Carbon Emissions Accounting Disclosure: An Empirical Analysis during the Covid-19 Pandemic Period in a Developing Country

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ABSTRACT

Carbon emissions accounting disclosure (CEAD) is an interesting research area that is related to the increase in global warming that is being caused by the use of non-renewable energy. However, there has been no research that has tested the disclosure of carbon emissions during the COVID-19 pandemic using a comprehensive model. Apart from that, there is still limited previous research that focuses on developing countries where the use of fossil-based energy has become an important issue at the moment. In this sense, this study aims to contribute to CEAD by analyzing earnings management, corporate governance, and media exposure as determinants of CEAD in Indonesia, a developing country. The sample consists of 244 firm-year manufacturing companies listed on the Indonesia Stock Exchange (IDX) during the 2020-2022 period. The test results, using partial least squares-structural equation modeling (PLS-SEM), indicate support for legitimacy theory, namely the view that corporate governance and media exposure have a positive effect on the level of CEAD. Drawn from the COVID-19 pandemic period, the empirical evidence from this study shows that the sample of manufacturing companies tended to carry out income-increasing earnings management and the disclosure of carbon emissions tended to be low.

Keywords: Carbon Emissions Accounting Disclosure, Earnings Management, Corporate Governance, Media Exposure
JEL Classifications: Q51, Q56, M41

1. INTRODUCTION

Carbon emissions have caused what is called the greenhouse effect, the impact of which has been increasing temperatures on the Earth. Carbon emissions come from human activities such as the use of fossil fuels, the decomposition of organic matter, industrial activities, and the use of fertilizers. Problems with emissions have become one of the sustainability issues, namely global warming and climate change which continue to threaten the future of the world. The era of industrialization has caused greenhouse gases to increase exponentially, resulting in the issue of global warming in the 21st century (Lee, 2022). Greenhouse gas emissions have caused global warming wherein surface temperatures have reached 1.1°C above 1850-1900 in 2011-2020 (IPCC, 2023). Between 2010 and 2019, carbon emissions continued to increase because of the use of unsustainable energy, along with changes in land use,

lifestyle, consumption, and production patterns across regions and between individuals. Climate change caused by humans has many impacts on weather and climate throughout the world, and it also impacts food and water security, health, the economy, society as a whole, and other damage related to the environment and humans.

According to accounting concepts, carbon disclosure is a voluntary practice that is not mandatory. The implementation of carbon emissions accounting disclosures (CEAD) in Indonesia is still voluntary and, although there is no obligation for companies, there is pressure from society for companies to be more responsive to climate change issues; consequently, companies are now starting to disclose their carbon emissions. However, disclosing carbon emissions also has negative implications for companies, including increasing operating costs (Nursulistyo et al., 2022) and allowing company managers to engage in earnings management (Prior et al., 2008).

This research was motivated by several concerns. First, this study analyzes CEAD in the context of Indonesia, a developing country, whereas previous research has generally focused on carbon emissions disclosure practices in developed countries (Rankin et al., 2011; Ben-Amar et al., 2017). Carbon emissions emissions may cause more serious problems for developing countries as they generally have higher economic growth rates and excessive fossil fuel consumption (Akbas and Canikli, 2019).

Second, previous research has generally tested the relationship between carbon emission disclosure and several variables such as corporate governance, earnings management, and media exposure and this has yielded inconsistent findings. For example, Gerged et al. (2021) and Xi and Xiao (2022) found a negative relationship between environmental disclosure and earnings management. Meanwhile, Buertey et al. (2020), using environmental disclosure, actually found a significant positive relationship with certain proxies of corporate governance such as board size and block ownership. In the Indonesian context, there have been several studies regarding the relationship between carbon emission disclosure and earnings management, such as the studies conducted by Khaq et al. (2022) and Astari et al. (2020) both of which had different results. Khaq et al. (2022) found that earnings management had no effect on carbon emissions disclosure, while Astari et al. (2020) found that the existence of earnings management in companies increases carbon emissions disclosure. In order to explain the inconsistencies in these research findings, this study adds a media exposure variable because, with the increase in public awareness regarding environmental issues in recent years, media attention has also increased as a consequence (Damassa et al., 2016; Fabricio et al., 2022; Gonzalez-Gonzalez and Zamora, 2022; Paananen et al., 2021). Research on media exposure is also now starting to be carried out by researchers to see its impact on the disclosure of carbon emissions. Previous research conducted by Ulupui et al. (2020) stated that media exposure significantly influences the disclosure of carbon emissions. This study will analyze the influence of corporate governance, earnings management, and media exposure on CEAD in one comprehensive model.

Third, this research uses the COVID-19 pandemic data period, namely 2020-2020. The conditions during the pandemic are interesting to study because there were various possibilities for earnings management (Liu and Sun, 2022) which could affect the relationship with CEAD. On the one hand, firms might have faced the pressure of earnings decline caused by the pandemic, motivating them to engage in more earnings management to increase income (Smith et al., 2001). On the other hand, firms might have exploited the pandemic as an opportunity to "take a big bath," meaning that they could intentionally report big losses in the pandemic year to boost earnings in future years (Chia et al., 2007; Rusmin et al., 2013). However, other considerations might also have obfuscated the decisions of management regarding earnings management in the pandemic year, such as the fact that the pandemic was beyond their influence and control, and the great uncertainty as to the long-term impacts of the pandemic on the economy. Thus, it is unclear how firms would manage earnings differently during the pandemic period.

This research contributes by testing a comprehensive model, namely to examine the influence of corporate governance, earnings management, and media exposure on CEAD, where previous research on this topic is still limited. Furthermore, this research also contributes by providing empirical evidence about the practice of carbon emission disclosure during the COVID-19 pandemic, where no previous research has provided such empirical evidence. Apart from that, this research also contributes by providing empirical evidence of CEAD in developing countries where, currently, the use of fossil-based and unsustainable energy has become a significant issue.

2. LITERATURE REVIEW

2.1. Legitimacy Theory
This research uses legitimacy theory to develop a model of the influence of corporate governance, earnings management, and media exposure on carbon emissions disclosure. Suchman (1995) defined legitimacy as the general perception or assumption that an entity's actions are desirable and appropriate within a changing socially constructed system of norms, values, beliefs, and definitions. Legitimacy theory is a mechanism that supports organizations to implement and develop voluntary social and environmental disclosures in order to fulfill social contracts that enable companies to gain recognition for their objectivity and resilience in an easy environment (Schiopoiu Burlea and Popa, 2013). According to legitimacy theory, companies will try to provide information about carbon to convey a positive signal to investors that the company is behaving as a good entity and doing its best in matters related to environmental conservation (Freedman and Jaggi, 1988; Jaggi et al., 2018). Through legitimacy theory, a company's involvement in environmental disclosure can be linked to better-reported income figures as something that can influence and regulate public perceptions regarding a favorable image.

2.2. Carbon Emission Control Practices in Indonesia
The increase in carbon emissions has caused global warming. Indonesia is one of the countries whose contribution to carbon emissions is quite high. The Indonesian government has committed to making efforts to overcome climate change by ratifying the Paris Agreement with Law No.16 of 2017. Through this commitment, Indonesia and other countries are jointly committed to keeping the rise in global temperatures below 2°C and to limiting the earth's temperature rising a further 1.5° above pre-industrial levels. Aside from this, Indonesia also ratified the Paris Agreement through Presidential Regulation No.98 of 2021 concerning the implementation of the economic value of carbon to achieve nationally determined contribution targets and control greenhouse gas emissions in national development. These regulations indicate that it is very important to carry out mitigation related to carbon emissions to achieve zero emissions.

Although carbon disclosure is not mandatory and is generally unregulated, many organizations disclose information about their initiatives and actions voluntarily. According to Hardiyansah and Agustini (2020), while the implementation of carbon emissions disclosure in Indonesia is still voluntary because there is no obligation for companies, there is nevertheless pressure from

society for companies to be more responsive to climate change issues; thus, companies are now starting to disclose their carbon emissions. However, disclosing carbon emissions also has negative implications for companies, including increasing operating costs (Nursulistyo et al., 2022) and allowing company managers to be involved in earnings management (Prior et al., 2008). Companies use fossil fuel energy such as coal, petroleum and natural gas, as well as other materials that produce carbon dioxide. So, companies in this sector are trying to disclose carbon emissions as a way of fulfilling their responsibility to the surrounding environment and also as a consideration for investors in assessing the company.

2.3. Hypothesis Development

Under the conditions caused by the COVID-19 pandemic, there were various possibilities for earnings management to occur. On one hand, there was the possibility of managers carrying out increases in income to avoid a decline in financial performance during the COVID-19 pandemic conditions (Liu and Sun, 2022). However, on the other hand, management might take advantage of the pandemic conditions to take a big bath, meaning that they could intentionally report big losses in the pandemic year to boost earnings in future years. However, other considerations might also have obfuscated management's decisions with regard to earnings management in the year of COVID-19, such as the fact that the pandemic was beyond management's influence and control, and the great uncertainty about its long-term impact on the economy. Thus, it is not clear what the pattern of earnings management would be in pandemic conditions, so it is interesting to test the impact on CEAD.

According to arguments based on legitimacy theory, companies will try to provide information about carbon emissions to convey a positive signal to investors that the company is behaving as a good entity and doing its best in matters related to environmental conservation (Jaggi et al., 2018). Managers engaging in earnings management usually try to show a positive image in order to be perceived well by shareholders and stakeholders to ensure optimal company performance. This can also be explained through agency theory which states that an agency conflict is likely to occur when managers behave opportunistically for personal gain and thus use carbon emission disclosures to cover their behavior up.

On the other hand, there are other arguments presented in the research by Gerged et al. (2021) who stated that companies with high levels of environmental disclosure appear to be more conservative in accounting decisions and so provide more accurate income information to their stakeholders. This means that CAED is driven by managers' motivation to be ethical, honest, and trustworthy in order to legitimize their activities and improve their prospects of survival (Gerged et al., 2021). This argument can be interpreted as meaning that environmental disclosures made by companies are not intended to cover up the opportunistic behavior of managers in manipulating company earningss.

Several previous studies, such as those by Astari et al. (2020), Buertey et al. (2020), and Rahayu et al. (2021), have found that earnings management has a positive effect on carbon emissions

disclosure. By contrast, Xi and Xiao (2022) and Gerged et al. (2021) stated that there is a negative relationship between environmental disclosure and earnings management, which indicates that companies that disclose information related to the environment are less likely to engage in earnings management. Another study by Khaq et al. (2022) found that there is no significant relationship between earnings management and carbon emissions disclosure.

Based on the arguments above, with the nature of earnings management in the COVID-19 pandemic conditions still unclear and the inconsistency of some empirical evidence from previous research, a non-directional hypothesis is formulated as follows:

H_1: Earnings management has an effect on carbon emissions accounting disclosures.

According to agency theory, the board of commissioners is responsible for supervising management as it conveys information in financial reports to prevent agency problems between managers and stakeholders. A large number of members on a board of commissioners in a company represents a variety of knowledge and expertise on that board. Peters and Romi (2012) stated that companies that have a larger number of members on their boards of commissioners will make more disclosures regarding CAED; this is supported by the findings of other studies which show that the number of board of commissioners members is positively related to disclosure of CAED emissions (Chithambo and Tauringana, 2016). Several researchers have also said that companies that have a larger number of board members will tend to disclose information about the environment in more quantity and detail (Allegrini and Greco, 2013; Magnan et al., 2010).

With the presence of independent commissioners in the company, disclosure of information regarding carbon emissions can also increase because independent commissioners are expected to be able to encourage management to be more transparent regarding company activities, especially those related to the environment amidst increasing awareness of environmental issues in society. According to agency theory, agency problems that may occur due to information asymmetry will be easier to avoid if there is more transparent information. Then, with the increasing proportion of independent commissioners in companies, the transparency of this information is also expected to increase.

Previous research has also revealed that independent commissioners will be more inclined towards the public interest and shareholders' interests, meaning that companies will disclose information related to the environment (Allegrini and Greco, 2013; Chau and Gray 2010; Kılıç and Kucey, 2019).

As a committee formed by the board of commissioners, the audit committee's responsibilities are in line with the duties and functions of the board of commissioners, namely monitoring the company's performance, especially in corporate reporting, including environmental disclosures. This study argues that the effectiveness of the audit committee, which consists of the dimensions of frequency of meetings and its members' expertise,

will have a positive effect on carbon gas emission accounting disclosures.

According to governance regulations in Indonesia, the audit committee needs to hold regular meetings at least once every 3 months. If meetings in excess of these requirements are held, it will certainly be better because the evaluation of financial reporting will be more optimal meaning that the opportunities for management to take opportunistic actions will be fewer. Then, with the increasing frequency of meetings, it is hoped that the transparency of information provided to other stakeholders, such as information regarding carbon emissions, will increase. Buallay and Al-Ajmi (2020) found that the frequency of audit committee meetings has a significant influence on sustainability disclosure and plays a role in determining the level of disclosure.

Audit committee members who have accounting and financial expertise enhance the audit committee's ability to evaluate the auditor's judgment and can play an important role in developing better internal control systems and risk management frameworks. The audit committee plays a role in overseeing corporate reporting and company disclosures. Therefore, audit committee members who have an accounting and finance background will be very helpful in monitoring effective management and reviewing a company's financial reports (Badolato et al., 2014). Disclosures regarding carbon are also expected to increase because audit committees will encourage companies to be more transparent. Audit committee expertise in finance is considered to have an important role in influencing companies in making decisions regarding financial reporting and carbon emissions disclosure (Xie et al., 2003).

This research argues that the effectiveness of corporate governance, which consists of four indicators, namely the number of members of the board of commissioners, the independence of the board of commissioners, the number of audit committee meetings, and the financial expertise of the audit committee will have a positive influence on CEAD disclosure. Based on these explanations, the following hypothesis is formulated:

H_2: The effectiveness of governance has a positive effect on carbon emissions accounting disclosures.

Publication in the media of an entity's activities related to environmental awareness is one suggestion for gaining legitimacy (Hassan and Romilly, 2018; Ananzeh et al., 2023). According to legitimacy theory, companies will try to convey information about their activities related to environmental issues to provide positive signals to shareholders and to gain a good reputation. Apart from the company itself disclosing information regarding its responsibility for the environment, positive signals can increase if the company's environmental management activities are covered by the media. In connection with agency theory, the media can help shareholders or other stakeholders to avoid information asymmetry. This allows companies to continue to strive to improve the quality of information disclosure regarding their carbon emissions.

According to research by Ananzeh et al. (2023), if the media reports that a company is polluting the environment and greenwashing, then this will have a bad impact on the company, including creditors becoming reluctant to provide loans to the company or increasing the interest on loans. This argument shows that the media is an important governance monitoring tool in bridging the information gap between companies and stakeholders. In the opinion of Bahriansyah and Lestari Ginting (2022), if the media makes greater efforts to concentrate on the environment, then businesses will be more encouraged to reveal their activities related to the issue of climate change and reducing carbon emissions. Previous research conducted by Rahayu et al. (2021) found that media exposure can significantly influence environmental disclosure. The same was found by Ulupui et al. (2020) who stated that media exposure significantly influences corporate social responsibility (CSR) disclosure or carbon emission disclosure. Based on the explanation above, the following hypothesis is formulated:

H_3: Media exposure has a positive effect on carbon emissions accounting disclosures.

3. METHODOLOGY

3.1. Population and Sample
This research analyzes carbon emissions accounting disclosures (CEAD) with a population of manufacturing companies registered on the IDX during the COVID-19 pandemic for a period of 3 years, namely 2020-2022. Companies in the manufacturing sector are companies whose operations are related to the environment and directly related to carbon emissions. Determining the sample in this study used a purposive sampling technique with the criteria of manufacturing companies registered on the IDX during the 2020-2022 period which disclosed carbon emissions in their sustainability reports.

3.2. Measurement of Variables
The dependent variable used in this research is CAED disclosure. The measurement used for this variable uses an index based on previous research, namely research conducted by Bae et al. (2014). This measurement index is compiled based on factors identified in the Request for Information sheet by the Carbon Disclosure Project (CDP).

In this disclosure index, there are five main categories, namely risks and opportunities of climate change, calculation of greenhouse gas emissions, calculation of energy consumption, reduction of greenhouse gases and costs, and accountability for carbon emissions. These five categories were then identified again so that they became more specific with 18 items. The measurement in this index uses a binary code: a value of 1 is given to each item if the company discloses information related to that item; if it does not disclose information, then it is given a value of 0. So, each company will get a maximum value of 18 if it discloses all items and the minimum value is 0. The CAED disclosure index score is obtained by adding up all the items disclosed in each company in the sample and then dividing it by the number of items, that is to say 18.

The independent variables in this research are as follows:
1. Earnings management

In this research, earnings management is proxied using discretionary accruals developed by Kothari et al. (2005). This model is estimated cross-sectionally every year.
2. Effectiveness of corporate governance

This variable is measured by the following four indicators:
  a. Number of members of the board of commissioners

The number of members of the board of commissioners is measured by adding up all members of the board of commissioners in the company
  b. Proportion of commissioners who are independent

The proportion of independent commissioners is measured by dividing the number of independent commissioners in the company by the total number of the company's board of commissioners.
  c. Audit committee meeting frequency

This indicator is measured by adding up all audit committee meetings held in 1 year.
  d. Audit committee accounting expertise

Audit committee expertise is measured by the proportion of audit committee members who have financial competence divided by the number of all audit committee members.
3. Media exposure

Based on the study of Abdullah et al. (2020) and also Ulupui et al. (2020), the measurement of media exposure in this study is measured using a dummy variable where the company gets a value of 1 if it discloses information related to carbon emissions disclosure via the company website, or on other media such as online news portals, and a value of 0 otherwise.

3.3. Data Analysis
The analysis technique used in this study is partial least squares-structural equation modeling (PLS-SEM) with the WarpPLS 8.0 software. PLS-SEM is used having considered its various advantages, including (Hair et al., 2017; Kock, 2020):
1. It can provide several model fit indicators that can be useful for comparing the best model among various different models, including average path coefficient (APC), average r-squared (ARS), average adjusted r-squared (AARS), average block variance inflation factor (AVIF), average full collinearity VIF (AFVIF).
2. It can provide full collinearity test values that can be used to analyze vertical and lateral multicollinearity problems.
3. If there is a formative construct in the research model such as in this study, then only PLS-SEM can be used.

4. EMPIRICAL RESULTS

4.1. Descriptive Statistics
The population of this study is 948 manufacturing companies listed on the IDX during the 2020-2022 period. During that period, there

were 648 companies that did not disclose sustainability reports in a row. A sustainability report is needed in this research to find out the extent of disclosure related to carbon emissions made by the company. Therefore, the companies chosen for the sample were those that disclosed information in sustainability reports. There were 24 companies that did not present the complete data required for this research. Overall, the observations consisted of 244 firm-years as the data for hypothesis testing.

Table 1 presents descriptive statistics for each of the research variables. In Table 1, it can be seen that the average value of carbon emissions accounting disclosure (CEAD) is 0.4389, which shows that the average disclosure made by the sample of companies in Indonesia covers only 43.89% of the total number of carbon emission disclosure indicators. These statistics show that the CAED for a sample of manufacturing industry companies in Indonesia is still low. The average earnings management of the entire sample is 0.0204. Discretionary accruals with positive values indicate earnings management with an income-increasing pattern during the COVID-19 pandemic. The BC size variable (the number of members of the board of commissioners) shows a mean of 4.49 which is greater than the standard deviation value of 2.13. The minimum value is 2.00, which means there is a company with the smallest number of board members, namely only 2 members.

The mean of the variable proportion of independent commissioner board members (BC independence) is 0.4193, meaning that the company has an average proportion of board commissioners of 41.93%. The minimum value is 0.2500 or 25.00%, which is close to the regulations regarding the board of commissioners and directors for issuers and public companies in Indonesia (POJK No.33/POJK.04/2014) which states that if members of the board of commissioners consist of more than two people, then the number of members of the board of commissioners who are independent must be at least 30% of the total number of members. So, it can be said that all companies in this research sample are in accordance with POJK No.33/POJK.04/2014 which states that the board of commissioners must consist of two members, one of whom should be an independent commissioner.

The average value of the frequency of audit committee meetings (AC meetings) in Table 1 is 7.84, which means that companies in this research sample hold audit committee meetings an average of 7.84 times a year. Regulation No.55/POJK.04/2015 states that the audit committee is required to hold regular meetings at least once every 3 months, which means that in 1 year the company should have held audit committee meetings 4 times. In accordance with these regulations, the minimum value shows the number 1, which

Table 1: Descriptive statistics

Variables	n	Minimum	Maximum	Mean	SD
CEAD	244	0.1111	0.7222	0.4389	0.1354
Earnings management	244	−0.6764	1.1937	0.0204	0.1434
BC size	244	2.00	15.00	4.49	2.13
BC independency	244	0.2500	0.8333	0.4193	0.1109
AC meeting	244	1.00	71.00	7.84	8.11
AC expertise	244	0.2500	1.0000	0.8038	0.2103

CEAD: Carbon emissions accounting disclosure, SD: Standard deviation

means that all companies in the research sample have held at least one audit committee meeting a year. The financial competence of audit committee members (AC expertise) is the final independent variable that describes the presence of audit committee members with financial competence. This is also regulated in Regulation No.55/POJK.04/2015 which states that the audit committee is required to have at least one member who has expertise in accounting and finance. The minimum value shows a value of 0.2500, which means that there are companies with a composition of members with financial competence in the audit committee of at least 25% of the total, so it can be said that all companies in this research sample, except for audit committee meetings, are in accordance with governance regulations.

Table 2 presents one of the independent variables of this research, namely media exposure, which was measured using a dummy variable. Table 2 above shows that, of the 244 companies in the sample, only around 71 (29.10%) disclosed information related to the disclosure of corporate carbon emissions either through the company website or through online news portals. A total of 173 (70.90%) of the sample companies did not have media exposure in terms of information regarding carbon emissions disclosure. These descriptive statistics show that the level of media exposure for carbon emission management is still much lower than samples without media exposure.

4.2. Hypothesis Testing Results

The hypothesis testing stages in PLS-SEM analysis include testing the outer model and inner model. At the outer model test stage, an evaluation is carried out to assess the suitability of the latent variable indicators. This study used the latent/unobserved variables, namely the board of commissioner structure and audit committee effectiveness, that were measured using formative indicators. Analysis of the measurement model can be utilized from the feasibility of the formative indicator by looking at the significance value of weight and co-linearity (variance inflation factor/VIF). The result of the measurement model using WarpPLS 8.0 in Table 3 shows that the P-value for weight significance of all indicators of formative variables <0.001 and co-linearity of all formative indicators indicates a VIF value of <3.3. Thus, the measurement model has fulfilled the criteria for formative constructs.

Table 4 presents the goodness of fit for the research model. The

test results show that all goodness of fit criteria for PLS-SEM have been met. Therefore, the structural model data analysis can be continued with hypothesis testing.

Figure 1 presents the WarpPLS 8.0 output for the structural model test results.

Table 5 presents a summary of the results of the hypothesis testing. The test results provide empirical evidence that hypothesis 1, namely earnings management, has an effect on CAED, supported by a path coefficient of −0.150 and significant with a P = 0.009. A negative coefficient of −0.150 shows that earnings management has a negative effect on CAED.

Hypothesis 2, namely that the effectiveness of corporate governance has a positive effect on CAED, is supported by a path coefficient of 0.258 and is significant with a P < 0.001. Furthermore, hypothesis 3, namely that media exposure has a positive effect on CAED, is also supported by a path coefficient of 0.162 and is significant with a P = 0.005.

The results of this research indicate that earnings management has a negative effect on CAED in a negative direction. Based on descriptive statistics, it can be concluded that earnings management had an income-increasing pattern during the COVID-19 pandemic. In contrast, CAED tends to be low with an average of only 43.89%. This empirical evidence explains the negative influence of earnings management on CAED. The empirical evidence from this research shows that, under the conditions of the pandemic, companies that carried out income-increasing earnings management tended toward a low level of disclosure about carbon emissions. The empirical evidence from this study supports the argument of Hardiyansah and Agustini (2020) that the implementation of carbon emission disclosure in Indonesia tends to be low because it is still voluntary due to the fact there is no obligation for companies so. The findings of this study also support research conducted by Gerged et al. (2021) which used a sample of 100 companies registered in Jordan during the period 2010-2014, namely that there is a negative relationship between corporate environmental disclosure and earnings manipulation. In addition, the findings of this study are also consistent with Xi and Xiao (2022) who also found a negative relationship between earnings management and environmental disclosure.

Table 2: Distribution of media exposure frequency

Key	n (%)
There is no media exposure	173 (70.90)
There is media exposure	71 (29.10)
Total	244 (100.00)

Table 3: Results of outer model

Indicators	Weight	Type	P-value	VIF
BOC size	0.408	Formative	<0.001	1.046
BOC independence	0.254	Formative	<0.001	1.018
AC meeting	0.456	Formative	<0.001	1.080
AC expertise	0.516	Formative	<0.001	1.106

VIF: Variance inflation factor

Table 4: Model fit and quality indices

Fit indicators	Results	P-value	Criteria
APC	0.190	<0.001	<0.05
ARS	0.152	0.004	<0.05
AARS	0.142	0.006	<0.05
AVIF	1.056		≤5.0
AFVIF	1.082		≤5.0
GoF	0.357		≥0.10
SPR	1.000		≥0.70
RSCR	1.000		≥0.90
SSR	1.000		≥0.70
Nonlinear bivariate causality direction	0.833		≥0.70

APC: Average path coefficient, ARS: Average R square, AARS: Average adjusted R square, AVIF: Average block VIF, AFVIF: Average full collinearity VIF, GoF: Tenenhaus GoF, SPR: Simpson's paradox ratio, RSCR: R^2 contribution ratio, SSR: Statistical suppression ratio

Table 5: Results of hypothesis testing

Structural/hypothesised paths	Parameter (β)	T-statistics	P-value	Conclusion
Earnings management → CEAD	−0.150	−2.398***	0.009	Supported
Corporate governance → CEAD	0.258	4.215***	<0.001	Supported
Media exposure → CEAD	0.162	2.600***	0.005	Supported

*Significant at alpha 10%, **Significant at alpha 5%, ***Significant at alpha 1%. CEAD: Carbon emissions accounting disclosure

Figure 1: Results of the structural model
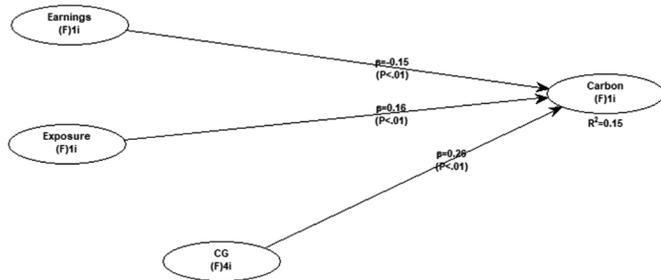
This study's empirical evidence shows that good governance can improve CAED. The PLS-SEM test results show that the effectiveness of governance—whose indicators are the number of members and independence of the board of commissioners as well as the number of meetings and expertise of the audit committee—will encourage company management to disclose more carbon emissions information in order to maintain its legitimacy. The empirical evidence of this study supports legitimacy theory and previous research findings regarding the structure of boards of commissioners (Amran et al., 2014; Liao et al., 2015; Jaggi et al., 2018; Krishnamurti and Velayutham, 2018; He et al., 2019; Prado-Lorenzo et al., 2010; Liao et al., 2015; Ben-Amar et al., 2017; Tauringana and Chithambo, 2015; He et al., 2019) will encourage greater disclosure of carbon emissions. This empirical evidence also supports the effectiveness of audit committees consisting of meetings and expertise indicators in encouraging companies to disclose more carbon emissions. These results provide support for legitimacy theory which states that an effective audit committee can encourage companies to disclose large amounts of environmental information in order to make the company more attractive to different stakeholders (Prado-Lorenzo et al., 2009).

The empirical evidence from this study also shows that media exposure has a positive effect on CAED. These findings support legitimacy theory which states that companies will try to convey positive information about their activities related to environmental issues by providing positive signals to shareholders in order to gain support from stakeholders. This also shows that the media can be used as an important tool for monitoring governance in bridging the information gap between companies and stakeholders. Other studies that are in line with these results include those conducted by Rahayu et al. (2021) and Ulupui et al. (2020) which both stated that media exposure significantly influences corporate social responsibility (CSR) disclosure or carbon emission disclosure.

5. CONCLUSION

This study has provided empirical evidence that shows the average value of carbon emissions accounting disclosures (CAED) for a sample of manufacturing companies in Indonesia is 43.89% of the total indicators used. Based on these descriptive statistics, it can be concluded that the level of CAED for manufacturing companies in Indonesia is still relatively low. The PLS-SEM test results show support for the legitimacy theory which says that corporate governance and media exposure have a positive effect on the level of CAED. As for governance structure and processes, these consist of indicators regarding the number of members and the independence of the board of commissioners as well as the number of meetings and expertise of the audit committee, and they can improve CAED. The empirical evidence from this study shows that, during the COVID-19 pandemic period, the sample of manufacturing companies tended to carry out income-increasing earnings management and their disclosure of carbon emissions tended to be low.

This study has several limitations, including the fact that its sample comprises companies only from the manufacturing industry, thereby limiting generalization to other industries. This research focuses on the COVID-19 pandemic period, namely 2020-2022, so research results may be different if based on observation data from other periods. Future studies could use industrial sectors other than manufacturing as well as different year periods to improve its generalizability. In addition, future studies could develop models using independent variables other than earnings management, governance, and media exposure.

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