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## Factors Influencing the Greenhouse Gas Emissions Disclosure at Manufacture Company in the Indonesia Stock Exchange

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***Abstract:*** *This study aims to examine empirically the factors that influence greenhouse gas emission disclosure. Factors examined in this research are a type of industry, firm size, profitability, and leverage. In this study, the researcher adopted the checklist issued by the Carbon Disclosure Project (CDP) to measure the extensive disclosure of greenhouse gas emissions. To examine the factors, the researcher utilized multiple regression. The population of this study was all manufacturing companies listed on the Indonesian Stock Exchange in 2018. This research applied the purposive sampling method to obtain 131 listed manufacturing in 2018. The result implies that firm size has a positive and significant correlation with greenhouse gas emission disclosure. Meanwhile, type of industry, profitability, and leverage had no significant correlation with greenhouse gas emission disclosure. Manufacturing companies, especially greenhouse gas-intensive companies, must participate in protecting the environment and help reduce greenhouse gas emissions as stipulated in Presidential Regulation No. 61 of 2011 concerning the National Action Plan for Reducing Greenhouse Gas Emissions. In line with the concept of performance measurement of "Triple Bottom Line," the company does not only pay attention to profit (profit) and people (social), the company must also pay attention to the planet (environment). So the company can compete with other companies. The results highlighted that the much resources of the company, the better the company is conducting a greenhouse-gas-emission reduction strategy. It makes it easier for the company to do the disclosure of greenhouse gas emissions.*

***Keywords:*** *Greenhouse Gas Emission Disclosure, Type of Industry, Firm Size, Profitability, and Leverage.*

## INTRODUCTION

The issue of global warming has become an essential topic for most countries, even Indonesia. One of the causes of global warming is greenhouse gas emissions. Majid and Ghozali (2015) stated that in 2005, greenhouse gas emissions in Indonesia reached 2.05 gigatons. Thus, Indonesia ranked third in the world, which contributed to greenhouse gas emissions after the United States, which produced 5.95 gigatons, and China, which reached 5.06 gigatons. In the same year, Indonesia became the 10th largest cement producer in the world, producing 37 million tons of cement per year, in which the cement industry is the largest source of greenhouse gas emissions from the industrial sub-sector. This condition is due to the process production of cement produces greenhouse gas

emissions from two sources, namely the utilization of energy and calcination process (RAN-GRK Academic Paper, 2010). The results of the calculation of the national greenhouse gas inventory in 2016 showed that greenhouse gas emissions reached 1,514,949.8 GgCO2e.

This calculation indicates an increase of 507,219 GgCO2e compared to 2000. It increases by 2.9% per year during 2000-2016. As the commitment of Indonesia to reducing its greenhouse gas emissions globally, Indonesia ratified the Paris Agreement with the ratification of Law Number 16 in 2016 on the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change on October 25, 2016. Indonesia has set a Nationally Determined Contribution (NDC) with the target of reducing emission at 29% by 2030, which will be done without international assistance, and by 41% with international help (Ministry of Environment and Forestry, 2017). The government can also introduce carbon regulation as a commitment to reduce greenhouse gas emissions as mandated in the Kyoto Protocol. The regulation of carbon intended is carbon taxes in Australia, carbon trading schemes in the EU, or the management of energy in Indonesia (Rokhmawati, Sathye, and Sathye, 2015).

Other commitments can be discovered in Law No. 6 / 1994, where Indonesia ratified the climate change convention. UU no. 17 / 2004, in which Indonesia ratified the Kyoto Protocol, which contains an agreement on reducing greenhouse gases on a global scale. UU no. 31 of 2009 concerning environmental protection and management. Presidential Regulation No. 71 of 2011 concerning the inventory for National greenhouse gases and Presidential Regulation No. 61 of 2011 concerning RAN-GRK (Mayndra, 2017). The plan revealed that the manufacturing industry is one of the contributors to greenhouse gas emissions. Therefore, it is expected that the industry can reduce greenhouse gas emissions as the realization of social responsibility. One of the ways that can be taken is to include the disclosure of greenhouse gas emissions in the company's annual report or sustainability report. A company's disclosure on greenhouse gas emissions can be considered as a signal of the company's seriousness in dealing with the issue of global warming due to the effects of greenhouse gases.

As also regulated in Law No. 40 of 2007 Article 66c and The Circular of OJK No. 30 / SEOJK.04 / 2016 requires public companies to report their social and environmental responsibility activities in the annual report. However, many companies have not disclosed their environmental-responsibility, including their released greenhouse gas emissions. That is due to the disclosure of greenhouse gas emissions in Indonesia is still voluntary. Hence, not all companies disclose this information in their report (Majid and Ghozali, 2015). Although the disclosure of greenhouse gas emissions in Indonesia is voluntary, it should be done by the companies. Particularly those that are intensive greenhouse gas emissions should pay more attention to this regard. In the last few years, the environmental conditions have deteriorated significantly, and society requires better environmental-conditions (Suhardi, 2015).

Companies that disclose greenhouse gas emissions will get benefits such as: gaining legitimacy from stakeholders, enhancing the company's image. Companies that produce greenhouse gases can avoid threats such as the increase of operating costs, reduced demand, reputational risk, legal proceedings, and fines and penalties (Berthelot and Robert, 2011). This research aims to examine and find out the empirical evidence of the factors that affect the disclosure of greenhouse gas emissions. The factors tested in this research include industry type, company size, profitability, and leverage.

## LITERATURE REVIEW AND THE DEVELOPMENT OF HYPOTHESES

The legitimacy theory explains that the activities carried out by an entity/institution are part of an effort that is supported by the pressure of the surrounding normative environment. Branco and Rodrigues (2006) and Syairozi (2019) asserted that this theory confirms the existence of a "social contract" between a company and society. This confirmation is because the company carries out operational activities and uses economic

resources and the role of the society, which enables a company to maintain its existence. The society also has the right to the fulfilment of its expectations while a business is operating.

Stakeholder theory points out that a company must provide benefits for its stakeholders (shareholders, creditors, consumers, suppliers, governments, societies, and other parties) not only for its interests. Thus, the support of stakeholders to the company affects the existence of the company. It implies that all stakeholders have the right to gain information about company activities that can affect their decision making. Organizational management is expected to carry out the activities and report them to the stakeholder (Ulum, 2017).

**The Effect of Industry Type on The Disclosure of Greenhouse Gas Emissions**

The legitimacy theory argues that society will give tremendous pressure on the group of greenhouse gas-intensive companies because the group is considered more polluting the environment. Thereby, the companies that have a significant detrimental impact on the environment will be more likely to expose a higher risk compared to less-polluting industries that have little effect on the environment. If the companies comply with environmental regulations, they will get legitimacy from the people. This explanation is in line with the research of Brammer and Pavelin (2006), which reveals that companies engaged in the processing of steel, natural resources, pulp and paper, power generation, water, and chemical have a much greater responsibility for the issues of the environment. Hence, the disclosure is undertaken by the intensive greenhouse gas company, also, to be a form of corporate responsibility. It will also assist the company to gain legitimacy from the community. The positive results are also shown in research conducted by Choi et al. (2013), Jannah and Muid (2014), Prafitri and Zulaikha (2016), Suhardi and Purwanto (2015) concluded that the type of industry has a positive and significant effect on the disclosure of greenhouse gas emissions. Regarding this discussion, a hypothesis can be drawn as follows:

H1: The type of industry has a positive effect on the disclosure of greenhouse gas emissions.

**The Effect of Company Size on The Disclosure of Greenhouse Gas Emissions**

The legitimacy theory reveals that the activities of large companies will attract the interest of the media, government, and people. Their environmental impact on the environment is assessed as greater than in small companies. Thus, the pressure of the companies from the stakeholders is greater than smaller companies (Brammer and Pavelin, 2006; Luo et al., 2013; Prado-Lorenzo et al., 2009). Therefore, to gain legitimacy from society, large companies are more responsive to the demand for environmental disclosure. The stakeholders require large companies to disclose their activities to reduce greenhouse gas emissions than small companies. According to Galani, Alexandridis, and Stavropoulos (2011), larger companies have sufficient resources to pay the costs of reducing GHG emissions and report the information to the people in the annual reports. Besides, large companies carry out greater operational activities and also have a large impact on the environment. As a result, it leads to greater oversight of society (Prado-Lorenzo et al., 2009; Stanny and Ely, 2008). The positive result is also shown by the research conducted by Prado-Lorenzo et al. (2009), Pradini and Kiswara (2013), Jannah and Muid (2014), Suhardi and Purwanto (2015), Majid and Ghozali (2015), Prafitri and Zulaikha (2016) ), Deantari et al. (2019) who point out that company size has a positive relationship with the disclosure of greenhouse gas emissions. Based on this discussion, a hypothesis can be drawn as follows.

H2: The company size has a positive effect on the disclosure of greenhouse gas emissions.

### The Effect of Company Size on The Disclosure of Greenhouse Gas Emissions

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H2: The company size has a positive effect on the disclosure of greenhouse gas emissions.

### The Effect of Leverage on The Disclosure of Greenhouse Gas Emissions

The legitimacy theory declares that people generally pressure companies to pay attention to environmental issues. This pressure will be more quickly responded to by the companies which have high profits because they have many resources. Accordingly, such companies tend to carry out strategies and environmental disclosures. If the company can generate high profits, the company will be able to fund the additional resources to improve its environmental performance and to disclose environmental information. Environmental disclosure can make it easier for companies to gain legitimacy from people. Thus, it can be concluded that there is a positive effect between profitability and the disclosure of greenhouse gas emissions. This argument is supported by the results of an analysis of 64 studies conducted from 1978 to 2008. In the studies, the results were 55% positive, 15% negative, and the remaining 30% did not affect (Irwhantoko & Basuki, 2016). This result is supported by research conducted by Hannah and Muid (2014), Luo et al. (2013), Majid and Ghozali (2015), Suhardi and Purwanto (2015). Jannah and Muid (2014) state that companies with high profits tend to disclose their produced greenhouse gas emission. Based on the argumentation, can be drawn a hypothesis as follows:

H3: Profitability has a positive effect on the disclosure of greenhouse gas emissions.

### The Effect of Leverage on The Disclosure of Greenhouse Gas Emissions

Stakeholder theory expresses that one of the stakeholders, namely creditors, tends to pressure the company to prioritize its performance, especially its sustainability of the company's operation. The higher leverage of the company leads to the higher the company's obligations to creditors. Hence, it is difficult for companies with enormous leverage to avoid disclosure of greenhouse gas emissions. When the company avoids disclosing its policy, it will be called as no transparency of information. So then, the

investors and creditors will have difficulty to evaluate the company's performance. It will lead to the delay of creditors to provide funding to the company. Rankin, Windsor, and Wahyuni (2011) found that the leverage of a company has a positive relationship with the credibility of GHG emission disclosure. The higher the leverage of the company, the greater the power of creditors to pressure the company. The expectation of creditors on the company's environmental performance also increases. It is due to the environmental performance will have an impact on the sustainability of the company operation. This circumstance emerges the company to disclose its GHG emissions. The research conducted by Irwhantoko and Basuki (2016) and Majid and Ghozali (2015) discovered that leverage effects on the disclosure of greenhouse gas emissions. Based on the argumentation, a hypothesis can be developed as follows:

H4: Leverage has a positive effect on the disclosure of greenhouse gas emissions.

## RESEARCH METHOD

This research was conducted on the Indonesia Stock Exchange (IDX). The data used in this research were the secondary data obtained from financial reports, annual reports, and company sustainability reports. The reports were published on the IDX website.

The population in this research was the manufacturing companies listed on the Indonesia Stock Exchange in 2018, numbering at 166 companies. This study used purposive sampling in that the total companies included as the samples were 131 manufacturing companies. The criteria for choosing the samples as follows:

a. Manufacturing companies listed on the IDX in 2018.
b. It publishes the annual report and or sustainability report in 2018.
c. company disclose its greenhouse gas emissions.

Table 1. Operational Definition of the Research Variable

| No | Variable | Definition and Formula | Researcher |
|---|---|---|---|
| 1. | Greenhouse Gas Emissions Disclosure | Greenhouse Gas Emissions Disclosure<br>Environmental disclosure is part of additional reports stated in PSAK No.1 (Revised 2009) paragraph twelve (Kelvin et al., 2017)<br>The formula is as follows:<br>$(\Sigma di/M)$ x 100%<br>Information:<br>$\Sigma di$ : Total company score (1 item is worth 0-3)<br>M : Maximum total score (54) | Choi et al. (2013) |
| 2. | Type of Industry | Industrial clusters are divided into two categories, namely the greenhouse gas-intensive industries and non-intensive industries in producing greenhouse gas emissions (Suhardi, 2015)<br><br>GICS classifications use dummy variable<br>0 = non-intensive greenhouse gases<br>1 = greenhouse gas intensive | Suhardi & Purwanto (2015) |
| 3. | Firm Size | The size of a company can be seen from the total assets and total sales (Fatkhudin, 2017)<br><br>The formula is: Natural logarithm of total assets | Stanny & Ely (2008) |
| 4. | Profitability | The company's ability to generate profits in a certain period (Majidah, 2019)<br>The formula is as follows:<br>$$\frac{Profit}{Total\ Assets}$$ | Jannah & Muid (2014) |
| 5. | Leverage | The use of assets/funds by companies that cause perfume costs intending to load potent shareholders profits (Majid, 2015)<br>The formula is as follows:<br>$$\frac{Total\ Amoun\ of\ Debt}{Total\ Assets}$$ | Majid & Ghozali (2015) |

**Method of Analysis**

To test the hypothesis, we used multiple linear regression analysis. The regression model is as follow:

$$GE\_Disc = \alpha + \beta_1 Type + \beta_2 Size + \beta_3 Prof + \beta_4 Lev + e$$

Information:

GE_Disc : Greenhouse Gas Emissions Disclosure
$\alpha$ : Constants
$\beta_1 - \beta_4$ : Regression coefficient
Type : Type of Industry
Size : Firm Size
Prof : Profitability
Lev : Leverage
e : Error

**FINDING**

Table 2. Descriptive Statistical Data

| | Type of Industry | Firm Size | Profitability | Leverage | GHG Emissions Disclosure |
|---|---|---|---|---|---|
| N | 131 | 131 | 131 | 131 | 131 |
| Min | 0.00 | 25.31 | -39.18 | 2.08 | .62 |
| Max | 1.00 | 33.47 | 47.40 | 6.14 | 4.17 |
| Mean | - | 28.6434 | 4.0934 | 3.7398 | 2.0509 |
| Std. Deviation | - | 1.53888 | 9.47266 | .64710 | .95997 |
| Skewness | - | .612 | .586 | -.111 | .024 |
| Kurtosis | - | .236 | 7.874 | 1.112 | -.604 |
| Mean of Industry | | | | | |
| Basic Industry and chemicals | - | 28.79 | 3.04 | 49.64 | 13.21 |
| Miscellaneous Industry | - | 28.49 | 2.04 | 71.41 | 9.63 |
| Consumer Goods Industry | - | 28.54 | 7.99 | 9.63 | 12.70 |

**Variable Description**

The disclosure of greenhouse gas emissions has a minimum value of 0.62; it indicates that the companies with the least disclosure of greenhouse gas emissions are 27 companies. Moreover, a maximum value of 4.17 indicates that most companies in exposing the greenhouse gas emissions, namely PT. Indocement Tunggal Prakarsa Tbk. (INTP). The disclosure of the most massive greenhouse gas emissions is carried out by the primary & chemical industry (13.21), which is a company that is intensive in producing greenhouse gases and followed by the consumer goods industry (12.70). The disclosure of the smallest greenhouse gas emissions is undertaken by the various industries (9.63). The standard deviation of 0.95997, which is lower than the mean value of 2.0509, it implies that the value of greenhouse gas emission disclosure in the company that the researcher observed, it has a low deviation. So that the data is appropriate to represent all data. The skewness value for the disclosure of greenhouse gas emissions is 0.024, which means the data is not distributed symmetrically because the curve tends to lean to the right. The value of kurtosis for the disclosure of greenhouse gas emissions is -0.604, which implies that the data distribution has a flat peak or has a platinum distribution.

6

The Industry type has a minimum value of 0 which indicates that the companies are classified as the non-intensive industry of greenhouse gas. The company is a manufacturing company of various industries, it consists of 35 companies, and the consumer goods industry consists of 35 companies. Furthermore, the maximum value of one indicates that the companies are classified as the intensive industry of greenhouse gas. The company is a manufacturing company of primary and chemical industries with totalling of 61 companies.

The size of the company has a minimum value of 25.31 (natural logarithm) which shows the company that has the smallest size, namely PT. Primarindo Asia Infrastructure Tbk (BIMA) from the various industries. Moreover, a maximum value of 33.47, which points out the company that has the largest size, namely PT. Astra International Tbk (ASII) from various industries. Industries in manufacturing companies in 2018 have almost the same size, namely primary and chemical industries by 28.79, various industries by 28.49, and the consumer goods industry by 28.54. The standard deviation of 1.53888, which is lower than the mean value of 28.6434, it implies that the value of company size data in the company that observed, it has a low deviation. So, the data is appropriate to represent all data. The skewness value for company size is 0.612, which means that the data are not distributed symmetrically because the curves tend to lean to the right. The value of kurtosis for company size is 0.236, which implies that the data distribution has a flat peak or has a platinum distribution.

Profitability has a minimum value of -39.18, which points out the company that produces the smallest profit, namely PT. Panasia Indo Resources Tbk (HDTX) from various industries. Furthermore, the maximum value of 47.40, which indicates the company that produces the most astounding profit, namely PT. Unilever Indonesia Tbk (UNVR) from the consumer goods industry. The company with high profitability also indicates that the company can manage its resources effectively and efficiently. The highest profitability is undertaken by the consumer goods industry (7.99), which is a non-intensive company of greenhouse gas. The smallest profitability is conducted by various industries (2.04) and primary & chemical industries (3.04), which are the intensive company of greenhouse gas-intensive. The standard deviation of 9,47266, which is higher than the mean value of 4.0934, it indicates that the value of profitability data in the company that observed, it has a high deviation. So the data is not appropriate to represent all data. The skewness value for profitability is 0.586, which implies that the data are not distributed symmetrically due to the curves tend to lean to the right. The value of kurtosis for profitability is 7,874, which implies that the data distribution has a high peak (more pointed) or it has a leptokurtic distribution.

Leverage has a minimum value of 2.08, which proves that the company that has low debt, namely PT. Inti Agri Resources Tbk (IIKP) from the consumer goods industry. The low ratio points out that the company has excellent capability to fulfil its obligations when they have been a due date. Furthermore, the maximum value of 6.14, which shows that company that has high debt, namely PT. Asia Pacific Fibers Tbk (POLY) from various industries. Various industries carry out tremendous leverage with an average value of 71.41, which is a non-intensive company of greenhouse gas that discloses low greenhouse gas emissions. The smallest leverage is undertaken by the consumer goods industry (37.09) and the primary & chemical industry (49.64), which are the company with the disclosure of the high greenhouse gas emissions. The standard deviation of 0.64710, which is lower than the mean value of 3.7398, it means that the value of leverage data in the company that observed, it has a low deviation. The skewness value for leverage is -0.111, which implies that the data are not distributed symmetrically due to the curves tend to lean to the left. The value of kurtosis for leverage is 1,112, which means that the data distribution has a flat peak or has a platinum distribution.

Table 3. Classical Assumption Test Data

| Test Assumption | GHG Emissions Disclosure (Y) | Results |
|---|---|---|
| Normality Test<br>Kolmogorov-Smirnov Z<br>Asymp. Sig. (2-tailed) | <br>.776<br>.584 | Asymp. Sig. (2-tailed) 0.584 > 0.05, which means the residual data are normal distribution. |
| Autocorrelation<br>Durbin-Watson | <br>2.096 | DL value is 1.6363, and DU is 1.7945 so that dU < DW < 4 - dU or 1.7945 < 2.096 < (4 - 1.7945) which means residual data is random and no autocorrelation occurs. |
| Heteroscedasticity<br>Type of Industry<br>Firm Size<br>Profitability<br>Leverage | <br>-.498 (.620)<br>.299 (.766)<br>1.003 (.318)<br>-.196 (.845) | Sig value greater than 0.05 concerning absolute residuals, meaning that the residual variance from observation to other observations is constant and heteroscedasticity does not occur. |
| Multicollinearity<br>Tolerance<br>Type of Industry<br>Firm Size<br>Profitability<br>Leverage<br>VIF<br>Type of Industry<br>Firm Size<br>Profitability<br>Leverage | <br><br>.972<br>.879<br>.824<br>.926<br><br>1.029<br>1.138<br>1.214<br>1.080 | Tolerance > 0.10 and VIF < 10, which means that the independent variables do not correlate with each other and do not occur multicollinearity. |

Table 4. The Goodness of Fit Data

| The Goodness of Fit Test | GHG Emissions Disclosure (Y) | Results |
|---|---|---|
| Determinant Coefficient (R2)<br>R Square | <br>.429 | The variation of the independent variables used in the model can explain that 42.9% of the dependent variable variation, while the remaining 57.1% is influenced or explained by other variables not included in this study. |
| Simultaneous Test (F Test)<br>F<br>Sig. | <br>23.657<br>.000b | df1 = k - 1 = 4 and df2 = n - k = 126, then Ftable is 2.44. Fcount is 23,657 so Fcount > Ftable with a significance of F 0,000 < 0.05. The meaning is that the independent variable has a significant simultaneous effect on the disclosure variable of greenhouse gas emissions. |

Table 5. Hypothesis Test Result

| Variable | Unstandardized Coefficients (β) | t | Sign (α=5%) |
|---|---|---|---|
| (Constant) | -8.540 | -6.638 | .000 |
| Type of Industry | .113 | .860 | .392 |
| Firm Size | .376 | 8.400 | .000 |
| Profitability | .011 | 1.476 | .142 |
| Leverage | -.077 | -.740 | .461 |

From Table 5, the results of hypothesis testing can be concluded that the company size factor produces a positive and significant effect. In contrast, the other factors, namely industry type, profitability and leverage, do not show a significant effect. Moreover, the mathematical equation is as follows:

GE_Disc = -8.540 + 0.113Type + 0.376Size + 0.011Prof - 0.077Lev

Partial testing is undertaken by comparing the value of t-count with t-table. To find out t-table, we used the terms of the df = n - k, (α) of 5% (an error rate of 5% or 0.05) or a confidence rate of 95% or 0.95. Df = 131 - 5 = 126 then the t-table is 1,657.

**DISCUSSION**

**The Industry Type has a Positive Effect on The Disclosure of Greenhouse Gas Emissions**

Dealing with the results of the t-test for the variable of Industry Type (X1) on the Disclosure of Greenhouse Gas Emissions (Y), the value of t-count is 0.860 and t-table is 1.657, then t-count is 0.860 <t table 1.657 with a significance of 0.392 > 0.05. This number indicates that partially the Industrial Type does not significantly affect on the Disclosure of Greenhouse Gas Emissions. The coefficient value of beta (β) type of industry has a positive number (+). This number indicates the direct relationship, and it implies that the more intensive the company in producing greenhouse gas emissions, it will increase the disclosure of greenhouse gas emissions conducted. It is in line with the theory of legitimacy which asserts that the society will give tremendous pressure on the greenhouse gas-intensive group of companies because the intensive group of greenhouse gas is considered to be more polluting the environment. Thus, it must reveal more total greenhouse gas emissions. A descriptive statistic in this research indicates that the most massive greenhouse gas emissions are disclosed by the primary & chemical industry. However, the number of greenhouse gas-intensive companies is less than non-greenhouse gas-intensive companies. This issue supports the results of research in which the industry type does not affect significantly on the disclosure of greenhouse gas emissions. The results of this research also do not support the theory of legitimacy.

The results of this research are supported by the results of previous studies from Pradini and Kiswara (2013). They found out that there is a high difference level in the disclosure of greenhouse gas emissions in the company of Indonesia. This disparity caused by the disclosure type of greenhouse gas emissions in Indonesia is still voluntary. Thus, the more intensive a company in producing greenhouse gas emissions, it is not a factor that leads to the companies conduct the voluntary disclosures about greenhouse gas emissions.

The results of this research assumed that it is unable to prove that the industry type effects on the disclosure of greenhouse gas emissions. In this research, both companies that are greenhouse gas-intensive and companies that are not greenhouse gas-intensive, both of them disclose the greenhouse gas emissions widely, and some disclose a small amount of greenhouse gas emissions. It implies that companies that are non-intensive in producing greenhouse gas emissions have the potential to carry out the disclosure of greenhouse gas emissions voluntarily. This result because the environmental factors are also essential things to be considered besides the economic and social factors. This result is in line with the change in the concept of the triple bottom line. The measurement of the business performance is to pay attention to the measurement of economic performance in the form of profitability, the measurement of social concern and the size environmental performance in the form of environmental preservation. Hence, the industry-type does not affect the disclosure of greenhouse gas emissions to a manufacturing company in Indonesia.

**The Size of Company has a Positive Effect on The Disclosure of Greenhouse Gas Emissions.**

According to the result of the t-test for the Size of Company variable (X2) on the Disclosure of Greenhouse Gas Emissions (Y), the value of t-count is 8,400, and the t-table is 1,657, then the t-count is 8,400> the t-table is 1,657 with a significance of 0,000 <0.05. It means that the Company Size partially has a positive and significant effect on the Disclosure of Greenhouse Gas Emission. The coefficient value of beta (β) of company size has a positive number (+). This number indicates the direction of a unidirectional relationship. It indicates that the larger the size of the company will increase the disclosure

of greenhouse gas emissions. This result is in line with the theory of legitimacy which argues that the activities of large companies will be more visible to the media, government, and society and the environmental impact is more remarkable than small companies so that the pressure that arises is greater than the small companies (Brammer and Pavelin, 2006; Luo et al., 2013; Prado-Lorenzo et al., 2009). Descriptive statistics point out that the industries in the manufacturing companies that observed, it has company size that tends to be the same. The most extensive disclosure of the greenhouse gas emissions is carried out by the primary & chemical industries, which are also the industries of the largest size manufacturing companies. The bigger the company, the more resources are owned by the company. This situation enables the company to develop a strategy for reducing greenhouse gas emissions, and it can report it in an annual report and sustainability report. This issue supports the results of research in which the company size effects significantly on the disclosure of greenhouse gas emissions.

The results of this research are supported by research by Deantari et al. (2019), Suhardi & Purwanto (2015) and Jannah & Muid (2014) that the tremendous pressure will lead to the large companies are more sensitive to environmental issues. Thus, they tend to increase responsiveness to the environment and provide voluntary quality disclosure to gain legitimacy. Rankin et al. (2011) assert that large companies are more open to society and governmental supervision so that tremendous pressure will encourage voluntary disclosure. Also, greenhouse gas emissions from large company operations will be more numerous. Therefore the large companies must minimize greenhouse gas emissions through a strategy of operating activities that can reduce or absorb greenhouse gas emissions. To achieve in this regard, companies need a lot of available resources. The large companies will be better able to allocate company resources to reduce greenhouse gas emissions and then reveal them in an annual report or company sustainability report (Pradini & Kiswara, 2013).

The results of this research seem to be able to prove that company size will affect the disclosure of greenhouse gas emissions. In this research, the companies that have large total assets tend to reveal more comprehensive about the disclosures of its greenhouse gas emissions. This comprehensiveness is caused by the availability of resources owned by the company. Also, this research proves that the average companies with have large total assets are companies that have an enormous impact on the environment. Thus, it is associated with the theory of legitimacy; the large companies are more likely to be broader in exposing its environment to gain legitimacy from the society. Thus, the size of the company has a positive effect on the disclosure of greenhouse gas emissions in manufacturing companies in Indonesia.

**The Profitability has a Positive Effect on the Disclosure of Greenhouse Gas Emissions.**

Based on the results of the t-test for the variable Profitability (X3) on the Disclosure of Greenhouse Gas Emissions (Y), the value of t-count is 1.476, and the t-table is 1.657. T-count is 1.476 <t table 1.657 with a significance of 0.142> 0.05. This number means that partially profitability does not affect significantly on the Disclosure of Greenhouse Gas Emissions. The coefficient value of beta (β) profitability has a positive number (+). This number indicates the direction of a unidirectional relationship. It shows that the higher the profitability of the company, it will increase the disclosure of greenhouse gas emissions undertaken. This result is in line with the theory of legitimacy, which points out that society always gives pressure on the company so that the company is more concerned with environmental issues. Companies with high profitability will more easily answer this pressure due to the companies with high profitability have high resources that can be used to carry out environmental strategies and disclosures compared to companies with low profitability. Descriptive statistics indicate that the greatest disclosure of greenhouse gas emissions is carried out by basic & chemical industries that have low profitability. In this

regard supports the results of research in which the profitability does not affect significantly on the disclosure of greenhouse gas emissions.

The insignificant effect of profitability on the disclosure of carbon emissions is caused by the irrelevance between the costs and disclosure costs. Irwhantoko (2016) argues that more extensive disclosure of carbon emissions requires supervision and higher costs. If the increase in the costs of reducing GHG emissions is not balanced with an increase in profitability, then what is the benefit provided in it for the disclosure. If the disclosure of greenhouse gas emissions by a company makes it difficult for investors and interested parties to understand the information contained therein, this is meaningless disclosure. In contrast, firms with high profitability tend to carry out a Clean Development Mechanism (CDM) project. These practices make sense when it is compared to the extent of disclosure. A higher profitable company can reduce emissions through the CDM project. Such a company gets income from sales by adopting a carbon emissions reduction certification. Meanwhile, the disclosure of greenhouse gas emissions will be more readily understood by investors and parties related to emission reduction projects due to the disclosure is part of the company's process for obtaining income of CER.

The results of this research seem unable to prove that profitability effects on the disclosure of greenhouse gas emissions, in this research, not all of the companies that have high profitability disclose greenhouse gas emissions broadly. This condition is due to by considering environmental disclosure; companies can interfere with information about the company's success in terms of their finances. Even in this research, the companies with low profitability and even negative ones have conducted more comprehensive disclosures, namely PT. Holcim Indonesia Tbk (SMCB). The reason is that companies with low profitability take advantage of the disclosure of greenhouse gas emissions for legitimate purposes. Then the profitability of companies does not affect the disclosure of greenhouse gas emissions in manufacturing companies in Indonesia.

**Leverage has a Positive Effect on the Disclosure of Greenhouse Gas Emissions.**

Regarding with results of the t-test for the variable Leverage (X4) on the Disclosure of Greenhouse Gas Emissions (Y), the value of t-count is -0.740 and t-table is 1.657, then t-count -0.740 <t table 1.657 with a significance of 0.461> 0.05. This number means that partially leverage does not affect significantly on the Disclosure of Greenhouse Gas Emissions. The coefficient value of beta ($\beta$) leverage is negative (-). The negative sign indicates the direction of the inverse relationship. It implies that the higher the leverage of the company, it will reduce the level of disclosure of greenhouse gas emissions. This result is not in line with stakeholder theory which states that one of the stakeholders (creditors) tends to pressure the company to prioritize the company's performance, especially in terms of the environment for the sustainability of the company's operations. So then it is difficult for companies with enormous leverage to avoid disclosure of greenhouse gas emissions. Descriptive statistics point out that most companies that reveal the greenhouse gas emissions with low leverage, namely the primary & chemical industry and the consumer goods industry. Companies with high leverage tend to withhold disclosure of greenhouse gas emissions. This issue supports the results of research in which the leverage does not affect significantly on the disclosure of greenhouse gas emissions. Moreover, the relationship between leverage and the disclosure of greenhouse gas emissions occurs negatively or inversely proportional. The results of this result are not also in line with the stakeholder theory.

Pradini and Kiswara (2013) assert that companies with high financial risk, it will increase agency costs to avoid conflict. As a result, companies will be careful in conducting the disclosure of greenhouse gas emissions. The disclosure will occur in companies that can build a company's reputation. If disclosure leads to the risk on the company's reputation, then the disclosure will be avoided. Disclosure error on companies with high leverage will weaken stakeholder confidence. Furthermore, the disclosure of greenhouse gas emissions requires costs in implementing strategies to reduce emissions and conduct

environmental disclosure. Thus, the disclosure of greenhouse gas emissions will be avoided by companies with high financial risks.

The results of this research do not appear to be able to prove that leverage will affect the disclosure of greenhouse gas emissions. In this research, the most extensive companies in revealing the greenhouse gas emissions are companies with low leverage. Even in this research, the company with the highest level of leverage only conducts a complete disclosure of about 1-2 scores on a 54 score scale. This figure means that the disclosure undertaken is very little. The explanation is due to the excessive use of debt will increase agency costs to avoid conflicts. Hence, the company will be careful in making disclosures. It is due to the disclosure errors on companies with high leverage will weaken stakeholder confidence.

**CONCLUSION**

This research aims to analyse the factors that influence the disclosure of greenhouse gas emissions in manufacturing companies listed on the Indonesia Stock Exchange in 2018. The factors examined in this research are related to their effects on disclosure of greenhouse gas emissions, namely industry type, company size, profitability and leverage, which then becomes an independent variable in this research. Based on the results of the regression test shows that the factor of company size produces a positive and significant effect. In contrast, other factors, namely industry type, profitability and leverage, do not show a significant effect.

This research has a limitation that can be taken into consideration for the following researcher. First, environmental disclosure is based on data in an annual report and sustainability report so that the sample of the research has low generalizability. As a result, the extent of disclosure undertaken by the sample is also low. Secondly, in assessing the extent of disclosure of greenhouse gas emissions, we adopted the disclosure index from the research by Choi et al. (2013). They measure the comprehensive disclosure of Australia's company. We used the measurement by adjusting with the condition in Indonesia and the presence of the researcher's subjectivity influence in assessing the comprehensive disclosure of the greenhouse gas emission. This reason is because of the different point of view in assessing the disclosure itself.

By the existence of this limitation, it is expected that future research can fix this research limitation. First, using company sample that has conducted Clean Development Scheme (CDM) or can compare the company that has conducted Clean Development Scheme (CDM) with the one that does not, or by using the sample which establishes completely sustainable report. Because therefore, the information of comprehensive disclosure of greenhouse gas emission is also high, and the sample does not have high generalization skill. Second, using the disclosure index of greenhouse gas emission that is under the condition in Indonesia such as disclosure index which refers to ISO 14064-1 because it is Indonesian National Standard (SNI) already arranged for the report and displacement of greenhouse gas emission. Next is a practical suggestion for the company. Most of the companies use the Global Reporting Initiative (GRI) for arranging the annual report. However, the usage of GRI as the guide causing the disclosure of carbon is relatively small. As mentioned by Rankin et al. (2011), standard GRI does not focus on the information disclosure of GHG. Until for the company which reduces the gas emission is better to use standard ISO 14064-1 Greenhouse gases which is the standard that provides the information related the credibility, measurement, monitoring, and more detail greenhouse gas report.

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