

A Comparative Analysis of Sustainable Development Goals Supports in the Mining, Oil and Gas Industries in Indonesia and Malaysia through Carbon Emissions Disclosures

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Abstract

This research objective was to reveal the level of disclosures of carbon emissions in Indonesia and Malaysia and compare the two in the mining sector, including oil and gas. In measuring the level of emission disclosure, this research used disclosure indicators derived from the Sustainability Standards Boards (SASB), Global Reporting Initiative (GRI), and Emission Information Disclosure (EID) obtained from other scientific literature used by Nurdiauwansyah et al. (2018). The sample population consisted of mining sector companies, including oil and gas listed on the Indonesia Stock Exchange (IDX) for Indonesian companies and Malaysian companies listed on the Malaysia Stock Exchange. It was found that the disclosure of carbon emissions through the disclosure of the SASB indicators did not have a significant difference. In contrast, the disclosure with GRI and EID had a significant difference. Therefore, it can be concluded that, in general, the disclosure of carbon emissions in Indonesia and Malaysia had a significant difference.

Keywords: carbon emission, emission, disclosure, Sustainable Development Goals

Date of Submission: 10-04-2022

Date of Acceptance: 27-04-2022

I. Introduction

Carbon emissions have become a severe threat to the world. The release of significant emissions into the air space makes the natural environment unstable and dangerous for nature and living things. Climate change, extreme weather, global warming, and air pollution are serious problems caused by carbon emissions. On January 11, 2022, (World Economic Forum, 2022) released the Global Risks Report 2022. The report presented the principal risks facing the world in the coming year, which showed that the five leading global risks in 2022 are environmental risks, three social risks, one concerning economics, and another one on geopolitics with failures in action to prevent climate change and extreme weather. It is undoubtedly a focus that needs to be addressed immediately. Then, concerning the issue of climate change, the problems that occur are certainly not free from human activities, especially the incessant industrialization carried out and the lack of human awareness of efforts to mitigate carbon emissions.

Industrial activities mainly cause this carbon emission. One of these industries is mining, including oil and gas. It was found that the cause of the emissions is the burning activity of fossil fuels such as coal and oil, and gas (Latif et al., 2021; Thess et al., 2020). Many countries contribute enormous carbon emissions, including China, United States of America, India, Russia, Japan, Iran and Indonesia (Statista, 2020). In addition, based on the ASEAN State of Climate Change Report (ASCCR) in 2021, it was revealed that the largest producers of CO₂ emissions from fuel combustion in ASEAN were Indonesia, Thailand, Malaysia, Vietnam and the Philippines. On the other hand, the holding of COP26 emphasized that countries in the world should work together to reduce emissions so that the global warming limit remains at 1.5°C (UK COP 26, 2021).

In responding to the handling and reduction of emissions, the Indonesia Government, through the Financial Services Authority (OJK), issued Regulation of the Financial Services Authority (POJK) No. 51/POJK.03/2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies. The Government also provides sustainability reporting guidelines for Issuers and Public Companies. In addition to Indonesia, Malaysia in 2006 through Bursa Malaysia also introduced a requirement for issuers listed on the Bursa Malaysia to provide information on Corporate Social Responsibility or "CSR" practices in the company's annual report (Bursa Malaysia, 2018). Then, to pursue further sustainability, including discussing emission reporting, Bursa Malaysia provided a Sustainability Reporting Guide released in 2015 and the second edition in 2018. Therefore, companies were encouraged to take action and publish

sustainability reports to demonstrate their commitment to achieving carbon emission reductions and supporting the Sustainable Development Goals (SDGs) No. 13 Addressing Climate Change to help countries reduce emissions.

This research is vital to measure the extent to which the mining sector, including oil and gas in Indonesia or Malaysia, supported the Government's efforts to realize the 13th SDG.

II. Literature Review

2.1 Stakeholder Theory

Stakeholders are individuals or groups with particular interests or claims related to company business and operational activities (Bello & Abu, 2021). They have a close relationship with the survival and development of the company (Gao et al., 2021). Stakeholders appear in many roles, including internal stakeholders (top management team, shareholders, investors, and employees) and external stakeholders (consumers, communities, citizens, policymakers, and the environmental community) (Ågerfalk et al., 2021; Mia et al., 2021; Shah et al., 2020).

On the other hand, stakeholder theory has a meaning, which discusses alternative ways to understand how companies and related people or stakeholders create value for each other (Freeman et al., 2018). The value is to create sustainable profits and minimize risk for potential impacts that can occur at any time, such as climate change, for each party, both the Company (internal stakeholder) and other stakeholders (external stakeholder). By understanding the value or achievement to be achieved, of course, it is known that stakeholders cannot be separated from sustainability because the value to be realized is in line with the sustainability term. It is confirmed by Freeman et al. (2021) who reveal that "sustainability" is a crucial element in stakeholder theory.

Furthermore, related to sustainability, the United Nations Brundtland Commission in 1987 defined it as "meeting the needs of the present without compromising the ability of future generations to meet their own needs and utilities". Thus, this research correlated that what was meant by sustainability was about responding to and handling sustainability issues that focused on climate change. Future generations can still enjoy a decent life because the earth is preserved and sustainable.

Meanwhile, those who have an awareness role in responding to and handling sustainability issues, such as climate change, are stakeholders, with the top management team having an essential role in making the strategy (Mia et al., 2021; Shah et al., 2020). Then, it is confirmed by the statement of Attanasio et al. (2021), which reveals that the literature argues that stakeholders can help respond to sustainability issues. Therefore, it can be concluded that all issues regarding sustainability, including the climate change issue, are essential concerns for stakeholders. In addition, to realize that climate change management can be achieved, all stakeholders in a company equally benefit or achieve what they want. Therefore, successful (practical and oriented) stakeholder involvement is critical to achieving SDGs (Jun & Kim, 2021).

Stakeholder theory was applied in this research to explain the disclosure of carbon emissions, both in Indonesia and Malaysia, whether the disclosure of carbon emissions was indeed related to the existence of regulations (pressure from local governments) or from other stakeholders such as investors. Thus, stakeholder theory is used to discuss the results of disclosing carbon emissions.

2.2 Sustainable Development Goals

The Sustainable Development Goals (SDGs) are global and national commitments to make ambitious changes regarding people, planet, and prosperity that seek to change the world by 2030 with 17 goal points, including the 13th point on Handling Climate Change (Ministry of National Development Planning/Bappenas Indonesia, 2020). To realize the SDGs, especially in this research, which was about the 13th SDGs, the state did not seek it alone but was assisted by companies in its country. It agrees with the statement of Izzo et al. (2020), which revealed that the role of companies in dealing with SDGs was significant: According to Ban Ki-moon, a Secretary-General of the United Nations, companies are essential partners in achieving SDGs because the public sector itself cannot successfully overcome this challenge.

In helping countries achieve the SDGs in 2030, companies need to think about the implications of the effects on business strategy and financial performance of an SDG that they want to support and show the company's thoughts on why the supported SDG is relevant to their business. It indeed can be done by looking at the current scenario and future (GRI et al., 2021). Therefore, it can be emphasized that not all (seventeen) SDGs are required to be supported by the Company, but those related to the company's business, both for now and with prospects for the future. Continuing the previous explanation, to achieve the SDGs target in 2030, the Company can report on the SDGs and achievements that are supported in a measurable, accountable, and assessable way, with adequate monitoring and assessment system (Heras-Saizarbitoria et al., 2021). These measurements can be reported periodically (annually) through financial or sustainability reports.

2.3 Carbon Emissions

Carbon emissions is a general term for greenhouse gas emissions, including those originating from a region, group, or organism that can be measured with carbon dioxide equivalents (Chi et al., 2021). With the increasing risk of climate change today, carbon emissions, which are one of the causes of climate change, are in the spotlight and public criticism, especially for companies that produce carbon emissions (Lee et al., 2021). This information and pressure motivate the company to respond and fulfill the Company's responsibilities (Tian et al., 2021).

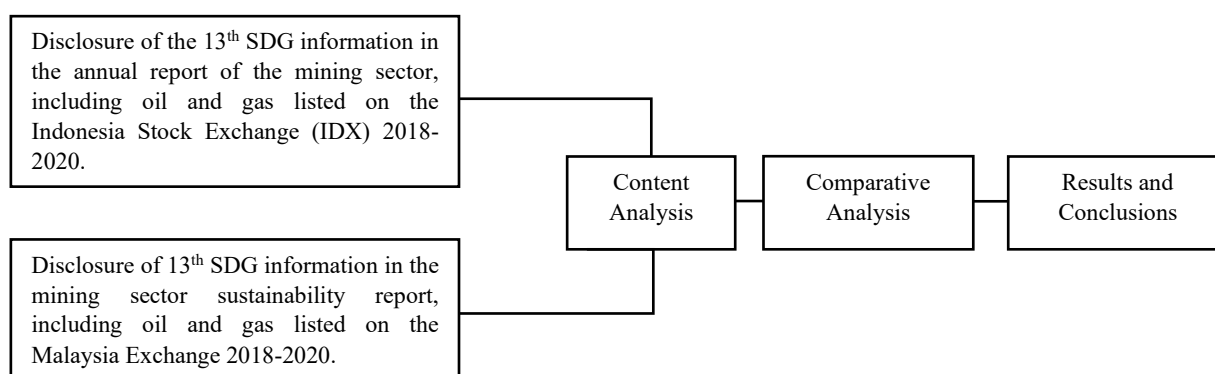
The Intergovernmental Panel on Climate Change (IPCC) has stated that emissions from fossil fuels are the leading cause of climate change (Client-Earth Communications, 2020). Meanwhile, the use of fossil fuels is closely related to the mining business sector, including oil and gas. Thus, this research analyzed the reporting of carbon emission disclosures in the mining sector, including oil and gas, by focusing on the countries of Indonesia and Malaysia, which have been the demands of both the Government and the world to measure the extent to which companies that produce carbon emissions also participate in handling carbon emissions. Furthermore, to find out the comparison of the disclosure of carbon emissions in the mining sector, including oil and gas in the two countries, the research hypothesis is as follows:

H₀: There was no difference between disclosure of mining sector carbon emissions, including oil and gas in Indonesia and Malaysia

2.4 Conceptual Framework

This conceptual framework describes the stages of testing carried out on the research. UK COP 26 (2021) reported that countries are asked to go forward with ambitious targets in reducing emissions by 2030, in line with achieving net-zero emissions by the middle of this century. Therefore, this research sought to disclose information regarding the support for the Sustainable Development Goals (SDGs), specifically focusing on the 13th point of SDGs for Handling Climate Change in mining sector companies, including oil and gas in Indonesia and Malaysia. Hence, in exploring this information, this research used annual report data and sustainability in the mining sector, including oil and gas in each country. Then, after the content analysis, this research revealed a comparative analysis and provided the results and conclusions.

Figure 2.1 Conceptual Framework



III. Research Method

To obtain empirical evidence related to the relative level of disclosure of carbon emissions in mining sector companies in Indonesia and Malaysia, the research design was a quantitative research approach. The research sample used a purposive sampling method with the company's criteria listed on the Indonesia Stock Exchange or the Malaysia Stock Exchange, with at least having consecutive annual reports in the 2018-2020 period. If the sample had a sustainability report, this report would also be analyzed and considered an integral part of the company's report that the public could access. According to SEOJK Number 16/SEOJK.04/2021, public companies in Indonesia can submit their sustainability reports in the annual report. Thus, both the annual report and the sustainability report can be considered as one unified report for the public that cannot be separated.

In measuring the level of disclosure of carbon emissions in each company, the research was conducted by analyzing data using indicators. The indicators used in this research were those from the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and other indicators derived from the

scientific literature used by [Nurdiawansyah et al. \(2018\)](#). In this research, it was called with Emission Information Disclosure (EID), with the indicators as follows:

Table 3.1 List of Carbon Emissions Disclosures

Carbon Emission Disclosure	No	Code	Indicator
SASB	1.	S-1	Discussion of long-term and short-term strategies or plans for managing Scope 1 emissions and performance analysis against these targets.
	2.	S-2	Discussion of strategies or plans to address risks, opportunities, and impacts related to air emissions.
GRI	3.	G-1	Direct (Scope 1) GHG emissions
	4.	G-2	Indirect (Scope 2) GHG energy emissions
	5.	G-3	Other indirect (Scope 3) GHG emissions
	6.	G-4	GHG emission intensity
	7.	G-5	GHG emission reduction
	8.	G-6	Emissions of ozone-depleting substances (ODS)
	9.	G-7	Nitrogen oxides (NOX), sulfur oxides (SOX), and other significant air emissions
EID	10.	E-1	Description of the methodology used to calculate GHG emissions (e.g., GHG or ISO protocol).
	11.	E-2	There was external verification of the amount of GHG emission by whom and on what basis.
	12.	E-3	Total greenhouse gas emissions (metric tons CO ₂ -e) produced.
	13.	E-4	Disclosure of GHG emissions by origin or source (e.g., coal, electricity, etc.).
	14.	E-5	Disclosure of GHG emissions by facility or segment level.
	15.	E-6	Comparison of GHG emissions with previous years.

The measurement of the carbon emission disclosure index was carried out with the following stages:

1. Giving a score for each disclosure based on the information in the annual and sustainability reports.
2. The maximum score in one disclosure was 3, and the lowest score was 0 ([Barnes et al., 2021](#)) so that if the company could disclose in its entirety, the total score obtained was 45. The conditions are as followings:

Table 3.2 Scoring Provisions Conditions

Score	Definition
0	Missing information
1	Low disclosure
2	Intermediate disclosure
3	Disclosure fulfilled

([Barnes et al., 2021](#))

3. The scores of each company were then added up, and to facilitate the reading of the values obtained by each company, the scale used was 0-100 with the following calculation method:

$$\text{Total CED} = \frac{\text{TS}}{45} \times 100$$

Description:

1. Carbon Emission Disclosure (CED) was the total score (value) after being scaled to 1-100;
2. TS: Total Score (scale 1-45).

The number 45 was obtained from the company's overall value if it explicitly disclosed carbon emissions. This value was obtained from three times the number of disclosures, namely 15, so 45 was obtained. Then, the results of the "Total CED" value were divided into three groupings of values based on value categorization ([Ettman et al., 2020](#)), namely:

- 0-33: Low disclosure rate;
- 34-66: Intermediate disclosure rate;
- 67-100: High disclosure rate.

IV. Results And Discussion

The research population was all companies in the mining sector, including oil and gas in Indonesia and Malaysia. Each company was listed on the Indonesia Stock Exchange (IDX) or the Malaysia Exchange with a minimum of consecutive annual reports from 2018 to 2020. The summary of sampling is described as follows:

Table 4.1 Sampling of the Mining Sector in Indonesia

No	Description	Total
1	Mining sector companies, including oil and gas listed on the Indonesia Stock Exchange (IDX), have presented annual and sustainability reports from 2018-2020.	47
2	Mining sector companies, including oil and gas, did not present complete annual reports for 2018, 2019, and 2020.	(4)
	Number of companies that can be analyzed in disclosing carbon emissions	43

Source: *Indonesia Stock Exchange (IDX) and data processed by the author*

In the explanation of the table above, it can be seen that the company data that can be analyzed in this research were 43 data in one period, so in the 2018-2020 period, the total data analyzed was 129 data (43 data in three years).

Table 4.2 Sampling of the Mining Sector in Malaysia

No	Description	Total
1	Mining sector companies, including oil and gas listed on Bursa Malaysia, have presented annual and sustainability reports from 2018-to 2020.	45
2	Mining sector companies, including oil and gas, did not present complete annual reports for 2018, 2019, and 2020.	(5)
	Number of companies that can be analyzed in disclosing carbon emissions	40

Source: *Bursa Malaysia and data processed by the author*

Based on the explanation in the table above, the number of companies that could be analyzed is not much different from that in Indonesia, namely in Malaysia, which was 40 data, so that in the 2018-2020 period, the total data analyzed was 120 data (40 data in three years). Overall, the total data were 249 data.

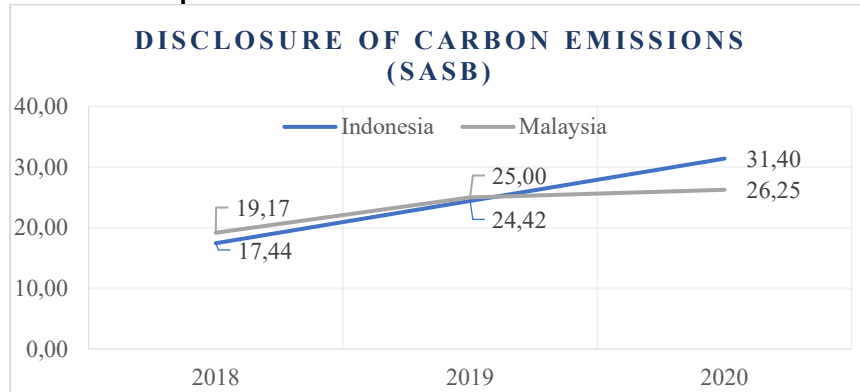
Table 4.3 Table of Independent Samples Test

TERM		Levene's Test for Equality of Variances		T-test for Equality of Means		
		F	Sig.	T	Df	Sig. (2-tailed)
SASB	Equal variances assumed	3.41	0.07	0.26	247.00	0.79
	Equal variances not assumed			0.26	246.36	0.79
GRI	Equal variances assumed	3.08	0.09	2.80	247.00	0.01
	Equal variances not assumed			2.84	218.59	0.01
EID	Equal variances assumed	2.72	0.11	2.46	247.00	0.02
	Equal variances not assumed			2.50	220.28	0.01
Total	Equal variances assumed	1.33	0.26	2.37	247.00	0.02
CED	Equal variances not assumed			2.41	223.58	0.02

Based on the picture above, the results show the disclosure indicators of carbon emissions in the mining sector, including oil and gas in Indonesia and Malaysia through SASB, GRI, EID, and the Total CED on Levene's test were 0.07, 0.09, 0.11, and 0.26. These numbers were more significant than 0.05 or $p \text{ sig.} > 0.05$, so the data was homogeneous. Otherwise, the data was non-homogeneous.

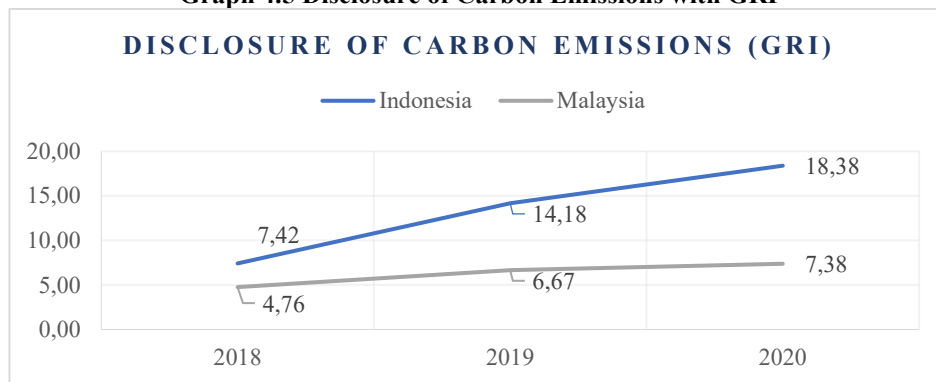
Then, because the data was homogeneous, the data taken in the significance test was data called "equal variances assumed" in each indicator. Therefore, it can be concluded that the different test results with the T -test indicated no significant difference between the SASB indicators because of $p \text{ sig.} > 0.05$. In contrast, the disclosure of carbon emissions, GRI, EID, and CED indicators had significant differences because of p was significant < 0.05 .

Graph 4.4 Disclosure of Carbon Emissions with SASB



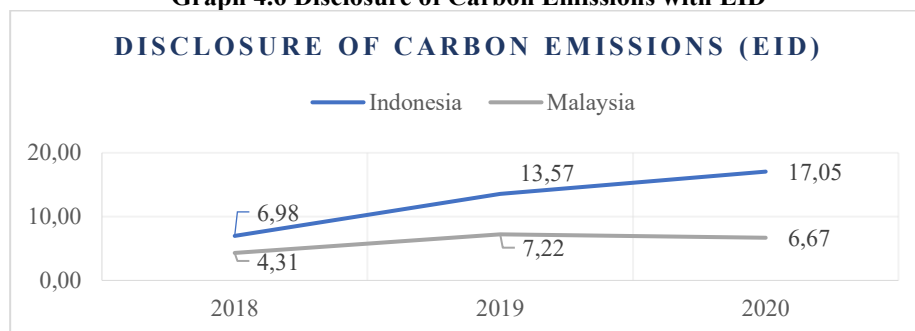
Based on the disclosure of carbon emissions using the SASB in graph 4.4 above, it can be seen that the mining sector in Indonesia has increased from 2018 to 2020. The same thing also happened in Malaysia. However, in 2019 towards 2020, the increase in carbon emission disclosures in Indonesia was higher than in Malaysia. The increase in Indonesia from 2019 to 2020 was 28.57%, while in the same year, Malaysia experienced an increase of 5.00%. In addition, the scores obtained by Indonesia and Malaysia were 31.40 and 26.25. This figure was still lower than the number 33, so it can be concluded that the level of the disclosure using the SASB was low.

Graph 4.5 Disclosure of Carbon Emissions with GRI

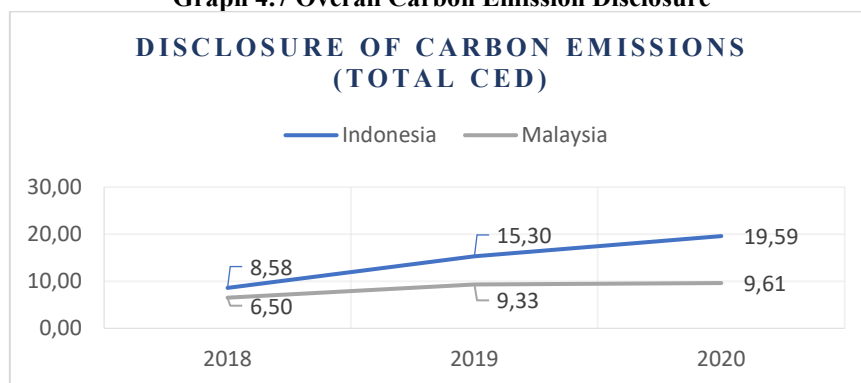


Based on graph 4.5 above, the disclosure of carbon emissions based on GRI, it was significant that the mining sector in Indonesia was superior in disclosing carbon emissions using GRI indicators than in Malaysia. Then, the scores obtained by Indonesia and Malaysia were 18.38 and 7.38. This figure was still lower than the number 33, so it can be concluded that the level of the disclosure using the GRI was low.

Graph 4.6 Disclosure of Carbon Emissions with EID



Furthermore, graph 4.6 was the disclosure of carbon emissions based on EID, it was clear that the mining sector in Indonesia was superior in disclosing carbon emissions using the EID indicator than in Malaysia. The scores obtained by Indonesia and Malaysia were 17.05 and 6.67, both of which were still low below 33, so disclosure using the EID indicator in both Indonesia and Malaysia was still low.

Graph 4.7 Overall Carbon Emission Disclosure

Based on the disclosure of carbon emissions in graph 4.7 as a whole (Total CED), which includes SASB, GRI, and EID, the mining sector in Indonesia had a higher disclosure value than in Malaysia. The scores of the two countries, namely Indonesia, were 19.59 and Malaysia 9.61. Both scores were still lower than 33, so the overall carbon emission disclosure using the SASB, GRI, and EID indicators were still relatively low.

There was no significant difference in the disclosure of carbon emissions in the mining sector, including oil and gas in Indonesia and Malaysia through the SASB because both Indonesia and Malaysia already have awareness, discussions, plans, or strategies regarding the disclosure of carbon emissions at least in scope one emission reporting so that both did not have a significant difference in value. However, based on the research conducted, there were still quite some companies that did not follow up on awareness of carbon emissions or the strategies that have been launched so that the disclosure of carbon emissions in the mining sector, including oil and gas, was still not optimal when assessed from the overall indicators of both SASB, GRI, and EID. In addition, it can be seen that the level of disclosure of carbon emissions in both Indonesia and Malaysia was still low, with Indonesia having a higher carbon emission disclosure value than Malaysia.

V. Conclusion

Based on the results of the analysis, testing, and discussion conducted in this research regarding the disclosure of carbon emissions in the mining sector, including oil and gas in Malaysia and Indonesia, which was intended as a form of support for the 13th SDG in Climate Change Management. It can be concluded that there were significant differences in the disclosure of emissions carbon with a value of Asymp. Sig. (2-tailed) was 0.02 ($0.02 < 0.05$), so H_0 was rejected.

In this research, there was an element of subjectivity in assessing the disclosure of carbon emissions contained in annual reports and sustainability reports based on four assessment categories, namely scores of 0, 1, 2, and 3. In addition, each sector was not seen in this research, in contrast, it was directly to the metal and energy sector (oil and gas) in Bursa Malaysia so there were still companies that might not be fully covered.

The study results could serve as an illustration and benchmark for companies in the mining sector, including oil and gas in Indonesia and Malaysia, regarding the extent to which they have contributed to supporting the 13th SDG in disclosing carbon emissions. Furthermore, in this study, it was seen that Indonesia was superior in disclosing carbon emissions than Malaysia. However, the value of both if taken on an average per country was still low, so both countries need to be more committed and show concrete evidence in disclosing carbon emissions. It, of course, must also be supported by stakeholders, especially the top management, to set strategies, take action, and carry out supervision.

It is expected that through this study, the Governments both in Indonesia and in Malaysia can continue to foster and direct mining sector companies, including oil and gas, to disclose carbon emissions and improve the quality of carbon emission disclosures through correct emission calculations and appropriate carbon emission reduction strategies. Then, together with government academics, they can also provide training on the implementation of carbon emission reduction strategies and training on calculating carbon emissions, both the intensity produced and the reduction as appropriate so that companies can maximize the 13th SDG through maximum carbon emission reductions. To encourage the companies to disclose carbon emissions, the Malaysian Government needs to require reporting on indicators of disclosure of carbon emissions, especially the oil and gas sector, which can be stated in a decree or law that is mandatory for companies listed on the Malaysian stock exchange. On the other hand, in Indonesia, the Government must continue to socialize the importance of this disclosure so that more companies are encouraged to disclose about carbon emissions and improve the quality of disclosure.

This research provides several suggestions for future research. First, the examination of sector can be broader so that generalizable can be further examined. Second, since the standard of carbon emission disclosure are getting

more available, the references and standards other than SASB, GRI, and EID, can be considered to be applied, such as TCFD and IPIECA. Finally, the climate changes issue continue to be a future trend, so further study may provide deeper discussion about initiatives from wider context of countries.

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