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Carbon Emissions Disclosure and Firm Value: A Systematic Literature Review and Future Research Agenda

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Abstract

This study provides a systematic literature review (SLR) of prior research examining the relationship between carbon emissions disclosure (CED) and firm value. Using the PRISMA framework, 33 Scopus-indexed journal articles published between 2011 and 2025 were systematically identified, screened, and analyzed. The review documents a sharp increase in scholarly attention in recent years, with research concentrated in emerging and developed market contexts. The findings reveal that empirical evidence on the CED–firm value relationship remains mixed and highly context-dependent. While many studies report a positive association, others find insignificant or negative effects due to disclosure costs, credibility concerns, and greenwashing risks. Stakeholder, legitimacy, and signaling theories emerge as the dominant theoretical lenses. The review further highlights that the valuation effects of CED are largely contingent on institutional, governance, and information environments and are transmitted through mediating mechanisms such as corporate reputation, information asymmetry, cost of equity, and financial performance. By synthesizing theoretical perspectives, measurement approaches, and moderating and mediating factors, this study clarifies boundary conditions in the literature and proposes directions for future research on carbon disclosure and firm value.

Keywords: *Carbon emissions disclosure; firm value; systematic literature review; sustainability reporting; capital market effects.*

1. Introduction

Over the past decade, climate change has become a major global concern due to its severe adverse impacts on human life and the natural environment, including the increasing frequency of extreme weather events, ecosystem degradation, rising global temperatures, sea level rise, and other related consequences. Carbon emissions are one of the main causes of climate change because they increase the amount of CO_2 in the atmosphere, which makes climate change worse (Chen et al., 2021). The amount of CO_2 in the atmosphere has gone up a lot in the last few years, and it is now at dangerous levels. The Global Monitoring Laboratory of NOAA released data showing that the global average level of CO_2 reached 427 ppm in May 2024 (Lindsley, 2025), which is much higher than the World Health Organization's recommended level of 310–330 ppm. These numbers show that carbon emissions are now a global problem that

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needs to be dealt with right away.

In the business context, corporations are among the largest contributors to rising CO_2 concentrations. A report by the Carbon Disclosure Project (2017) reveals that 100 companies are responsible for approximately 71% of total global carbon emissions. Furthermore, the Carbon Major Database: Launch Report issued by InfluenceMap (2024) shows that 80% of global emissions between 2016 and 2022 originated from only 57 companies, including both state-owned enterprises and private firms. These findings underscore the substantial role of corporations in driving carbon emissions and their responsibility in addressing this issue. Consequently, firms face increasing pressure from stakeholders to provide transparent and reliable information regarding their carbon emissions Mayapada & Lyu (2025). In this regard, carbon emissions disclosure has become increasingly important. Setiawan et al. (2025) argue that carbon emissions disclosure plays a strategic role in strengthening corporate accountability and supporting sustainable development agendas by encouraging low-carbon practices, improving energy efficiency, and fostering environmentally friendly innovation in the long term. Additionally, this kind of disclosure is a way to see how well companies are cutting down on carbon emissions (Syafik et al., 2025). It also shows that businesses care about reducing their carbon footprint and helping the world reach the United Nations Sustainable Development Goals (Poole, 2022). Consequently, the disclosure of carbon emissions is a crucial tool for encouraging the reduction of carbon emissions

Previous studies have examined various determinants of carbon emissions disclosure, including firm characteristics (Bae Choi et al., 2013; Chu et al., 2013; Rosita et al., 2022; Saraswati et al., 2021; Wahyuningrum et al., 2024), board characteristics (Saraswati et al., 2021; Wahyuningrum et al., 2024; Wulan, 2022), ownership structure (Bedi & Singh, 2024; Rosita et al., 2022; Singhania & Bhan, 2024; Wahyuningrum et al., 2024; Wulan, 2022), and industry type (Ott et al., 2017). In addition, prior research has investigated the consequences of carbon emissions disclosure for firm outcomes, including financial performance (Desai et al., 2022; Khunkaew et al., 2023), firm value (Mahmudah et al., 2023), corporate reputation (Khalid et al., 2024), stock prices (Griffin et al., 2017; Jaggi et al., 2018), and earnings management (Mayapada & Lyu, 2025).

Within the literature review context, Setiawan et al. (2025) conducted a bibliometric analysis of 278 Scopus-indexed articles published between 2004 and 2024 and found that carbon disclosure research has grown rapidly worldwide, with major themes focusing on emissions disclosure, carbon performance, corporate governance, and greenwashing. Singhania & Bhan (2024) performed a systematic literature review and meta-analysis of 55 empirical studies conducted between 2008 and 2022 across 13 countries to examine the relationship between ownership mechanisms and voluntary carbon disclosure. Their findings indicate that institutional ownership and state ownership positively influence voluntary carbon disclosure, whereas ownership concentration, managerial ownership, and foreign ownership have no significant effects. Wang (2023) reviewed 78 high-quality journal articles published between 2011 and 2021 on the financial consequences of carbon risk and carbon disclosure and reported that the relationship between carbon disclosure and firm value remains inconclusive, largely due to differences in measurement approaches, geographical contexts, and study periods.

Drawing on empirical and review studies, this research examines the impact of carbon emissions disclosure on firm value and its underlying factors. It is important to look into this relationship because information about carbon emissions can change how investors see a company's reputation, risk, and long-term prospects. This is because clear disclosure shows that a company is committed to sustainable business practices and may boost market confidence. Nonetheless, prior research on the relationship between carbon emissions disclosure and firm value remains ambiguous and inconclusive (Wang, 2023). Some studies indicate positive effects (e.g., Alsaifi et al., 2019; Yong et al., 2022), whereas others reveal weak, insignificant, or even negative market reactions attributed to compliance costs, disclosure credibility, and concerns over greenwashing (Khalid et al., 2024). These inconsistencies indicate significant variability in measurement methodologies, institutional frameworks, temporal contexts, and theoretical orientations, complicating the derivation of a coherent conclusion regarding the actual pricing of carbon transparency in capital markets. From the viewpoint of stakeholder theory, the disclosure of carbon emissions constitutes a facet of corporate social responsibility that may bolster legitimacy and investor confidence, potentially augmenting firm value; however, the disjointed empirical evidence hinders a definitive theoretical and practical comprehension of this relationship (Griffin et al., 2017; Matsumura et al., 2014). Consequently, despite the strategic importance of carbon disclosure for evaluating reputational capital, risk management, and future growth potential, the existing literature offers no unified knowledge base. In this context, a Systematic Literature Review is essential because it enables a rigorous, transparent, and replicable synthesis of heterogeneous empirical findings by systematically evaluating theoretical frameworks, measurement of carbon disclosure and firm value, most influential journal and studies, most influential moderating/mediating variables. In addition, systematic literature reviews support theory development by identifying the contexts in which carbon disclosure affects firm value and by providing a robust foundation for future research agendas in sustainability accounting and capital market research (Paul et al., 2021; Tranfield et al., 2003; Xiao & Watson, 2019).

Research Question

In response to the research problem, this study seeks to address the following research questions.

1) What are the publication trends, theoretical foundations, and methodological characteristics of prior studies examining the relationship between carbon emissions disclosure and firm value?
2) What empirical evidence exists regarding the association between carbon emissions disclosure and firm value, and how consistent are the reported findings across different institutional and geographical contexts?
3) What moderating and mediating mechanisms have been identified in the literature to explain how and under what conditions carbon emissions disclosure affects firm value?
4) What key research gaps and future research directions can be derived from existing studies to advance theory and empirical understanding of carbon emissions disclosure and firm value?

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2. Methodology

This study adopts systematic literature review (SLR) method by reviewing 46 research articles that discuss carbon emissions disclosure and firm value. In order to conduct an exhaustive and transparent review, the study is guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework that allows for a structured and controlled assembly of literature. The process of PRISMA consists of four primary phases: identification, screening, eligibility and inclusion. In the identification phase, relevant studies were identified in Scopus using specific keywords and filtering by language, document type, source category and subject area that meet pre-defined inclusion criteria. The screening stage involved evaluating titles and abstracts to remove studies that were not aligned with the research objectives. In the eligibility stage, full-text articles were carefully examined to confirm their relevance in terms of geographical focus, thematic alignment, and methodological rigor. The final stage, inclusion, resulted in a refined set of articles that formed the basis of the analysis. The overall selection process is depicted in Figure 1, which illustrates the PRISMA flow diagram.

Relevant articles were retrieved from the Scopus database. Scopus was selected because it provides extensive coverage of reputable journals that have undergone rigorous peer-review processes. In addition, Scopus offers a well-structured indexing system and comprehensive metadata analysis, which supports accurate bibliometric mapping and analysis (Manani & P. S, 2025). The keywords used in this study are as follows.

> (“carbon emission* disclosure*" OR "carbon disclosure*" OR "greenhouse gas emission* disclosure*" OR "greenhouse gas disclosure*") AND ("Firm* Valu*" OR "Corporate Valu*" OR "Market Valu*" OR "Tobin's Q" OR "Shareholder Valu*")

The preliminary keyword search resulted in the identification of 91 research articles within the Scopus database. Following the identification of relevant studies, a filtering process was applied by limiting the source type to journals, restricting the subject areas to Business, Management and Accounting; Economics, Econometrics and Finance; and Social Sciences, confining the document types to articles, and selecting only publications written in English. As a result of these criteria, 22 records were excluded, leaving a sample of 69 research articles. From the remaining 69 documents, a title and abstract screening was undertaken. Articles that did not specifically examine carbon emissions disclosure or firm value, were removed from the dataset. This stage led to the exclusion of 12 studies, resulting in a sample of 57 research articles for further analysis. Out of the initial 143 articles, the author conducted a manual screening to exclude studies that could not be accessed in full text (n=11). The author then further filtered the remaining publications by eliminating 13 articles that did not specifically examine the effect of carbon emission disclosure on firm value. Through this selection process, a total of 33 research articles were retained for analysis.

3. SLR Findings

Distribution of Studies by Year and Country

Figure 2 shows the trend in publications from 2011 to 2025. The early period is characterized by low and volatile publication output, whereas the later period exhibits a pronounced increase in research activity. During the period 2011–2019, research output remained limited and sporadic, generally comprising one to two publications per year. A marked shift in the trend is observed from 2020 onward. Publication output increases sharply, peaking at five articles in 2021, followed by a temporary decline in 2022, and then rising steadily from 2023 onward. The year 2025 records the highest publication output, with eight articles published. The two-period moving average further corroborates this pattern, demonstrating a sustained upward trend in recent years and highlighting increasing scholarly attention to the topic.

Table 1 reports the distribution of publications by country and the corresponding citation counts. This shows that there are big differences in both research output and scholarly impact. Indonesia has the most publications (seven articles), followed by global or multiregional studies (six articles) and China (four articles). This shows that a lot of research is being done in these areas. However, citation patterns are very different from publication counts. For example, the United States has only two publications but the most citations (1,110), which shows that its contributions have a very big impact. Japan and Korea, each with one publication, also have relatively high citation counts, which shows that they have a strong influence even though they don't publish much. The table shows that having more publications doesn't always mean having a bigger impact on citations. This shows that research visibility and influence vary from country to country.

Table 1. Distribution of Articles by Countries and citations per country

No	Country	Publications	Citations
1	Indonesia	7	98
2	Global/Multiregional	6	216
3	China	4	16
4	ASEAN	2	2
5	Bilateral/Multinational	2	24
6	United States	2	1110
7	UK	2	67
8	Asia-Pacific	2	5
9	Japan	1	191
10	Korea	1	179
11	Italy	1	62
12	South Africa	1	38
13	South Korea	1	19
14	Canada	1	13
15	Malaysia	1	2

Theory

Tabel 2 summarizes the theoretical frameworks employed in previous studies on carbon emissions disclosure and firm value. This study explain three most influential theories as follows.

1) **Stakeholder Theory**

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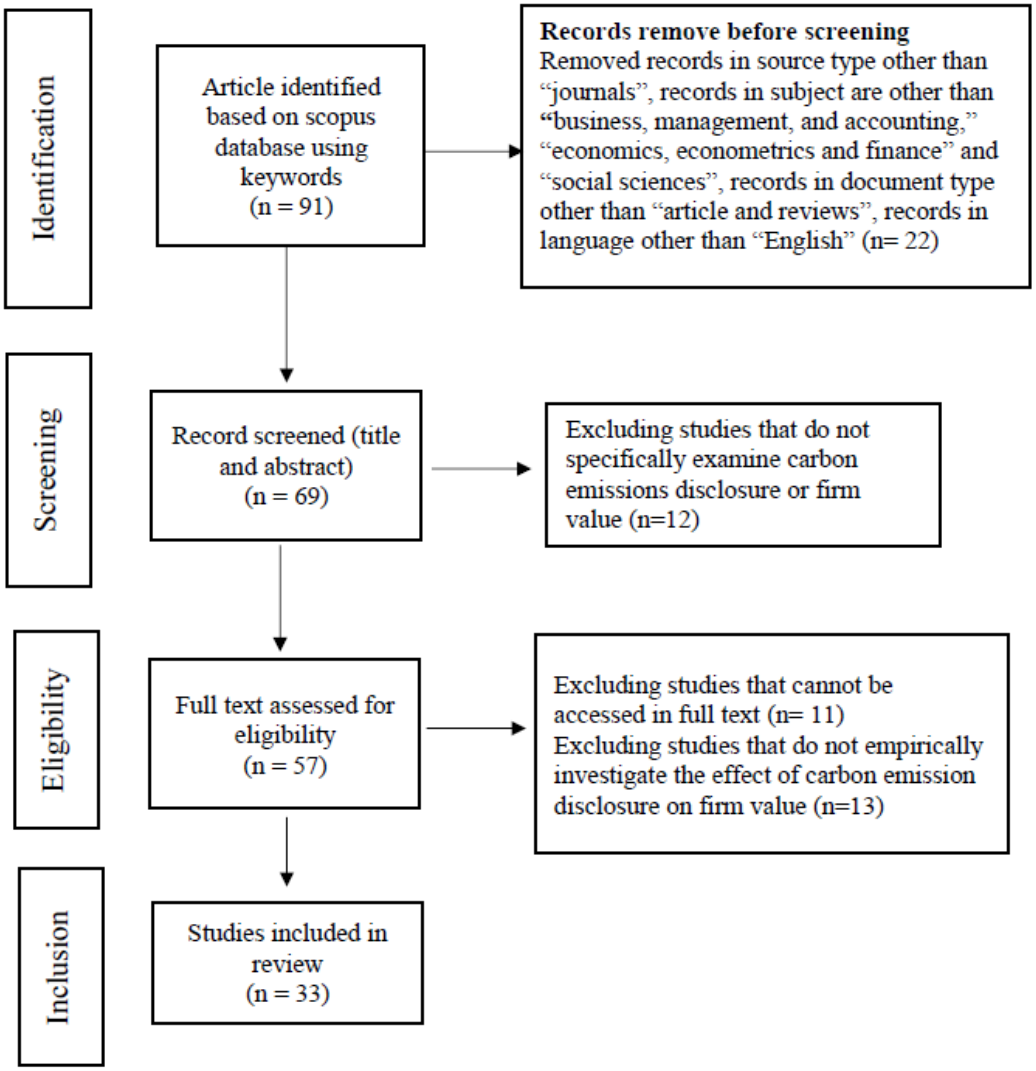

Figure 1. PRISMA Protocol

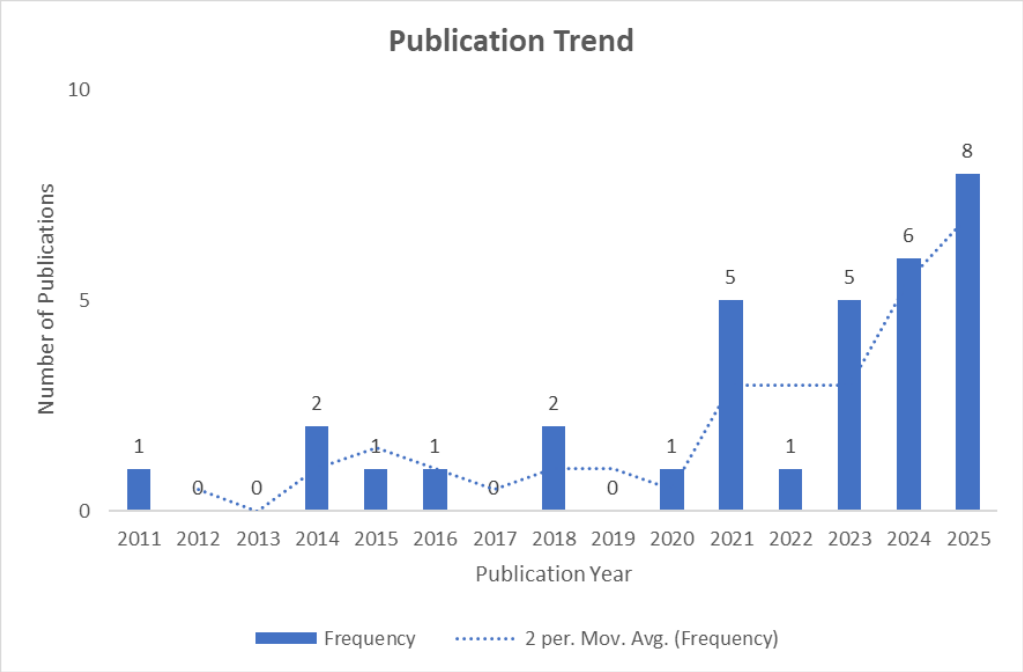

Figure 2. Publication Trends

The results indicate that stakeholder theory is the predominant framework, appearing in 15 studies. Stakeholder theory posits that firms are accountable not only to shareholders but also to a broad range of stakeholders, including investors, regulators,

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communities, customers, and environmental groups, whose interests can influence corporate survival and value creation (Freeman, 1984; Donaldson & Preston, 1995; Harrison et al., 2010). Within this perspective, carbon emissions disclosure (CED) is viewed as a strategic communication mechanism through which firms respond to stakeholders' increasing demand for transparency regarding environmental impacts and climate-related risks. By disclosing carbon emissions information, firms can enhance legitimacy, reduce information asymmetry, and strengthen stakeholder trust, which in turn may positively affect firm value through improved reputation, lower perceived risk, and more favorable capital market responses. Empirical evidence in the carbon disclosure literature supports this theoretical argument. For example, Kurnia et al. (2021) document that carbon emissions disclosure has a positive effect on firm value among Indonesian listed firms, indicating that investors respond favorably when firms provide transparent carbon-related information that reflects stakeholder accountability. Hardiyansah et al. (2021) also find a strong and positive link between carbon emission disclosure and firm value, as measured by Tobin's Q. This supports the idea that market participants value environmental transparency. Zhu et al. (2025) provide more recent evidence that refines this relationship by demonstrating that interactive carbon disclosure increases firm value by improving reputation and lowering the cost of equity. However, the effect diminishes when disclosure becomes symbolic rather than substantive. Conversely, Claudia & Lindrianasari (2024) demonstrate that carbon emissions disclosure does not directly enhance firm value, indicating that stakeholder-driven advantages may be contingent upon governance attributes, including board composition. These findings collectively illustrate that stakeholder theory offers a coherent explanatory framework for comprehending how carbon emissions disclosure can lead to increased firm value when such disclosures adequately address stakeholder expectations.

2) Legitimacy Theory

9 studies use legitimacy theory, making it the second most popular framework. Legitimacy theory posits that firms continuously seek to ensure that their operations are perceived as legitimate by society by aligning corporate actions and disclosures with prevailing social norms, values, and expectations (Suchman, 1995; Deegan, 2002). Within the environmental disclosure literature, carbon emissions disclosure is interpreted as a legitimization strategy through which firms respond to societal and regulatory pressures arising from heightened concern over climate change. By voluntarily disclosing carbon emissions information, firms attempt to demonstrate environmental responsibility, mitigate legitimacy threats, and maintain social approval, which may ultimately translate into improved firm value through enhanced reputation and reduced political or regulatory risk. Evidence from the studies reviewed in this research supports this argument. For example, Hardiyansah et al. (2021) show that carbon emissions disclosure increases firm value, particularly for firms operating in environmentally sensitive industries, suggesting that legitimacy pressures are stronger in high-impact sectors. Similarly, Kurnia et al. (2021) find a positive association between carbon emission disclosure and firm value in Indonesia, indicating that firms gain market benefits when disclosures are used to maintain societal legitimacy. However, the legitimacy effect is not always uniform. (Ganda, 2018) reports a positive impact of carbon disclosure on accounting performance (ROA) but a negative association with market-based value measures, implying potential market skepticism toward symbolic disclosure. More recent findings by Zhu et al. (2025) suggest that interactive forms of carbon disclosure contribute to higher firm value by strengthening corporate reputation and reducing the cost of equity; however, these legitimacy-driven benefits diminish when such disclosures are viewed as symbolic rather than reflecting substantive environmental commitment. Overall, these findings demonstrate that legitimacy theory provides a powerful framework for explaining how carbon emissions disclosure can influence firm value, while also highlighting that the effectiveness of disclosure depends on its credibility and societal relevance.

3) Signaling Theory

Corporate disclosure has long been understood as a strategic practice aimed at reducing informational gaps between firms and capital market participants. Within this perspective, signaling theory suggests that firms use disclosure selectively to convey private information about their underlying quality to investors (Spence, 1973; Connelly et al., 2011). In the context of environmental reporting, carbon emissions disclosure can be interpreted as an attempt by firms to communicate their environmental competence, climate-related risk management, and long-term strategic orientation toward sustainability. Firms that possess stronger environmental capabilities are more likely to voluntarily release carbon-related information as a way to distinguish themselves from firms with weaker environmental performance. Such disclosure allows firms to shape investor perceptions by signaling that their environmental initiatives are not merely symbolic but embedded in broader value-creation strategies. Evidence reviewed in this study provides partial support for this argument. Lestari et al. (2024) report that carbon disclosure is associated with higher firm value, both directly and through improvements in financial performance, indicating that markets tend to reward credible environmental information. Relatedly, Sari et al., (2024) show that carbon emissions disclosure links green innovation to firm value, suggesting that disclosure plays an important role in translating environmental investments into economically meaningful signals.

Additional findings indicate that carbon transparency may also function as a risk-related signal. Jin et al. (2025) find that firms with more transparent carbon disclosure experience weaker negative valuation effects from climate change exposure, implying that investors view such disclosure as evidence of effective climate risk management. However, the signaling role of carbon disclosure is not universal. Rahmatika et al. (2024) demonstrate that although financial slack encourages firms to disclose more carbon information, such disclosure does not automatically improve firm value, particularly when investors question its credibility or economic relevance. Taken together, these findings suggest that signaling theory offers a useful—but conditional—framework for explaining how carbon emissions disclosure affects firm value. The effectiveness of disclosure as a signal ultimately depends on its perceived credibility, informational content, and consistency with firms' actual environmental performance.

Table 2. Previous Research Theory

No	Theory	Frequency
1	Stakeholder Theory	15
2	Legitimacy Theory	9
3	Signaling Theory	4

DOI: 10.5281/zenodo.18374378

4	Resource-Based View (RBV) Theory	3
5	Institutional Theory	3
6	Trade-off Theory	3
7	Information Asymmetry Theory	2
8	Agency Theory	2
9	Information Asymmetry Theory	2
10	Voluntary Disclosure Theory	1
11	Value Relevance Theory	1
12	Climate Governance Theory	1

Influential Journal and Studies

Table 3 summarizes the journals that have published influential studies on carbon emissions disclosure, taking into account both publication frequency and citation impact. The International Journal of Energy Economics and Policy records the highest number of publications, with three articles, reflecting the close connection between carbon disclosure research and energy- and policy-related themes. In contrast, Environment, Development and Sustainability contributes fewer articles but attracts relatively high citation counts, indicating strong academic visibility despite lower output. In addition, several journals achieve substantial scholarly impact even though they publish only a single study on the topic. This is particularly evident for journals such as The Accounting Review, Sustainability Accounting, Management and Policy Journal, and Corporate Social Responsibility and Environmental Management, all of which receive exceptionally high citations. Overall, this pattern suggests that although carbon emissions disclosure research is scattered across a wide range of journals, its theoretical and empirical advancement is strongly shaped by a small number of high-impact outlets in accounting, sustainability, and business ethics.

Table 3. List of Influential Journal

No	Journal	Frequency	Citations
1	International Journal of Energy Economics and Policy	3	20
2	Environment, Development and Sustainability	2	42
3	Sustainability Accounting, Management and Policy Journal	1	191
4	Corporate Social Responsibility and Environmental Management	1	179
5	Accounting Review	1	1,086
6	B.E. Journal of Economic Analysis and Policy	1	109
7	Journal of Asian Finance, Economics and Business	1	64
8	Journal of Business Ethics	1	63
9	Review of Quantitative Finance and Accounting	1	62
10	International Review of Financial Analysis	1	61

Table 4 presents a list of influential studies examining the relationship between carbon emissions disclosure and firm value, highlighting their academic impact through citation counts and geographical contexts. The most influential study is Matsumura and Prakash (2014) from the United States, with 1,086 citations, underscoring its seminal role in establishing the firm-value effects of carbon emissions and disclosure practices. This is followed by Saka et al. (2014) from Japan and Lee et al. (2015) from Korea, with 191 and 179 citations respectively, both emphasizing market and corporate value responses to carbon-related disclosure. Kim and Lyon (2011), classified as a global study, has also received substantial attention with 109 citations, particularly in the context of institutional investor activism and shareholder value. Finally, Hardiyansah et al. (2021) represents evidence from Indonesia, with 64 citations, reflecting growing scholarly interest in carbon emissions disclosure and firm value in emerging market contexts.

Table 4. List of Influential Studies

No	Title	Authors	Citation	Country
1	Firm-value effects of carbon emissions and carbon disclosures	Matsumura & Prakash (2014)	1086	US
2	Disclosure effects, carbon emissions and corporate value	Saka et al. (2014)	191	Japan
3	Market responses to firms' voluntary climate change information disclosure and carbon communication	Lee et al. (2015)	179	Korea
4	When does institutional investor activism increase shareholder value? the carbon disclosure project	Kim & Lyon (2011)	109	Global
5	The Effect of Carbon Emission Disclosure on Firm Value: Environmental Performance and Industrial Type	Hardiyansah et al. (2021)	64	Indonesia

Variables Measurement of Carbon Emissions Disclosure and Firm Value

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Table 5 indicates that the Carbon Disclosure Project (CDP) database is the most frequently used measure of carbon emissions disclosure, employed in 16 studies, reflecting its strong credibility, comprehensive coverage, and widespread acceptance in empirical research. This is followed by the carbon emissions disclosure index adopted from GRI-based carbon disclosure, which appears in 6 studies and demonstrates the relevance of internationally recognized sustainability reporting guidelines in measuring firms' carbon-related transparency. Next, the carbon emissions disclosure index adopted from Choi et al. (2013) is used in 4 studies, indicating its continued applicability as a structured and theory-driven measurement approach. Finally, self-developed disclosure indices are employed in 7 studies, suggesting that some researchers prefer customized measurement frameworks to better capture contextual, sectoral, or country-specific characteristics of carbon emissions disclosure.

Table 5. Measurement of Carbon Emissions Disclosure

No	Measurement of Carbon Emissions Disclosure	Frequency
1	Carbon Disclosure Project (CDP) Database	16
2	Carbon Emissions Disclosure index adopted from GRI Based Carbon Disclosure	6
3	Carbon Emissions Disclosure Index adopted from from Choi et al. (2013)	4
4	Others (Self developed index by author)	7

Table 6 shows that Tobin's Q is the most frequently used proxy for firm value, appearing in 21 studies, indicating a strong preference for market-based measures that capture investors' expectations of a firm's future performance. This is followed by market value or market capitalization, which is used in 8 studies and reflects the firm's overall valuation as perceived by the market. Cumulative abnormal return is employed in 4 studies, suggesting its use in assessing short-term market reactions to firm-specific information, while stock price is the least frequently applied measure, appearing in only 2 studies. Overall, the distribution highlights the dominance of forward-looking, market-based indicators in measuring firm value within the literature.

Table 6. Measurement of Firm Value

No	Measurement of Firm Value	Frequency
1	Tobin's Q	21
2	Market Value/Market Capitalization	8
3	Cumulative Abnormal return	4
4	Stock Price	2

Moderating Variables

Table 7 summarizes the moderating variables identified in prior studies examining the relationship between carbon emissions disclosure and firm value. Overall, the findings indicate that the impact of carbon emissions disclosure on firm value is highly contingent on institutional, organizational, governance, and information-related contexts. Institutional factors such as country characteristics, legal origin, regulatory pressure, and Shariah compliance shape how markets interpret and value carbon-related information, while governance mechanisms—including environmental committees, internal control systems, board gender diversity, and board educational background—enhance disclosure credibility and effectiveness. In addition, firm-level attributes such as ESG and environmental performance, industry sensitivity, voluntary disclosure behavior, and environmental communication practices strengthen the positive valuation effects of carbon disclosure. Conversely, information environment characteristics,

particularly investor online social networks, may weaken this relationship by reducing the incremental informational value of disclosure. Collectively, these results underscore that carbon emissions disclosure does not uniformly affect firm value but instead operates through multiple moderating channels that condition market responses.

Table 7. Moderating Variables

No	Moderating variables	Frequency	Result
1	Carbon communication frequency	1	Carbon communication frequency mitigate negative impact of carbon disclosure on firm value.
2	Country	1	The effect of carbon emissions disclosure on firm value is context-dependent across countries; it is significant in certain developing countries but remains inconsistent in others.
3	Disclosure quality	1	High-quality carbon disclosure strengthens the positive effect of carbon emissions disclosure on firm value.
4	ESG performance / ESG-related factors	1	Strong ESG performance strengthens the positive effect of carbon emissions disclosure on firm value, particularly in the context of long-term investors
5	Environmental performance / ISO 14001 / Industry sensitivity	1	Carbon emissions disclosure is more strongly associated with firm value for companies with high environmental performance and those in environmentally sensitive industries
6	Environmental committee	1	An environmental committee increases the credibility of carbon emissions disclosure, which in turn reinforces its impact on firm value.
7	Environmental risk / Information environment	1	In high-risk and high-information environments, carbon

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			emissions disclosure is more relevant to investors and exerts a stronger impact on firm value
8	Internal control	1	Strong internal control systems enhance the credibility of carbon emissions disclosure, thereby strengthening its effect on firm value.
9	Investor online social networks	1	Investors' online social network centrality negatively moderates the positive relationship between interactive carbon emissions disclosure and firm value
10	Legal origin / Internationalization	1	Legal origin and the level of internationalization influence the strength of the moderating effect of carbon emissions disclosure on firm value
11	Regulatory pressure (Kyoto Protocol / Paris Agreement / post-regulation)	1	Participation in the Carbon Disclosure Project (CDP) does not directly enhance firm value; however, it becomes value-relevant when regulatory pressure intensifies, particularly following the ratification of the Kyoto Protocol.
12	Shariah compliance		Sharia compliance strengthens the positive effect of carbon emissions disclosure on firm value, particularly among firms operating under Islamic governance frameworks
13	Voluntary vs non-discloser	1	Voluntary disclosing firms receive more positive market responses than non-disclosing firms.
14	Women on board	1	The presence of women on the board strengthens the effect of carbon emissions disclosure on firm value, even though the direct effect of carbon emissions disclosure is not always significant.
15	Education background (board)	1	Board educational background strengthens the relationship between carbon emissions disclosure and firm value through improvements in disclosure quality.
16	Industrial pollution level & environmental communication	1	Industrial pollution intensity and the presence of an environmental or sustainability committee moderate the relationship between reported carbon emissions and firm value, with stronger market penalties observed for low-polluting firms and for firms that have such committees

Mediating Variables

Table 8 summarizes the mediating mechanisms identified in prior studies linking carbon-related disclosure and performance to firm value. Overall, the evidence indicates that the valuation effects of carbon disclosure operate primarily through economic, informational, and reputational channels.

Specifically, interactive carbon disclosure enhances firm value by reducing the cost of equity and improving corporate reputation, although these mediating effects may be attenuated when investor online social network centrality is high. In addition, financial analyst following and corporate governance quality mediate the negative valuation effects of embedded CO_2 disclosure, while corporate governance alone channels the impact of annual emissions disclosure. Financial performance also emerges as an important mediator, transmitting the positive effect of carbon performance—but not carbon information disclosure—on firm value. Finally, information asymmetry and corporate reputation jointly mediate the relationship between carbon disclosure and firm value, with high-quality declarative and interactive disclosures reducing information asymmetry and strengthening reputational capital, whereas low-quality interactive disclosure produces the opposite effect.

Table 8. Mediating Variables

No	Mediating variables	Frequency	Result
1	Cost of equity & firm reputation	1	Interactive carbon disclosure increases firm value through reduced cost of equity and enhanced corporate reputation, although these mediating effects are weakened by high investor online social network centrality
2	Financial analyst following & corporate governance quality	1	Financial analyst following and corporate governance mediate the negative effect of embedded CO_2 disclosure on firm value, while only corporate governance mediates the impact of annual CO_2 emissions disclosure.

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3	Financial Performance	1	Financial performance mediates the positive effect of carbon performance on firm value but does not mediate the relationship between carbon information disclosure and firm value
4	Information asymmetry & reputation	1	Information asymmetry and corporate reputation mediate the effect of carbon disclosure on firm value, with high-quality declarative and interactive disclosures reducing information asymmetry and enhancing reputation, while low-quality interactive disclosure has the opposite effect.

Future Research

Future research should move beyond examining the direct association between carbon emissions disclosure (CED) and firm value by further unpacking the underlying mechanisms and boundary conditions that explain the observed heterogeneity in prior findings. While existing studies have identified several moderating and mediating variables, their use remains fragmented and largely exploratory. Future empirical work is encouraged to adopt integrated research designs that simultaneously examine multiple mediating channels, such as information asymmetry, cost of capital, reputation, and financial performance, within unified theoretical frameworks. In addition, greater attention should be given to disclosure quality, credibility, and communication style (e.g., declarative versus interactive disclosure, to distinguish substantive transparency from symbolic reporting. From a conceptual standpoint, future research could advance the literature by moving beyond single-theory explanations and instead integrating established perspectives, such as stakeholder, legitimacy, and signaling theories, with newer lenses including climate governance theory and the resource-based view. Such integration would allow scholars to more fully capture the strategic role of carbon disclosure in firm value creation. In addition, there is a clear need to broaden the contextual focus of existing studies. Comparative cross-country analyses, longitudinal research designs, and closer attention to institutional conditions, such as regulatory stringency, legal systems, and sustainability policy frameworks, would help explain why the value relevance of carbon disclosure varies across settings.

Further progress may also be achieved by reconsidering how firm value is operationalized. Given the heavy reliance on market-based measures in prior studies, future work could incorporate accounting-based or hybrid valuation indicators to provide a more nuanced assessment of value implications. From a methodological perspective, the application of more sophisticated econometric approaches, text-based analysis using machine learning, and ESG-oriented disclosure metrics may improve measurement accuracy and mitigate subjectivity in carbon emissions disclosure indices. Finally, emerging topics, including digital forms of carbon disclosure, greenwashing concerns, and differences in investor horizons, warrant closer examination to ensure that carbon disclosure research continues to reflect evolving capital market conditions and global sustainability priorities.

4. Conclusions

This review brings together empirical studies that examine the link between carbon emissions disclosure (CED) and firm value and reveals that the relationship cannot be characterized by a single, uniform pattern. Although a considerable number of studies suggest that transparent carbon disclosure is valued by the market—often through enhanced stakeholder confidence, legitimacy, and signaling effects—other evidence points to weak, insignificant, or even adverse valuation consequences. These less favorable outcomes are frequently associated with disclosure-related costs, doubts about credibility, and concerns over symbolic reporting or greenwashing.

Importantly, the findings reviewed in this study indicate that the effect of carbon emissions disclosure on firm value is rarely straightforward. Instead, it is shaped by contextual and organizational conditions, including institutional environments, governance structures, ESG-related attributes, and regulatory pressures. In many cases, the value implications of disclosure materialize indirectly through channels such as corporate reputation, information asymmetry, financing costs, and financial performance. Viewed in this way, carbon emissions disclosure should be interpreted as a strategic and context-sensitive practice rather than an inherently value-enhancing activity. These insights carry practical implications: regulators and policymakers are encouraged to improve disclosure standards and assurance frameworks to strengthen credibility, while managers and investors should place greater emphasis on the quality, consistency, and substantive nature of carbon-related disclosures when assessing firm value.

Despite offering a comprehensive synthesis, this study is subject to several limitations that suggest directions for future inquiry. The review focuses exclusively on Scopus-indexed journal articles, which may result in the omission of relevant contributions published in other databases or reputable regional outlets. In addition, the diversity of empirical designs and measurement approaches across studies constrains direct comparison and aggregation of findings. Furthermore, the limited number of studies that explicitly examine mediating mechanisms or interactive disclosure practices restricts the scope for broader theoretical generalization. Addressing these limitations, future research could widen the range of data sources, apply meta-analytic methods, and adopt longitudinal as well as cross-country research designs to better account for institutional variation. Greater attention to disclosure credibility and quality—through the use of textual analysis, assurance-related variables, and investor heterogeneity—would also help advance a more refined and theory-driven understanding of the conditions under which carbon emissions disclosure influences firm value.

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