

М.Б. ТРАЯНСАХ*

Університет Шривіджая, м. Палембанг, Індонезія

М. АДАМ**

Університет Шривіджая, м. Палембанг, Індонезія

Т. ВАХИЙДІ***

Університет Шривіджая, м. Палембанг, Індонезія

Розкриття інформації про викиди вуглецю промисловими компаніями Індонезії

В Індонезії уряд мотивує суб'єктів господарювання спільно зменшувати викиди парникових газів шляхом розкриття інформації про викиди вуглецю. У зв'язку з тим, що таке розкриття проводиться на добровільних засадах, не всі компанії розкривають цю інформацію у своїх звітах. Метою даної статті є оцінка впливу таких факторів як розмір компанії, прибутковість, зростання компанії, комітети з охорони навколишнього середовища та гендерна розмаїття на розкриття інформації про викиди вуглецю промисловими компаніями в Індонезії. Для проведення дослідження автори відібрали 16 промислових компаній, акції яких котувалися на Індонезійській фондовій біржі у 2014-2018 роках. Діяльність цих компаній є предметом дослідження. З метою оцінки ступеня розкриття інформації про викиди вуглецю було розроблено контрольний перелік показників на основі таблиці вимірювань, яка запропонована Проектом розкриття вуглецю (Carbon Disclosure Project). Проект розкриття вуглецю – організація, що базується у Великобританії та підтримує компанії та міста у питанні розкриття інформації про вплив великих корпорацій на довкілля. Головна ідея проекту – екологічна звітність та управління ризиками повинні стати нормою бізнесу, щоб забезпечити стійкий розвиток економіки. Результати дослідження свідчать, що розмір компанії впливає на рівень розкриття інформації про викиди вуглецю. Чим більша компанія, тим більше уваги суспільства та уряду викликає її діяльність, а це спонукає компанію розкривати інформацію про викиди вуглецю. В той же час, такі фактори як прибутковість, зростання компанії, комітет з охорони навколишнього середовища та гендерне розмаїття не впливають на розкриття інформації про викиди вуглецю. Виявлено, що рівень розкриття інформації про викиди вуглецю серед промислових компаній в Індонезії є дуже низьким, а тому уряду і суспільству необхідно вживати заходів щодо підвищення відповідальності бізнесу за забруднення навколишнього середовища.

Ключові слова: викиди вуглецю, розмір компанії, прибутковість, зростання компанії, комітет з охорони навколишнього середовища, гендерне розмаїття.

DOI [https://doi.org/10.33146/2307-9878-2020-3\(89\)-148-154](https://doi.org/10.33146/2307-9878-2020-3(89)-148-154)

M.B. TRIANSYAH

Sriwijaya University, Palembang, Indonesia

M. ADAM

Sriwijaya University, Palembang, Indonesia

T. WAHYUDI

Sriwijaya University, Palembang, Indonesia

Carbon Emission Disclosure in Indonesia's Manufacturing Companies

In Indonesia, the government invites business actors to jointly reduce greenhouse gas emissions through disclosure of carbon emissions. Disclosure of carbon emissions in Indonesia is still voluntary (voluntary disclosure), so not all companies disclose this information in their reports. The purpose of this article is to assess the impact of factors such

* Траянсах Мухаммед Баю (TRIANSYAH Muhammad Bayu), аспірант факультету економіки Університету Шривіджая (м. Палембанг, Індонезія). ORCID 0000-0001-8932-1588

** Адам Мохамед (ADAM Mohamad), викладач факультету економіки Університету Шривіджая (м. Палембанг, Індонезія), професор. ORCID 0000-0001-5516-5345

*** ВАХИЙДІ Тертіарто (WAHYUDI Tertiarto), викладач факультету економіки Університету Шривіджая (м. Палембанг, Індонезія), доктор економічних наук. ORCID 0000-0003-4056-5105

as company size, profitability, company growth, environmental committees, and gender diversity on carbon emission disclosure by Indonesia's manufacturing companies. For the study, the authors selected 16 manufacturing companies listed on the Indonesia Stock Exchange in 2014-2018. The activities of these companies are the subject of study. To measure the extent of the carbon emission disclosure, a checklist is developed based on the measurement sheet provided by the Carbon Disclosure Project (CDP). The CDP is an organisation based in the United Kingdom which supports companies and cities to disclose the environmental impact of major corporations. The main idea of the project is that environmental reporting and risk management should become a business norm in order to ensure sustainable development of the economy. The study results show that company size has an effect on the level of carbon emission disclosure. The bigger is the company – the greater is the pressure that results from its economic activities. Therefore, the government and the public pay more attention to such business entities. It prompts the company to disclose its carbon emissions. At the same time, such factors as profitability, company growth, environmental committee and gender diversity do not affect on carbon emission disclosure. It was found that the level of carbon emission disclosure among Indonesia's manufacturing companies is very low, and therefore the government and society need to take measures to increase the responsibility of business entities for environmental pollution.

Keywords: carbon emission, company size, profitability, company growth, environment committee, gender diversity.

Introduction

Greenhouse gas emissions / carbon emissions can be interpreted as a disruption to the earth's climate system caused by increased emissions from the burning of fossil fuels since the beginning of the industrial revolution together with other emissions of greenhouse gases into the atmosphere (Solomon et al, 2007). According to Suparmoko (2010), in the first Intergovernmental Panel on Climate Change (IPCC) in 1990, the results of research showed climate change as a threat to the lives of all humanity. This means the IPCC is calling for the importance of a global agreement to tackle climate change.

To prevent greater economic losses, the UNFCCC established an international amendment known as the Kyoto Protocol that was formed in Kyoto, Japan in 1997. The Kyoto Protocol requires countries that are members of the Annex 1 country to reduce greenhouse gas emissions due to the industrial revolution since the industrial revolution in 1850 the use of fossil fuels was considered a cause of world climate change (United Nation, 1998).

The aim of the Kyoto Protocol is to reduce the average emissions of six greenhouse gases, namely CO₂, methane, nitrous oxide, sulfur hexafluoride, HFC and PFC. The target of reducing carbon emissions for each country that follows the protocol is a reduction of 6% for the European Union, 7% for the United States, 6% for Japan and Russia, 8% for Australia and 10% for Iceland (Freedman & Jaggi, 2005).

Ratification of Presidential Regulation Number 61 of 2011 in relation to the National Action Plan to reduce greenhouse gas emissions (RAN-GRK) regulates efforts to reduce greenhouse gas emissions in the agriculture, forestry and peat land sectors, energy and transportation, industry, waste treatment and activities other supporters. Based on Article 4 of Presidential Regulation No. 61 of 2011, the RAN-GRK becomes a reference for the community and businesses in the planning and implementation of reducing greenhouse gas emissions. It means that the government invites business actors to jointly reduce greenhouse gas emissions through disclosure of carbon emissions (Carbon Emission Disclosure).

Disclosure of carbon emissions in Indonesia is still voluntary (voluntary disclosure), so not all companies disclose this information in their reports. This phenomenon causes the factors that influence the disclosure of carbon emissions are very interesting to study. In business design and practice, it is necessary to synergize the three basic pillars, namely company profit (profit), environment (planet), and society (people) known as Triple Bottom Line (Elkington, 1997).

Research results related to the disclosure of carbon emissions, such as the research of Ghomi & Leung (2013), Choi, Lee, & Psaros (2013), Freedman & Jaggi (2005), and Luo, Tang, & Lan (2013), concluded the relationship between company size and disclosure of greenhouse gas emissions in the financial statements. The bigger is the company – the greater is the pressure that results from its economic activities, including community pressure.

Research conducted by Jannah & Muid (2014) concluded that there is a positive correlation between company performance as measured by ROA and disclosure of carbon emissions. The company realizes that the profits generated by the company are not only for the benefit of investors, but also for the community. Improved company performance must pay attention to operational performance first.

According to Luo, Tang, & Lan (2013), the company's performance has no effect on the disclosure of carbon emissions due to irrelevant costs and benefits, so the company decided to postpone the disclosure. Companies with limited resources are more conservative in applying policies, especially on costs, so that high debt and interest burdens cause companies not to disclose carbon emissions (Jannah & Muid, 2014).

Companies that are experiencing growth periods describe the availability of resources and will usually be more conservative in utilizing the resources they have. Companies use more focused resources on improving operational performance in order to achieve profits. So companies that are still in a period of growth tend to be more concerned with achieving business expansion (Luo, Tang, & Lan, 2013).

Choi, Lee, & Psaros (2013), Freedman & Jaggi (2005), and Jannah & Muid (2014) said after ratifying the

Kyoto Protocol, the high level of carbon emissions produced by the incentive industry began to gradually decrease. The seriousness of reducing carbon emissions is to gain legitimacy from the social environment, especially for companies with cross-country market share (Stanny & Elly, 2008).

Efforts to reduce carbon emissions can be done through the use of new machines with environmentally friendly technology (Ghomi & Leung, 2013). The strong drive to reduce together is reflected in emissions trading. Specifically, countries with strict environmental regulations, and supported by a legal system with strong investor protection such as common law (Luo, Tang, & Lang, 2013).

According to Choi, Lee, & Psaros (2013), the quality of good corporate governance is the key to disclosure of carbon emissions. Corporate governance, including the organizational structure, serves as a determinant and controller for annual report disclosures. The composition of share ownership also controls the company's policies.

The company's business prospects get attention for the policy chosen. Developed and developing countries have different business prospects. Research by Luo, Tang, & Lang (2013) concludes that companies operating in developing countries still pay less attention to environmental issues. The company considers that achieving economic growth is more important than additional disclosures that will add to the company's burden.

The Environmental Committee suggests that companies pay attention to environmental protection and try to improve their environmental reputation through long-term strategies as goals (Yunus, Elijido-Ten, & Abhayawansa, 2016). The Environmental Committee is a committee that has the role of providing consideration regarding efforts to prevent the impact of matters relating to environmental issues, as well as the maintenance of social relations by developing communication in the community (Berthelot & Roberts, 2011; Rankin, Windsor, & Wahyuni, 2011) and concluding research an influence on the disclosure of carbon emissions.

This research is a development of research conducted by Choi, Lee, & Psaros (2013). The difference from this research lies in several points. First, the research sample used in the study Choi, Lee, & Psaros (2013), are 100 large companies listed on the Australian Stock Exchange. While this research focuses on manufacturing companies listed on the Indonesia Stock Exchange (BEI) in 2014-2018. Researchers want to obtain and know the factors that influence Indonesian manufacturing companies in expressing carbon emissions.

The second point, the research period used Choi, Lee, & Psaros (2013), for 3 periods, namely from 2006 to 2008. The reason for choosing the year (2014 – 2018) to find out whether manufacturing companies in Indonesia really paid attention to environmental problems related to the disclosure of carbon emissions, especially since Indonesia ratified the Kyoto Protocol the second period, namely 2014.

The third point, the variables used Choi, Lee, & Psaros (2013), using variable company size, profitability, carbon emission levels, industry type and quality of corporate governance. While this study uses variables of company size, profitability, company growth, environmental committee and gender diversity. The addition of independent variable is company growth. Indonesia is a developing country and its industry needs business expansion.

A board that has a variety of genders and has many female directors, shows the female gender stereotype is more empathetic towards the issue of CSR. A board that has a higher ratio of female directors has characteristics and behavior related to women leaders. MPs with diverse genders are more responsive to help in bad situations and are increasingly empathetic and helpful. A board that has a diverse gender is more empathetic (Hogg, 2001).

The phenomenon of global warming and the risk of climate change are recognized internationally as a significant problem for companies. Issues that have developed lately regarding global warming are also related to the activities of companies, especially manufacturing companies. In the Handbook of Indonesia's Energy Economy Statistics (Jalal, 2007) it can be seen that the top three of the three hundred causes of carbon emissions are contributed by companies, namely industry (manufacturing), power generation, and transportation. In line with the phenomenon of global warming, manufacturing companies have a significant role in contributing carbon emissions every year. The remnants of carbon released into the air freely can accelerate global warming, disrupt the earth's climate and damage the world's ecosystems.

Theoretical Framework

Legitimacy Theory

The legitimacy theory is more focused on interactions between companies and public. The company try to create harmony between social values that are part of business operations with standards of behavior that already exist in social system, which is a part of the system. If the system works in harmony, then the legitimacy of the company is created (Dowling & Pfeffer, 1975). In the legitimacy context, the company organization is required to report the environmental performance and social environmental identification (Berthelot & Robert, 2011).

Companies disclose carbon management in annual reports, sustainability reports and websites (Kiliç & Kuzey, 2011). Disclosure is considered as a medium to restore, enhance and maintain the legitimacy they have received. When legitimacy from the community and stakeholders is obtained, companies can continue to operate as a business entity by applying norms and values of the local community and the surrounding environment.

Firm Size

The size of the company is how companies are valued in terms of their total assets, sales, profits, and tax expenses, Brigham & Houston (2010). The criteria for

Economics & Management

company size are the assets of a company. The calculation formula is as follows:

$$= \frac{\text{Total assets}}{\text{Logarithm of Natural Assets of company } j \text{ in year } t}$$

Profitability

Profitability is information related to financial performance, Choi, Lee, & Psaros (2013). Profitability is measured by Return on Assets (ROA). The calculation formula is as follows:

$$ROA = \frac{\text{Profit } jt}{\text{Total Asset } jt}$$

Company Growth

Company growth is the level of company's development measured by comparing the amount of profit for the year with the profit of four years ago minus one Irwhantoko & Basuki (2016). The calculation formula is as follows:

$$\text{Growth} = \frac{\text{current year profit } jt}{\text{Profit } j \text{ in 4 year period} - 1}$$

Environmental Committee

The environmental committee can increase employee awareness of the environmental aspects of work and their responsibilities to reduce negative impacts, Liao, Luo, & Tang (2014). In this study, the environmental committee is measured using dummy data; if the company has an environmental committee will be given a number 1, and if the company does not have an environmental committee, 0 will be given.

Gender Diversity

Board diversity's divided into two main groups; structural diversity and demographic diversity, Hafsi & Turgut (2013). Structural diversity includes the size of the management board (number of directors in the company), director independence, director's share ownership, and the duality of board leadership. On the other hand, demographic diversity also includes gender, ethnic director, age and experience of directors. The calculation formula is as follows:

$$\text{Gender} = \text{Female direction porporson in a company}$$

Carbon Emission Disclosure

The calculation of the carbon emission disclosure index is conducted with the following steps:

1. Giving a score on each disclosure item with a dichotomous scale
2. The company score will be 18 if the company discloses all items
3. The scores of the company are then summed:

$$\text{Carbon Emission Disclosure} = \frac{\text{the number of items disclosed}}{18} \times 100\%$$

Hypothesis

- H₁: Company size influences on carbon emission disclosure.
 H₂: Profitability (ROA) has no influence on carbon emission disclosure.
 H₃: Company growth has no influence on carbon emission disclosure.
 H₄: The Environmental Committee has no influence on carbon emission disclosure.
 H₅: Gender diversity has no influence on carbon emission disclosure.

Methodology

The samples in this study are 16 manufacturing companies listed on the Indonesia Stock Exchange in 2014-2018. To measure the extent of the carbon emission disclosure, a checklist is developed based on the measurement sheet provided by the Carbon Disclosure Project (CDP). We chose the samples based on following criteria:

1. Manufacturing companies that have been listed on Indonesia Stock Exchange from 2014 to 2018.
2. Manufacturing companies that published annual reports or sustainability reports from 2014 to 2018.
3. Manufacturing companies that continuously used Rupiah currency during the study period from 2014 to 2018.
4. Manufacturing companies that explicitly disclosed carbon emission (cover at least one policy related to carbon emission disclosure item).

Data analysis techniques used in this study began by presenting the multiple regression model used in this study. Multiple regression analysis is used to determine the effect of company size, profitability, company growth, environmental committees, and gender diversity on carbon emission disclosure in Indonesia's manufacturing companies. The regression model in this study is as follows:

$$CED = \alpha + \beta_1 \text{SIZE}_{it} + \beta_2 \text{PRO}_{it} + \beta_3 \text{GROWTH}_{it} + \beta_4 \text{ENVCOM}_{it} + \beta_5 \text{GEND}_{it} + e$$

Note:

CED	Carbon Emission Disclosure
α	constant
$\beta_1 - \beta_5$	Regression Coefficient
i	i entity
t	t period
SIZE	Company Size
PRO	Profitability
GROWTH	Company Growth

ENVCOM	Environment Committee
GEND	Gender Diversity
e	Error Term, the difference in the actual outcome variables and the outcome variables predicted in this study

Results and Discussion

The fixed effect model is properly applied. The Panel data regression results can be seen in Table 1.

Table 1

Panel Data Regression Results

Variable	Coefficient	Std. Error	t-Statistics	Prob.
C	-7.120198	1.877461	-3.792460	0.0004
SIZE	0.24910	0.063359	3.931712	0.0002
PRO	-0.070857	0.27929	-0.253698	0.8006
GROWTH	-0.001297	0.001573	-0.824860	0.4128
ENVICOM	-0.003396	0.057797	-0.058759	0.9533
GEND	0.368146	0.257395	1.430277	0.1579
R-squared		Mean dependent var	0.297222	
Adjusted R-squared		SD dependent var	0.270307	
SE of regression		Akaike info criterion	-2.140556	
Sum squared resid		Schwarz criterion	-1.515274	
Log likelihood		Hannan-Quinn criter.	-1.889862	
F-statistics		Durbin-Watson stat	1.675889	
Prob (F-statistic)		0.000000		

Based on table 1 above, the result of panel data regression equation is as follows:

$$CED = -7.120198 + 0.249109 (SIZE_{it}) + 0.070857 (PRO_{it}) - 0.001297 (GROWTH_{it}) - 0.003396 (ENVICOM_{it}) + 0.368146 (GEND_{it}) + e$$

Based on the results of processing data, the obtained value of Probability (F-Statistic) is 0.000000 which indicates that the independent variables jointly affect the dependent variable. R² value of 0.943554 or 94% means that Company Size, Profitability (ROA) of Company Growth (Growth), Environmental Committee, and Gender Diversity variables are able to explain the diversity of carbon emissions disclosure variables.

Based on the test results, t value obtained by the statistical t value is 3.931712 while the probability is 0.0002 or < 0.05 ($\alpha = 5\%$). It depicts that company size has an influence on carbon emission disclosure. The results of this study support the results of research by Freedman & Jaggi (2005).

This research is in line with the legitimacy theory in which the company try to create harmony between social values that are part of business operations with the standards of behavior that already exist in the social system. If the system works in harmony, then the legitimacy of the company is created. This disclosure is considered as media to maintain the company legitimacy.

Based on the test results, the t-statistic value is -0.253698 while the probability is 0.8006 or > 0.05 ($\alpha = 5\%$). It shows that profitability has no influence on the disclosure of carbon emission. The results of this study do not support research conducted by Jannah & Muid (2014), however this study is in line with the research carried out Luo, Tang, & Lan (2013). The difference of this study results compared to

the research conducted by Jannah & Muid (2014) can be due to the nature of the sample used and the year or period of the study conducted.

The results of the study are not in line with the theory of legitimacy. Legitimacy theory is used to explain the motivation of voluntary environmental disclosure done by companies, Ahmad & Hossain (2015). Legitimacy theory is a theory that underlies an entity to disclose social and environmental accountability reports voluntarily (Deegan, 2002). According to Friedman (1970), companies do not solely put concern on profit yet also get involved in social responsibility.

Based on the test results, the t-statistic obtained value is -0.82486 and the probability is 0.4128 or > 0.05 ($\alpha = 0.05$). It indicates that the company's growth has no influence on carbon emission disclosure. This study does not support research conducted by Luo, Tang, & Lan (2013) due to the nature of the sample used. In the study of Luo, Tang, & Lan (2013), the company growth influence the decision on carbon emission disclosure.

The results of the study are not in line with legitimacy theory, Legitimacy theory is used to explain the motivation of voluntary environmental disclosure by companies Ahmad & Hossain (2015). Legitimacy theory is a theory that underlies an entity to disclose social and environmental accountability reports voluntarily (Deegan, 2002). According to Friedman (1970), companies are not

only concerned with profit, but also by taking social responsibility.

Based on the test results, obtained t statistic value is -0.058759 while the probability is 0.9533 or > 0.05 ($\alpha = 0.05$). It depicts that the environmental committee has no influence on carbon emission disclosure. This study does not support research by United Nations (1998). Greenhouse gas disclosure and transparency of greenhouse gas disclosure are positively related to the existence of an environmental committee on the board of directors and sustainable cooperation director officials (CSOs). In line with the theory of legitimacy, the existence of an environmental committee shows how proactive the company is in regard to the environmental issues Liao, Luo, & Tang (2014).

This research is also not in line with the legitimacy theory. The companies that have environmental committees are expected to be able to disclose emission openly, and to give more credibility in showing their commitment to climate change voluntarily (Ashforth & Gibbs, 1990). The company may divert resources into the other environmentally-based forms resource by bringing up and overcoming society's environmental and social issues to maintain good corporate image.

Based on the obtained t value with 1.430277 and the probability at 0.1579 or > 0.05 ($\alpha = 0.05$). It indicates that gender diversity has no influence on carbon emission disclosure. The results of the study do not support research conducted (Ben-Amar, Chang, & McIlkenny, 2015). In that research, women are able to facilitate more informed decisions and bring different perspective to the board compared to all male directors. The results of research conducted by Bear, Rahman, & Post (2010), Hollindale et al (2016), Kiliç & Kuzey (2019), and Liao, Luo, & Tang (2014) stated that the proportion of women in the board of directors had positive impact on carbon emission disclosure.

The results of the study are not in line with the legitimacy theory. Legitimacy is a resource, on which an organization depends on survival, Dowling & Pfeffer (1975). When there is a difference between the values adopted by the company and the values of society, then the legitimacy of the company will be in a threatened position. The company should be able to convince stakeholders that the activities that the company carries out are in line with stakeholder expectations relating to emissions to gain legitimacy and maintain social contracts.

Conclusion

Based on the analysis and test on the effect of company size, profitability, company growth, environmental committees, and gender diversity on carbon emission disclosure in manufacturing companies in Indonesia, it can be concluded that:

1. The company size has influence on carbon emission disclosure.
2. Profitability (ROA) has no influence on carbon emission disclosure.
3. Company growth (growth) has no influence on carbon emission disclosure.

4. The Environmental Committee has no influence on carbon emission disclosure.

5. Gender diversity has no influence on carbon emission disclosure.

For further research, we suggest to have more independent variables such as ISO, company competition, market share, foreign ownership and other factors that can affect carbon emission disclosures in Indonesia. We suggest the next researcher to increase the number of company samples and lengthen the observation period.

4 References

- Ahmad, N. N. N. & Hossain D. M. (2015). Climate Change and Global Warming Discourses and Disclosures in the Corporate Annual Reports: A Study on the Malaysian Companies. *Procedia – Social and Behavioral Sciences*, 172, 246-253.
- Ashforth, B. E. & Gibbs B. W. (1990). The Double-Edge of Organizational Legitimation. *Organization Science*, 1 (2), 177-194.
- Bear, S., Rahman N. & Post, C. (2010). The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation. *Journal of Business Ethics*, 97: 207–221. DOI 10.1007/s10551-010-0505-2
- Ben-Amar, W., Chang, M. & McIlkenny, P. (2015). Board Gender Diversity and Corporate Response to Sustainability Initiatives: Evidence from the Carbon Disclosure Project. *Journal of Business Ethics*. <https://doi.org/10.1007/s10551-015-2759-1>
- Berthelot, S. & Robert, A. M. (2011). Climate change disclosures: An examination of Canadian oil and gas firms. *Issues in Social and Environmental Accounting*, 5 (1), 106-123.
- Borghesi, Z., Leung, P. & Guthrie, J. (2018). Does Voluntary Greenhouse Gas Emissions Disclosure Reduce Information Asymmetry? Australian Evidence. *Afro-Asian J. Finance and Accounting*, 8(2), 123–147.
- Brigham, E. F. & Houston J. F. (2010). *Fundamentals of Financial Management*. Cincinnati: Thomson South Western.
- Choi, B. B., Lee, D. & Psaros, J. (2013). An Analysis of Australian Company Carbon Emission Disclosures. *Pacific Accounting Review*, 25(1), 5879. <https://doi.org/10.1108/01140581311318968>
- Deegan, C. (2002). The Legitimizing Effect of Social and Environmental Disclosures, Theoretical Foundation. *Accounting, Auditing and Accountability Journal*, Vol. XV, No. 3.
- Dowling, J. & Pfeffer, J. (1975). Organizational Legitimacy: Social Values and Organizational Behavior. *The Pacific Sociological Review*, 18(1), 122–136.
- Elkington, J. (1997). *Cannibal with Forks, the Triple Bottom Line of Twentieth Century Business*, Capstone Publishing Ltd, London.
- Freedman, M. & Jaggi, B. (2005). Global Warming, Commitment to the Kyoto Protocol, and Accounting Disclosures by the Largest Global Public Firms from Polluting Industries. *The International Journal of Accounting*, Vol. 40, No. 3, pp. 215-232.

- Friedman, M. (1970). *The Social Responsibility of Business Is to Increase Its Profits*. New York: The New York Time Magazine.
- Ghomi, Z. B. & Leung, P. (2013). An Empirical Analysis of the Determinants of Greenhouse Gas Voluntary Disclosure in Australia. *Accounting and Finance Research*, 2 (1), 110-127.
- Hafsi, T. & Turgut, G. (2013). Boardroom Diversity and its Effect on Social Performance: Conceptualization and Empirical Evidence. *Journal of Business Ethics*, 112(3), 463-479.
- Hogg, M. A. (2001). A social identity theory of leadership. *Personality and Social Psychology Review*, 5(3), 184-200.
- Hollindale, J., Kent, P., Routledge, J. & Chapple, L. (2016). Women on boards and greenhouse gas emission Disclosures. *Accounting & Finance*. [https://doi: 10.1111/acfi.12258](https://doi.org/10.1111/acfi.12258)
- Irwhantoko, Basuki. (2016). Carbon Emission Disclosure: Studi pada Perusahaan Manufaktur Indonesia. *Jurnal Akuntansi dan Keuangan*, 18 (2), 92-104. <https://DOI: 10.9744/jak.18.2.92-104>
- Jalal. (2007). *Handbook of Indonesia's Energy Economy Statistics: Isu Pemanasan Global dalam CSR, Transparency International Indonesia*. Jakarta: Kementerian Energi dan Sumber Daya Mineral Republik Indonesia.
- Jannah, R. & Muid, D. (2014). Analisis Faktor-Faktor yang Mempengaruhi Carbon Emissions Disclosure pada Perusahaan yang Terdaftar di Bursa Efek Indonesia Periode 2010-2012. *Journal of Accounting*, 3(2), 1-11.
- Kiliç, M. & Kuzey, C. (2019). The Effect of Corporate Governance on Carbon Emission Disclosures Evidence from Turkey. *International Journal of Climate Change Strategies and Management*, 11 (1), 35-53.
- <https://DOI 10.1108/IJCCSM-07-2017-0144>
- Liao, L., Luo, L. & Tang, Q. (2014). Gender Diversity, Board Independence, Environmental Committee and Greenhouse Gas Disclosure. *The British Accounting Review*, 1-16.
- Luo, L., Tang, Q. & Lan, Y. C. (2013). Comparison of Propensity for Carbon Disclosure between Developing and Developed Countries. *Accounting Research Journal*, 26(1), 6-34. <https://doi.org/dx.doi.org/10.1108/ARJ-04-2012-0024>
- Rankin, M., Windsor, C. & Wahyuni, D. (2011). An Investigation of Voluntary Corporate Greenhouse Gas Emissions Reporting in a Market Governance System Australian Evidence. *Accounting, Auditing & Accountability Journal*, 24 (8), 1037-1070. <https://DOI 10.1108/09513571111184751>
- Solomon, S. D., Qin, M., Manning, Z., Chen, M., Marquis, K. B., Averyt, M. T. & Miller, H. L. (2007). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. New York: Cambridge University Press, 966.
- Suparmoko. (2010). *Ekonomi Sumber Daya Alam dan Lingkungan*. Yogyakarta: BPEF.
- Stanny, E. & Ely, K. (2008). Corporate Environmental Disclosures about the Effects of Climate Change. *Corporate Social Responsibility and Environmental Management*, 15, 338-348.
- United Nations. (1998). *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. <http://www.idx.co.id>
- Yunus, S., Eljido-Ten, E. & Abhayawansa, S. (2016). Determinants of Carbon Management Strategy Adoption. *Managerial Auditing Journal*, 31(2), 156-179.