated with additional control over policies made by management. It is predicted that institutional ownership will be able to increase the pressure on management to conduct a wider disclosure of carbon emissions. The board of commissioners is an important part of the company component based on the good corporate governance mechanism. Based on the General Guidelines for Indonesian Good Corporate Governance (KNKG, 2006), the board of commissioners has the duty and responsibility of supervising and providing advice to the directors and ensuring that the company implements GCG. Kuswanto et al (2014) argue that the large proportion of independent commissioners makes supervision tighter so that the company can survive, carry out business activities, and develop. Liao et al. (2014) proved that the independent board of commissioners has a positive relationship with environmental disclosure. Nainggolan & Rohman (2015) also prove that the proportion of independent commissioners has a positive effect on environmental disclosure. Therefore, the proportion of independent commissioners is thought to have a positive effect on environmental disclosures, including disclosure of carbon emissions. So that 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.

3. 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.

3.1. Variable Measurement

The dependent variable in this study is the disclosure of carbon emissions. CED is a voluntary disclosure of company activities related to carbon emissions, which the company communicates through annual reports and sustainability reports. Measurement of carbon emission disclosure in this study uses 18 checklist items developed by Choi, et al (2013). Choi, et al (2013) define five broad categories relevant to climate change and carbon emissions 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).

Environmental performance is the company's performance in creating a good (green) environment. Environmental performance in this study is measured by the presence of 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 is calculated from the date of the Initial Public Offering (IPO) up to the research period. The corporate governance mechanism uses a measure of managerial ownership as measured by the percentage of shares by the management, namely commissioners and directors. Institutional ownership is the percentage of shares owned by financial institutions such as banks, insurance companies, pension funds, and others. Institutional ownership is measured by the proportion of shares owned by financial institutions at the end of the year. An independent board of commissioners is a party that does not have a business and family relationship with the controlling shareholder, members of the board of directors and the board of commissioners as well as with the company itself.

3.2. Data Analysis Technique

Descriptive statistics used in this study 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 white test and autocorrelation with Breusch-Godfrey Serial Correlation LM Test. Furthermore, panel data regression testing for the research model was carried out using the E-Views tool.

4. Results and discussions

4.1 Descriptive Statistical Analysis

Table 2. 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

Note: CED (Carbon Emmission Disclosure), EP (Environmental Performance), AGE (firm age) MO (Managerial Ownership), IO (Institutional Ownership), IC (Independent Commissioners).

The results of descriptive statistics in the study show an average carbon emission disclosure of 18.79%, which indicates that the level of disclosure of carbon emissions in manufacturing companies in Indonesia is still low. The low level of carbon emission disclosure indicates that the company has not fully implemented carbon emission disclosure. Another reason for the low disclosure of carbon emissions is that voluntary disclosure requires a lot of funds. As a result, many companies are unable to report carbon emissions in a quality manner. The highest disclosure of carbon emissions was 66.67% by PT Holcim Indonesia Tbk in 2015. The table above 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 well. 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.

4.2 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

Tabel 3. Hasil Regresi Data Panel

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

Note: CED (Carbon Emmission Disclosure), EP (Environmental Performance), AGE (firm age) MO (Managerial Ownership), IO (Institutional Ownership), IC (Independent Commissioners).

4.3 Discussion

The environmental performance has no effect on carbon emission disclosure

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

Company age is proven to have a positive effect on carbon emission disclosure

Company age is proven to have a positive effect on 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, so that the quality of voluntary disclosure will increase, including disclosure of carbon emissions. The larger company will encourage to make voluntary disclosure (Solikhah, 2016).

Managerial ownership has no effect on carbon emission disclosure

The third hypothesis, which states that managerial ownership has a significant positive effect on carbon emission disclosure, is rejected. This study is in accordance with research by Jannah and Muid (2014) which states that there is no effect of managerial ownership on disclosure of carbon emissions. These results do not support the results of research by Ghomi and Leung (2013) and research by Tauringana and Chitambo (2014) which states that ownership concentration affects the disclosure of carbon emissions. Increasing managerial ownership does not encourage management to disclose carbon emissions. The existence of institutional monitoring encourages managers to use internal funds in order 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 a positive effect on carbon emission disclosure

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 supervision of management. Research by Chang and Zhang (2015) shows that companies with

high institutional ownership will disclose more information related to the environment. This research is in line with the study of Nainggolan & Rohman (2015) which shows that institutional ownership has a positive effect on disclosure of carbon emissions. The greater the institutional ownership, it is expected that the supervision of management will be tighter.

The Independent Commissioner has a positive effect on disclosure of carbon emissions

The Independent Commissioner has a positive effect on disclosure of carbon emissions. These results are consistent with the findings of Tang and Lan (2013) and Ghomi and Leung (2013) which state that there is a positive influence from independent commissioners on carbon emission disclosure. These results are also in line with research conducted by Jannah and Muid (2014). Liao et al. (2014) proved that the independent board of commissioners has a positive relationship with environmental disclosure. The higher the proportion of independent commissioners, the greater the environmental disclosure by the company. Nainggolan & Rohman (2015) also prove that the proportion of independent commissioners has a positive effect on environmental disclosure.

5. Conclussion

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 so that the company will 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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