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Carbon emissions disclosure: an overview of research in Indonesia

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Abstract
Research aims: This research aims to find out the research's development of carbon emissions disclosure topic in the Indonesia context.
Design/Methodology/Approach: The method employed was charting the fields by Hesford et al. (2006) on some articles indexed by Sinta 2 and 3, as well as Scopus with research based in Indonesia. The articles were selected by criteria, obtaining 60 articles for further analysis.
Research findings: The literature study's results showcase that the carbon emission disclosure research trend in Indonesia has increased in the last five years. This trend was reviewed deeply through further discussions in terms of its factors influencing and consequences, theories and samples used. The major factors influencing carbon emission disclosure are profitability, firm size, and leverage. Moreover, carbon emission disclosure also affects firm value.
Theoretical contribution/Originality: This study provides knowledge regarding existing carbon emission disclosures and opportunities for further research agenda, especially on empirical research.
Keywords: Carbon emission disclosure; Charting the fields; Literature review

Introduction

Global warming is a major problem faced by all. A report by the Intergovernmental Panel on Climate Change (IPCC) (2021) has shown that currently, the earth's temperature has increased by 1.1°C from the 1800s. To prevent the adverse effects of climate change and preserve a habitable planet, the increase in global temperature must be limited. The Global Environment Organization continues to encourage policymakers worldwide to realize 45% emission reductions in 2030 and zero carbon by 2050, in line with the 2015 Paris Agreement. The Carbon Disclosure Project or CDP (2021) also stated that based on CDP Reports, 13,000 companies have disclosed about climate change, water management, and deforestation through CDP, and there has been an increase of 37% in 2020. Based on these situations, more companies are starting to participate in reducing and disclosing carbon emissions. However, the disclosure remains voluntary, and no standards support the credibility and comparability of the information disclosed (Kolk et al., 2008), and disclosure has also become challenging (Bazhair et al., 2022). By disclosing carbon information, companies can assess the extent to which efforts have been made to mitigate carbon emission reductions

(Giannarakis et al., 2017). In addition, disclosure of carbon emissions provides benefits for companies to evaluate the advantages and disadvantages of carbon management and builds investor confidence. Zhang and Liu (2020) stated that as regulated by the Australian government (2009), the US Environmental Protection Agency (2009), and the UK Government (2013), developed countries such as America, Britain, and Australia have required disclosure of carbon emission information for companies. In Indonesia, under the Ministry of Maritime and Investment Affairs of Indonesia (2022), Indonesia is a country that has declared itself to be committed to reducing carbon emissions in 2060 or earlier, and this was conveyed at the Net Zero Summit and B20 Investment Forum Opening Ceremony held on November 2022. The energy transition is one of Indonesia's priorities, which focuses on reducing carbon emissions and requires decarbonization of the power generation and end-use sectors. The existence of Presidential Regulation Number 98 of 2021 further demonstrates Indonesia's seriousness in mitigating the reduction of carbon and greenhouse gas emissions (Sulistiawati & Buana, 2023). This means there will be more companies in Indonesia to mitigate carbon emissions, and to prove this, companies will need to convey information using carbon disclosure. Carbon disclosure could be a useful communication tool to ensure a company's accountability and transparency regarding the amount and impacts of carbon emissions (Ben-Amar & McIlkenny, 2015).

Research related to carbon disclosure now attracts academics and researchers in the fields of economics and environmental management to produce theoretical and empirical basis to increase corporate awareness and transparency of carbon information (Zhang & Liu, 2020). Empirical research on carbon disclosure in Indonesia has been conducted for several years, such as Akhiroh and Kiswanto (2016), Prasetya and Yulianto (2018), Astiti and Wirama (2020), and Ratmono et al. (2022) that discussed factor influencing carbon disclosure in Indonesia. On the other hand, the impact of carbon disclosure has also been discussed by Gabrielle and Toly (2019) and Mahmudah et al. (2023) on firm value. This means that Indonesia's academics and researchers have started to be concerned about carbon disclosure. Nevertheless, the previous empirical studies also exhibit inconsistent results.

A literature study was conducted previously by Zhang and Liu (2020) on carbon disclosure topics and obtained 79 articles from indexed international journals from various countries of the world. The research was categorized based on the theoretical basis used, cause and effect factors, and type of industry. In Indonesia's context, the results of a literature study by Nursulistyo et al. (2023) demonstrate the number of studies in accounting journals indexed by local and international journals (SINTA 1 & 2) and obtained 30 articles with a research range of 2010 – 2021. Those year observations were chosen because an accredited SINTA 2 journal published its first carbon disclosure article in 2010, while 2021 was their study done. They also classified based on articles, research methods, as well as financial and non-financial factors affecting carbon disclosure.

Meanwhile, this research aims to see the research development and future opportunities regarding carbon disclosure in the Indonesia context. Hopefully, the results can be used by academicians to provide relevant theoretical and empirical foundations so the transparency of carbon disclosure increases. According to previous literature studies, the author found that there were important points in the research that had not been discussed, such as the theory used and the research sample. The theory is a guide in research that underlies problem investigation (Kivunja, 2018), so through the theory used, the carbon disclosure problem can be understood from various points of view. The research sample is also a critical point in the research as a representation of the population. As such, this literature review is needed to answer the questions related to the trend of carbon disclosure research in Indonesia, the factors influencing and the impact of carbon disclosure, which theories are relevant, and the industrial sector in which the research has been carried out. The author examined SINTA 2, 3, and Scopus-indexed articles using charting the fields method. This research classified the article based on topics defining direct and indirect relationships, the theory used, and the sample used. This study contributes to giving perspectives to the researchers about empirical studies for the next carbon emission disclosures' future research agenda.

***RQ$_1$**: What are the trends of carbon emission disclosure research in matters of factors influencing and consequences, theories and samples used? What are the future research agenda opportunities?*

Literature Review and Hypotheses Development

Carbon emissions in the global warming context are defined as gases produced from the burning activity of carbon-containing compounds and include gases that have a greenhouse effect, such as carbon dioxide (CO_2), methane gas (CH_4), nitrogen oxide gas (N_2O), and others. The majority of the gas produced comes from the industrial sector, which uses fossil fuels such as oil and coal, causing the earth's atmosphere to heat up due to the carbon dioxide produced (Ministry of Energy and Human Resources, 2022). These carbon emissions bring detrimental effects on human life, such as uncertain climate change. Efforts to reduce carbon emissions are needed to prevent environmental conditions from getting worse, such as companies starting to be obliged to identify, measure, record, present, and disclose carbon emissions (Kalu et al., 2016). Moreover, the data from the International Energy Agency (2022) revealed that Indonesia become the world's ninth-largest emitter of carbon emissions. According to this condition, Indonesia needs to mitigate its carbon emissions. This is reinforced by the existence of Presidential Regulation (Perpres) No. 98 of 2021 regarding the Implementation of the Economic Value of Carbon to Achieve Nationally Determined Contribution Targets and Control of Greenhouse Gas Emission as National Development.

Therefore, carbon emission disclosure is a company tool to gain public trust and legitimacy for the mitigation that has been carried out related to carbon emissions (Iswati & Setiawan, 2020). Choi et al. (2013) also revealed that efforts to mitigate carbon emissions that are known to the public can also encourage awareness and make environmentally friendly industrial policies. In essence, disclosure of carbon or greenhouse gases is an integral part of a financial report as a form of implementing regulations and gaining legitimacy (Kolk et al., 2008). In several developed countries, carbon disclosure is mandatory to reduce stakeholders' bad perceptions of companies (Milanés-Montero et al., 2021). However, in Indonesia, carbon disclosure is still voluntary. Even so, several companies have disclosed carbon emissions because there has been pressure from stakeholders who care about the environment (Muhammad & Aryani, 2021). A study (Hahn et al., 2015) uncovered that much of the information on the disclosure of carbon emissions was found in annual reports and sustainability reports, while for countries in Europe and America, it was mostly found on carbon disclosure project pages. Until now, CDP, as an independent institution founded in America, continues to develop carbon emission reporting systems and standards for regions, cities, states, and companies to measure the environmental impact they cause (Al-Qahtani & Elgharbawy, 2020).

Furthermore, charting the fields is a systematic literature review method that is part of qualitative research and mapping analysis on research topics (Nursulistyo et al., 2023). This method aims to determine the development of a research topic and research gaps (Villas et al., 2008). The system was first implemented by Hesford et al. (2006), who conducted a literature review on the topic of management accounting research with a sample of 916 articles from 10 journals over 20 years (1981-2000). The literature review used two approaches, namely charting the fields and community analysis.

Research Method

The method used was charting the field developed by Hesford et al. (2006). Sixty articles on the topic of carbon emission disclosure during 10 years of research (2014-2023), which were published in SINTA 2 and 3 accredited journals as well as Scopus-indexed international journals with research samples in Indonesia, were obtained. The criteria for the selected articles were that 1) they came from SINTA 2 and SINTA 3 accredited journals because, through these journals, they have been processed properly so that the quality is better and 2) international journals with research samples in Indonesia. The reason for choosing SINTA 2 and 3 as well as Scopus-indexed is due to the fact that the quality of the articles published in these journals has been guaranteed by going through a strict selection process.

The steps for collecting sample articles from Indonesian accredited journals included the following. Firstly, the researcher searched for a list of journals accredited by SINTA 1, 2, and 3 through the website https://sinta.kemdikbud.go.id/journals and entered the keywords “akuntansi/accounting,” “bisnis/business,” “manajemen/management,” and “keuangan/finance.” Secondly, each journal website was opened one by one by entering the keywords "carbon" and "carbon disclosure," and related articles were downloaded. Thirdly, downloaded articles were classified based on year of publication, author's name, variables, theory, samples, research methods, and research results using Microsoft Excel.

Furthermore, the steps for selecting a sample of Scopus-indexed articles are as follows. 1) The researcher visited the websites of leading publishers, namely Emerald, Elsevier, Wiley, Taylor & Francis, and MDPI. 2) The researcher entered the keywords "Carbon

Disclosure" and "Indonesian Carbon Disclosures." 3) Besides that, the researcher searched through the Google website and entered the same keywords. 4) the index of the journal containing related articles was checked via Scimago https://www.scimagojr.com/. 5) Articles that had been confirmed Scopus indexed were downloaded and classified based on the year of publication, author's name, variables, theories, samples, research methods, and research results using Microsoft Excel. Specifically, to search the articles published in Scopus-indexed journals, the researcher conducted a broader search through the Google website because it was estimated that many articles related to carbon disclosure were not published in accounting, management, business, or finance journals. This is because the topic of carbon is also closely related to the environment.

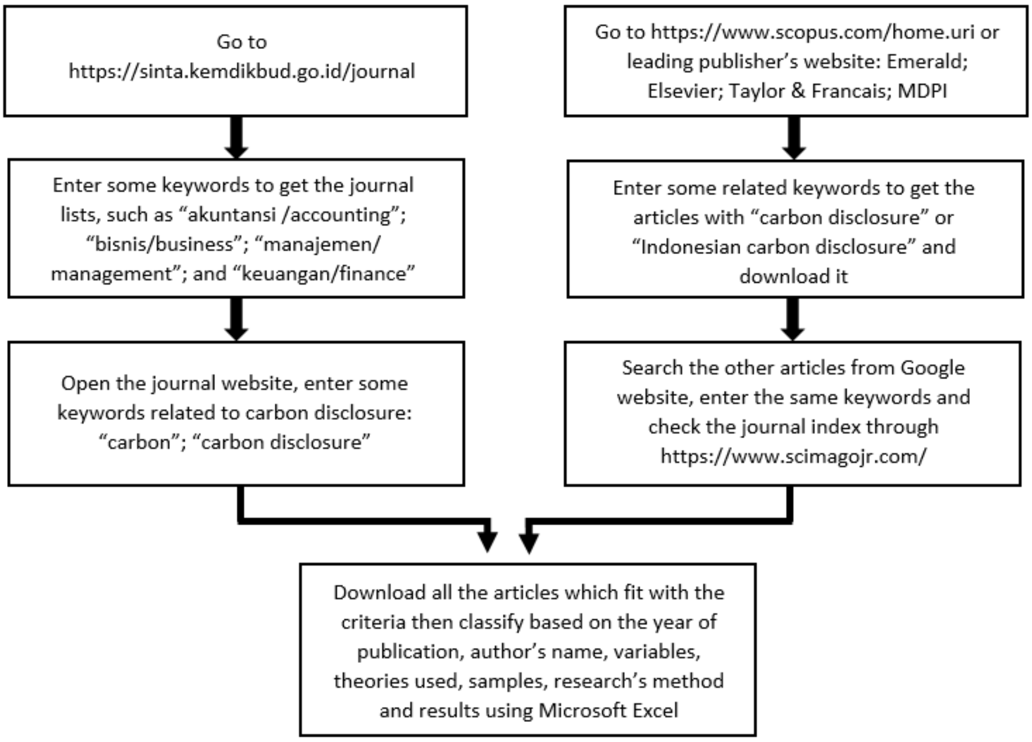

Figure 1 Systematic Literature Review Process

Result and Discussion

After the classification process was carried out, the results were attached and described in each table. Table 1 details that 18 journals have been accredited by SINTA 2, 12 journals indexed by SINTA 3, and 6 Scopus-indexed journals. The samples obtained were 50 published articles on SINTA 2 and 3, while 10 articles were published in Scopus-indexed journals with studies in Indonesia within 10 years of the observation period (2014-2023). Based on Table 2, it can be seen that the Scientific Journal of Accounting and Business (JIAB) and the Journal of Accounting and Business Dynamics (JDAB) are the journals that have published the most research on carbon disclosure in the SINTA 2 accredited journal group, with four articles published during 2018- 2022. In addition, the SINTA 3 accredited journal group, namely the Udayana Accounting E-Journal, is the journal that has published the most articles on the topic of carbon disclosure, as many as six articles during the 2019-2021 period.

Table 1 List Sample of Literature Review

Journal Name	Author	Total Article
Accounting Analysis Journal (AAJ)	Akhiroh (2016); Krisnawanto and Solikhah (2019); Hapsari and Prasetyo (2020)	3
Journal of Accounting Investment (JAI)	Iswati and Setiawan (2020); Hapsoro and Falih (2020)	2
The Indonesian Accounting Review (TIAR)	Pratiwi et al. (2021)	1
Indonesia Journal of Sustainability Accounting Management (IJSAM)	Daromes and Wijaya (2020); Evana et al. (2021); Setiawan and Iswati (2019)	3
The Indonesian Journal of Accounting Research(TIJAR)	Ambarwati et al. (2020)	1
Jurnal Dinamika Akuntansi dan Bisnis (JDAB)	Astari et al. (2020); Ummah and Setiawan (2021); Muhammad and Aryani (2021); Nursulistyo et al. (2023)	4
AKRUAL: Jurnal Akuntansi	Rahmadhani and Indriyani (2019)	1
Jurnal Akuntansi dan Keuangan (JAK)	Irwhantoko and Basuki (2016)	1
Jurnal Dinamika Akuntansi (JDA)	Prasetya and Yulianto (2018)	1
Jurnal Ilmiah Akuntansi dan Bisnis (JIAB)	Pratiwi (2018); Gabrielle and Toly (2019); Kelvin et al. (2019); Monica et al. (2021)	4
Jurnal Reviu Akuntansi dan Keuangan (JRAK)	Kholmi et al. (2020)	1
Journal of Economics, Business and Accountancy Ventura (JEBAV)	Alfani and Diyanty (2020)	1
Jurnal Ekonomi dan Keuangan Islam (JEKI)	Cahya (2017)	1
Jurnal Akuntansi (e-JA)	Narsa (2021); Anggita et al. (2022); Ng et al. (2022)	3
Jurnal Manajemen Teknologi (JMT)	Zuhrufiyah and Anggraeni (2019)	1
Jurnal Akuntansi Multiparadigma (JAMAL)	Soleha and Isnalita (2022)	1
Riset Akuntansi dan Keuangan Indonesia	Suryani and Wijayati (2019)	1
Jurnal Akuntansi dan Keuangan Indonesia (JAKI)	Anggraeni (2015)	1
E-Jurnal Akuntansi Udayana	Dewi et al. (2019); Witri and Wirama (2020); Setya Permana and Tjahjadi (2020); Eka and Budiasih (2020); Eka Dewayani & Ratnadi (2021); Sari and Budiasih (2022)	6
E-Jurnal Akuntansi Aktual (JAA)	Anshari and Isnalita (2020)	1
OWNER: Riset dan Jurnal Akuntansi	Hilmi et al. (2020); Yuliandhari et al. (2023)	2

Table 1 List Sample of Literature Review (Cont.)

Journal Name	Author	Total Article
Jurnal Riset Akuntansi dan Keuangan	Florencia and Handoko (2021)	1
Jurnal AKSI: Akuntansi dan Sistem Informasi	Destiyuanita et al. (2022)	1
Jurnal Akuntansi Bisnis	Widiastutik and Khafid (2021)	1
Jurnal Akuntansi dan Auditing - Univ Diponegoro	Yusuf (2021)	1
Jurnal Akuntansi Trisakti	Pranasyahputra et al. (2020)	1
AKUNTABILITAS: Jurnal Penelitian dan Pengembangan Akuntansi	Maulidiavitasari and Yanthi (2021)	1
Reviu Akuntansi dan Bisnis Indonesia	Nur Farida and Sofyani (2018); Almaeda et al. (2023)	2
Akuntansi: Jurnal Akuntansi Integratif	Rahmanita (2020)	1
Journal of Contemporary Accounting	Simamora et al. (2022)	1
Journal of Environmental Accounting and Management	Manurung et al. (2022)	1
Journal of Southwest Jiaotong University	Andrian and Kevin (2021)	1
Cogent Economics & Finance	Qosasi et al.(2022); Mahmudah et al. (2023)	2
Corporate Social Responsibility and Environmental Management	Faisal et al. (2018)	1
Sustainability	Nasih et al. (2019)	1
International Journal of Energy Economics and Policy	Hermawan et al. (2018); Saraswati et al. (2021); Ratmono et al. (2022); Riantono and Sunarto (2022)	4

The researcher also divided the years of observation into two periods, namely 2014-2018 and 2019-2023, to compare the research's changes over the five years since the beginning of the study and the last five years. Through this comparison, whether the research topic related to carbon disclosure remains a relevant topic for research in Indonesia would be known. Judging from Figure 2, it can be seen that the 2014-2018 range exhibits early developments, even though research related to carbon disclosure has not appeared since early 2014. The 2014 was chosen because it refers to the purpose of this study to look at developments in the last ten years. After searching, in 2015, the first research related to carbon disclosure was conducted by Anggraeni (2015) which was published in the Indonesian Journal of Accounting and Finance (JAKI).

There are two journals accredited by SINTA 2 that have published research articles related to carbon disclosure, namely the Accounting Analysis Journal and the Journal of Financial Accounting. Furthermore, in 2019-2023, research related to carbon disclosure in Indonesia is growing. 2020 was the year that published the most articles, namely 18 articles in accredited journals SINTA 2, SINTA 3, and Scopus-indexed journals. The researcher's consideration for ending the research in mid-2023 is because the researchers conducted a literature review in mid-2023 and several articles on the topic of carbon disclosure were still in the review process, so they could not be fully accessed.

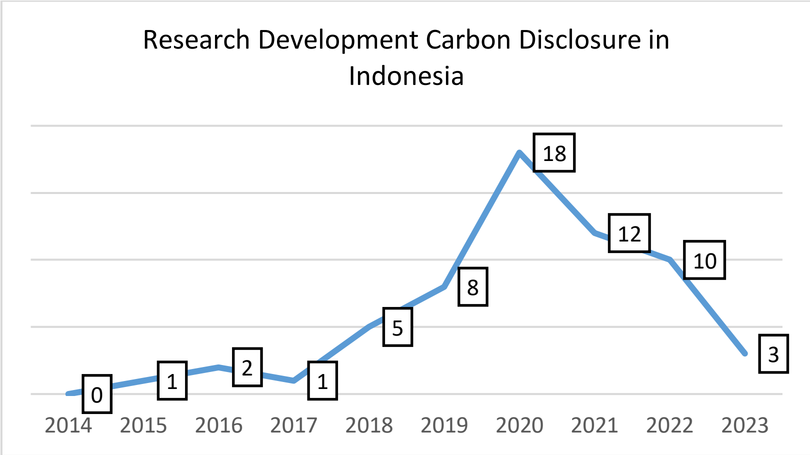

Figure 2 Research Development on Carbon Emission Disclosure

Article Classification

In this literature study, the articles obtained were classified into three categories based on the research topic (direct and indirect cause-and-effect relationships), the theory used, and the research sample.

Classification Based on Research Topics

The classification carried out in the research article is divided into two, namely, the causes or factors influencing carbon emission disclosure and the impact of the influence of carbon emission disclosure. In more detail, the classification is based on its role as the dependent variable, independent variable, moderating variable, and intervening variable. Based on this classification, it can be seen that most research related to carbon disclosure has its role as the dependent variable. Figure 3 portrays the results of mapping the cause and effect of carbon disclosure with a direct relationship to the antecedent and consequent factors that have positive, negative, and insignificant effects. Based on the results of the analysis, it was found that company size (SIZE), industry type (IND), profitability (PRO), and environmental performance (EP) were the most important research variables, which explained that these variables were the antecedent factors driving the extent of carbon emission disclosure.

Company size (SIZE) shows the wealth owned by the company so that with adequate resources, companies are better able to manage carbon emissions and disclose them in the form of voluntary reports to fulfill the legitimacy of investors (Hapsari & Prasetyo, 2020). Industry types (IND) that intensively produce carbon in their operational activities will receive more attention from the government to participate in efforts to reduce carbon emissions. Therefore, to meet the demands of the government, companies need to disclose carbon emissions (Pratiwi et al., 2021). In addition, profitability is a factor that can encourage the disclosure of carbon emissions because the company's profits are obtained from its operational activities, which, of course, leave a carbon emission footprint. With high profitability, there are demands from stakeholders to disclose carbon emissions (Saraswati et al., 2021).

Moreover, environmental performance is a measure of corporate responsibility towards the surrounding environment (Luo et al., 2013). Companies with good environmental performance will encourage companies to disclose information related to carbon emissions (Jannah & Narsa, 2021). In addition, leverage (LEV) is an antecedent factor that reduces the extent of disclosure of a company's carbon emissions. This is because the management of companies that have debt with a larger nominal value and short maturities will prioritize paying their debts to creditors rather than making disclosures that cost more and are considered not worth the costs incurred (Luo et al., 2013). The relationship does not affect the antecedent factor research variable on carbon emission disclosure, which is mostly shown by profitability (PRO), revealing a wider carbon emission. This indicates that companies do not need to wait to have high profitability to disclose carbon emissions in Indonesia because, in Perpes No. 61 of 2011, companies are expected to contribute to carbon reduction (Pratiwi, 2018).

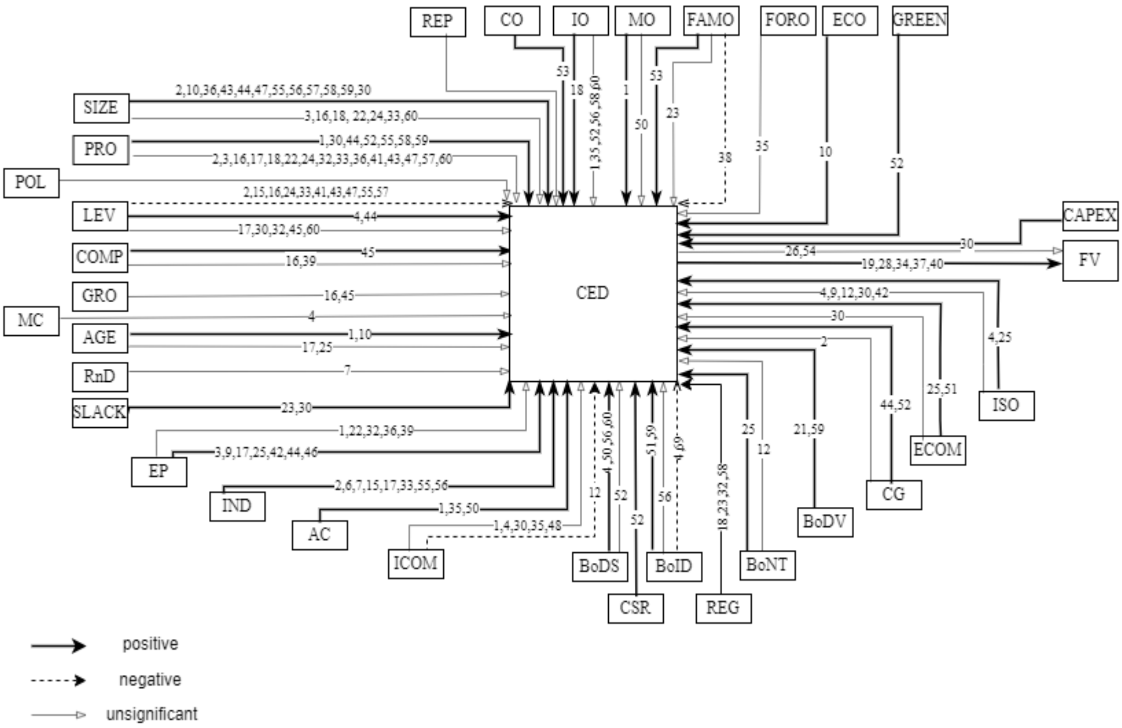

Figure 3 Cause and Effect on Direct Relationship of Carbon Disclosure
Source: Data Processed (2023)

In a direct relationship, there are consequences for carbon emission disclosure on company value. From the results of the analysis of several articles, it was found that carbon emission had a positive effect on company value. Companies disclosing carbon emissions for operational activities that have an impact on the environment will increase their reputation in the eyes of stakeholders (Wenni Anggita et al., 2022). <See

https://bit.ly/ListofArticlesCEDinIndonesia for reference to the number of articles in each relationship>.

Figure 4 illustrates an overview of the indirect relationship involving carbon disclosure. One study shows that carbon disclosure has a moderating effect on the relationship between company size (SIZE) and firm value (FV). This means that carbon disclosure strengthens the relationship between company size and company value. This indicates that when investors want to invest, they need other considerations. The size of the company is not the only determinant that investors will invest. Investors need other supporting information, and one of them is the disclosure of carbon emissions because the industry is currently growing and there is an emphasis from investors on environmental issues (Choi et al., 2013). Through the disclosure of information related to carbon emissions, investors increasingly believe that companies are suitable places to invest. The willingness of investors to invest their capital in the company can increase the value of the company.

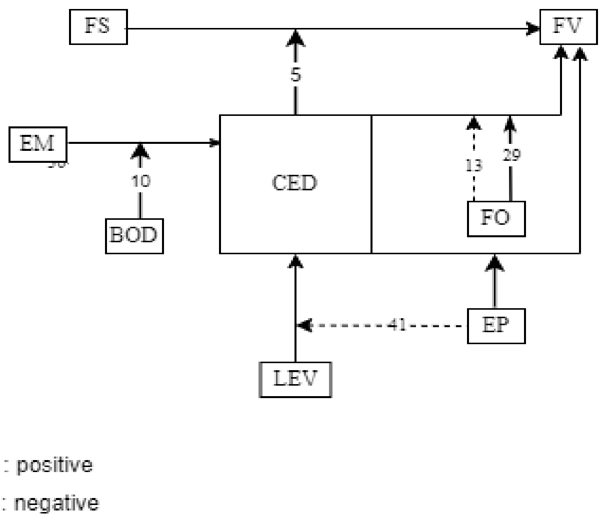

Figure 4 Cause and Effect on Indirect Relationship of Carbon Disclosure

Another indirect relationship is explained in the relationship between carbon disclosure and firm value with the foreign ownership variable (FORO) as a moderating variable. Through this relationship, there is a significant negative influence. In other words, foreign ownership strengthens the negative effect of carbon disclosure and brings benefits to companies. This is possible because foreign investors understand and care more about environmental issues. When companies disclose their carbon emission activities, they value it more. <see https://bit.ly/ListofArticlesCEDinIndonesia for references to the number of articles in each relationship>.

Classification Based on Theory Used in the Research

From various theoretical perspectives, the previous researchers explain carbon disclosure using six broad theories, namely legitimacy, stakeholders, signaling theory, institutional theory, agency theory, and voluntary disclosure theory (Zhang & Liu, 2020). The results of the carbon disclosure literature review in Indonesia exposed five theories used, as well as several other developmental theories such as upper echelon theory, socioemotional theory, impression management theory, Sharia enterprise theory, and stewardship theory. Table 2 points out that the theory that is widely used in research on the topic of carbon disclosure in Indonesia is the legitimacy theory of 40 articles (44%). Legitimacy theory explains the practice of company involvement in mitigating carbon emissions, which are the main cause of climate change, as an effort to improve the company's image (Setiawan & Iswati, 2019). These company's motivations can be comprehensively explained by legitimacy theory (Pellegrino & Lodhia, 2012).

Then, the stakeholder theory also dominates as the theoretical basis in research. In several studies in Indonesia, one carbon disclosure research used two to four theories. Furthermore, one article as a sample in this literature review study does not explain the theory used.

Table 2 Article Classification – Research Theory Used

Theory	Total	Percentage
Legitimacy Theory	40	44%
Stakeholder Theory	31	34%
Signaling Theory	9	10%
Agency Theory	5	5%
Upper Echelon Theory	1	1%
Socioemotional Theory	1	1%
Impression Management Theory	1	1%
Sharia Enterprise Theory	1	1%
Stewardship Theory	1	1%
Institutional Theory	1	1%
	91	100%

Classification Based on Research Sample

Based on Table 3, the samples used in each carbon disclosure study are very diverse. However, the average research sample used was a company listed on the Indonesia Stock Exchange. In more detail, two samples dominated, namely companies in all non-financial industries with 13 articles, companies in the manufacturing sector with 13 articles, and companies in the mining sector with 10 articles. In addition, each sample is also in a different research range, which is adjusted to the conditions when the researchers conducted the research. According to the results, it can be concluded that the non-financial industry was the largest used as a research sample, followed by manufacturing companies.

Cited to several articles such as Hapsari and Prasetyo (2020) and Pratiwi et al. (2021), the common reason why the researchers used non-financial sectors such as mining, manufacturing, energy, and transportation was that companies in these sectors were considered more intensive producing emissions, which have direct impact to the environment. Hence, this gains more attention from stakeholders to disclose its carbon mitigation. Otherwise, other industries, such as the financial industry, are rarely used as research samples on carbon emission disclosure in Indonesia's research context. This could be an opportunity for future research. The financial sector itself has a main role in business activities through its funding to all sector industries (Kılıç & Kuzey, 2019).

Table 3 Article Classification – Research Sample Used

Research Sample	Total	%
All Companies Listed IDX	10	15
Non-Financial Company Listed IDX	13	20
Mining Company Listed IDX	10	15
Manufacturing Company Listed IDX	13	20
High Profile Industry Listed IDX	1	2
Company Listed OSIRIS	2	3
Chemical Company Listed IDX	1	2
Plantation Company Listed IDX	5	8
Energy Company Listed IDX	2	3
Transportation Listed IDX	1	2
The Company Listed CGPI (Corporate Governance Perception Index)	2	3
Non-Service Company	1	2
Index Jakarta Islamic Index (JII)	1	2
All ASEAN Stock Exchange	1	2
Financial Company IDX	1	2
The Company Joined the CDP Project	1	2
	65	100

Conclusion

This study analyzes 60 articles on carbon disclosure in Indonesia. Articles were obtained from 36 accredited journals SINTA 2, SINTA 3 in Indonesia, and Scopus with Indonesian samples. Then, the articles were classified based on the topic, sample, and theory used. In conclusion, the E-Journal of Accounting (EJA) is a journal that dominates carbon disclosure research, namely as many as six articles (16%). Based on the topic of discussion, the most widely used independent variables in research on carbon disclosure are probability, company size, and leverage. The most employed sample is a non-financial company listed on the Indonesia Exchange. In addition, the theory most widely used in carbon disclosure research is the legitimacy theory. This means that almost all the researchers have the same point of view regarding the carbon emission practice in Indonesia.

This research is also limited to the mapping results in articles whose research is in Indonesia. Suggestions for further research development are to use other research methods and add literature studies in ASEAN or the world. Furthermore, the results of this study can also be used as a description later for empirical research. Researchers can examine the effect of several financial influence variables (financial slack) and non-financial influence variables (family ownership and independent directors) on carbon emission disclosure.

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Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.