

ESG PERFORMANCE AND CARBON DISCLOSURE EFFECTIVENESS: INSIGHTS FROM A SYSTEMATIC REVIEW OF CARBON EMISSION INTENSITY STUDIES

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Abstract: This study aims to systematically review empirical evidence on the influence of Environmental, Social, and Governance (ESG) practices and carbon disclosure on carbon emission intensity (CEI). The research problem arises from inconsistent findings across previous studies regarding whether ESG and disclosure effectively reduce emission intensity. Using a systematic literature review (SLR) approach, sixty empirical studies published between 2017 and 2025 were analyzed based on their research design, context, analytical method, and the direction of ESG–CEI relationships. The analysis reveals heterogeneous results: 27% of studies found a negative relationship, 22% a positive relationship, and the rest mixed or insignificant effects. Regression-based methods dominate the empirical approaches, particularly multiple linear regression and panel data analysis. These findings suggest that the impact of ESG and disclosure on CEI varies depending on contextual factors such as regulatory environment, industry characteristics, and disclosure quality. The study concludes that while ESG performance tends to contribute to emission reduction, its effectiveness remains conditional and context-dependent. Future research should focus on causal identification, longitudinal design, and emerging markets to better clarify the decarbonization potential of ESG practices.

Keywords: Carbon Disclosure; Carbon Emission Intensity; Environmental, Social, and Governance (ESG); Sustainability Reporting; Systematic Literature Review

Abstrak: Penelitian ini bertujuan untuk meninjau secara sistematis bukti empiris mengenai pengaruh praktik Environmental, Social, and Governance (ESG) dan pengungkapan karbon terhadap intensitas emisi karbon (Carbon Emission Intensity/CEI). Permasalahan penelitian muncul dari temuan sebelumnya yang tidak konsisten terkait efektivitas ESG dan pengungkapan dalam menurunkan intensitas emisi. Dengan menggunakan pendekatan Systematic Literature Review (SLR), sebanyak enam puluh studi empiris yang diterbitkan antara tahun 2017 hingga 2025 dianalisis berdasarkan desain penelitian, konteks, metode analisis, serta arah hubungan antara ESG dan CEI. Hasil analisis menunjukkan adanya heterogenitas temuan: 27% studi menemukan hubungan negatif, 22% hubungan positif, dan sisanya menunjukkan hasil campuran atau tidak signifikan. Metode regresi, terutama regresi linier berganda dan analisis data panel, merupakan pendekatan empiris yang paling dominan. Temuan ini menunjukkan bahwa pengaruh ESG dan pengungkapan karbon terhadap CEI bergantung pada faktor kontekstual seperti lingkungan regulasi, karakteristik industri, dan kualitas pengungkapan. Penelitian ini menyimpulkan bahwa meskipun kinerja ESG cenderung berkontribusi terhadap penurunan emisi, efektivitasnya tetap bersifat kondisional dan tergantung konteks. Penelitian selanjutnya disarankan untuk fokus pada identifikasi kausal, desain longitudinal, serta konteks pasar berkembang guna memperjelas potensi dekarbonisasi melalui praktik ESG.

Kata Kunci: Lingkungan, Sosial, dan Tata Kelola (ESG); Pengungkapan Karbon; Intensitas Emisi Karbon; Pelaporan Keberlanjutan; Tinjauan Pustaka Sistematis

INTRODUCTION

In recent years, the global movement toward sustainability and carbon neutrality has intensified the demand for transparent corporate environmental accountability. Environmental, Social, and Governance (ESG) practices have emerged as a comprehensive framework that encourages firms to integrate sustainability objectives into business strategies. Among the various ESG dimensions, the disclosure of carbon emissions has become a focal point of attention, as it reflects a company's commitment to mitigating climate risks and reducing carbon intensity. The increasing number of regulations and investor expectations has further strengthened the role of ESG reporting as a critical instrument for promoting low-carbon corporate transitions.

However, despite the growing emphasis on ESG disclosure, empirical evidence on its effectiveness in reducing carbon emission intensity remains inconsistent. Several studies reveal that ESG implementation and carbon reporting can significantly improve firms' carbon performance by enhancing transparency, promoting energy efficiency, and reducing emission intensity (Yin et al., 2023). In contrast, other research finds that ESG disclosure does not always translate into lower carbon emissions, and in some cases, it merely serves as symbolic compliance rather than substantive environmental action (Lee et al., 2021). Such contradictory findings suggest that ESG performance may not automatically ensure emission reduction, and its impact may depend on contextual factors such as governance quality, institutional enforcement, and firm-level capabilities.

This inconsistency becomes even more apparent in developing countries, where ESG reporting practices are still evolving. Many firms in emerging markets adopt ESG disclosure to meet regulatory or investor pressures, yet their implementation often lacks strategic integration with core operational goals. The absence of standardized frameworks, differences in disclosure quality, and institutional gaps contribute to mixed findings on ESG effectiveness in reducing carbon emission intensity. Moreover, the limited number of longitudinal studies and causal analyses in these regions hinders a clear understanding of how ESG initiatives translate into tangible decarbonization outcomes.

Given these challenges, this study aims to systematically review the empirical literature on the effectiveness of ESG performance and carbon disclosure in influencing carbon emission intensity. Using a Systematic Literature Review (SLR) approach, this paper synthesizes findings from sixty peer-reviewed studies published between 2017 and 2025 to identify patterns, inconsistencies, and research gaps. The review contributes to the ongoing discourse on ESG and sustainability by providing a comprehensive understanding of how ESG disclosure operates across different contexts, especially within developing economies, and by proposing future research directions to strengthen the link between ESG and corporate decarbonization.

LITERATURE REVIEW

ESG Disclosure and Carbon Emission Intensity

ESG disclosure has become an essential mechanism for communicating a firm's sustainability practices, especially regarding climate-related risks and carbon management. Prior studies demonstrate that transparent ESG reporting can help reduce information asymmetry, strengthen corporate accountability, and encourage firms to adopt environmentally responsible strategies. Yin et al. (2023) found that ESG disclosure significantly improves corporate carbon performance in heavy-polluting industries in China, showing that higher disclosure levels are associated with measurable reductions in carbon intensity. Their findings further indicate that external monitoring mechanisms—such as institutional pressure and media attention—strengthen the influence of ESG disclosure on carbon performance. However, the relationship between ESG disclosure and carbon emission intensity remains mixed across empirical studies. Some research suggests that ESG-related transparency enhances legitimacy and corporate reputation without necessarily reducing emissions. Lee et al. (2021) argue that voluntary carbon disclosure often enhances perceived transparency but may not lead to substantive emission reductions, particularly when firms prioritize symbolic compliance over operational environmental improvement. These findings indicate that while ESG disclosure may signal environmental commitment, it may not consistently translate into genuine carbon-reduction outcomes.

Studies from developing countries reinforce these inconsistencies. Putri and Paramita (2025) reported that ESG disclosure had no significant impact on firm value in Indonesia, whereas carbon emission disclosure did. This result suggests that carbon-specific transparency carries more influence in emerging markets than broad ESG reporting, which may be variable in quality and depth. More recently, Li and Xu (2024) showed that ESG ratings in Chinese listed firms can significantly reduce carbon emissions by mitigating financing constraints and lowering agency conflicts. Their findings suggest that ESG can effectively support carbon-reduction efforts when supported by strong governance mechanisms and external stakeholder scrutiny.

Taken together, these studies reveal a context-dependent relationship between ESG disclosure and carbon emission intensity. The effectiveness of ESG disclosure appears to rely on disclosure quality, institutional strength, and the level of external monitoring. These variations explain why empirical results across countries and industries remain inconsistent.

ESG, Carbon Emission Disclosure, and Trends in Developing Countries

The inconsistent findings regarding ESG disclosure and carbon emission intensity are even more pronounced in developing countries, where reporting standards, governance structures, and stakeholder expectations are still evolving. Firms in emerging markets often adopt ESG disclosure to satisfy regulatory signals or investor-driven expectations rather than as part of deeper environmental strategies. This variability in motivation and capacity contributes to differing outcomes across empirical studies.

Research in Indonesia by Putri and Paramita (2025) illustrates this issue clearly. Their results indicate that while carbon emission disclosure significantly affects firm value, ESG disclosure does not. This difference suggests that carbon-related information is perceived as more credible, relevant, and decision-useful than general ESG reporting in emerging economies, where ESG data quality may vary significantly. Such findings imply that some firms may use ESG disclosure primarily to achieve legitimacy or regulatory compliance rather than as evidence of substantive environmental improvement. Yin et al. (2023) similarly highlight the conditional nature of ESG effectiveness in China. Their study shows that ESG disclosure improves carbon performance only in contexts where external monitoring, such as media attention and institutional support, is strong. Meanwhile, Li and Xu (2024) found that ESG ratings reduce carbon emissions primarily through mechanisms that reduce agency problems and strengthen governance efficiency. The effect is more pronounced in high-polluting industries and firms subject to greater public scrutiny.

These findings collectively suggest that in developing countries, ESG disclosure is most effective when supported by strong institutional frameworks, credible reporting standards, and active stakeholder oversight. Where these conditions are weak, ESG disclosure alone may not meaningfully influence carbon emission intensity—reinforcing the need for stronger environmental governance in emerging markets.

Theoretical Perspectives on ESG and Carbon Performance

Several theoretical perspectives help explain why ESG disclosure exhibits inconsistent effects on carbon emission intensity. Stakeholder Theory posits that firms respond to the expectations of various stakeholders, including investors, regulators, and communities. Firms facing strong stakeholder pressure—particularly those in environmentally sensitive industries—are more likely to adopt ESG practices that lead to genuine reductions in carbon emissions. This aligns with findings such as those by Li and Xu (2024), who found that ESG ratings exert stronger effects in high-pollution industries that face heightened public scrutiny.

Signaling Theory suggests that ESG disclosure serves as a mechanism to signal environmental responsibility and long-term sustainability. Firms with strong ESG performance use disclosure to differentiate themselves. However, the credibility of such signals depends on disclosure quality, external verification, and governance strength. Yin et al. (2023) show that ESG disclosure has a stronger influence on carbon performance when firms operate under strong institutional pressure and media oversight, highlighting the importance of credible signal reinforcement.

Legitimacy Theory explains why firms may disclose ESG information without necessarily improving their environmental performance. In environments where regulation is weak and enforcement limited, firms may engage in ESG disclosure primarily to maintain legitimacy rather than implement substantive carbon-reduction strategies. Evidence from Putri and Paramita (2025) suggests that such symbolic practices may be common in developing economies, where ESG disclosure does not always correspond to measurable environmental outcomes.

Agency Theory provides another perspective by suggesting that ESG reporting can reduce information asymmetry and agency conflicts between managers and stakeholders. Li and Xu (2024) argue that ESG ratings enhance governance discipline, enabling stakeholders to monitor environmental behavior more effectively and thereby incentivizing emission reduction.

Together, these theories explain why ESG disclosure yields different outcomes across contexts. Strong institutional environments and credible monitoring mechanisms tend to amplify the positive effects of ESG disclosure, while weak governance environments increase the likelihood of symbolic reporting. These theoretical foundations help illuminate the heterogeneity found in empirical studies.

Research GAP

Although ESG disclosure and carbon emission reporting continue to grow globally, the literature remains fragmented. Studies use different ESG metrics, examine varied industries, and apply different analytical methods, leading to inconsistent results. Evidence from developing countries is still limited, and empirical findings often contradict one another. Furthermore, few studies systematically compare findings across multiple contexts to understand when ESG disclosure effectively reduces carbon emission intensity. Given these gaps, a systematic literature review (SLR) is needed to synthesize existing findings, map inconsistencies, and clarify the mechanisms through which ESG and carbon disclosure influence emission intensity—especially in emerging markets where disclosure practices are evolving.

RESEARCH METHODOLOGY

Research Design

This study employs a Systematic Literature Review (SLR) to synthesize empirical evidence on the relationship between ESG disclosure, carbon emission disclosure, and carbon emission intensity. The SLR method was chosen because it allows for a transparent, rigorous, and replicable procedure in identifying, evaluating, and integrating findings across multiple empirical studies. This review follows the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological clarity and reporting consistency.

Database Selection and Search Strategy

The literature search was conducted across major academic databases known for their comprehensive coverage of peer-reviewed social science and sustainability research, including:

- Scopus
- ScienceDirect
- Web of Science
- Google Scholar

The search focused on studies published from 2017 to 2025, reflecting the period when ESG reporting frameworks and carbon emission disclosure practices began receiving heightened regulatory and academic attention.

Keywords and Boolean Operators

The search keywords were selected to capture variations of ESG and carbon-related terminologies. Boolean operators were used to expand or narrow results as needed. Search terms included combinations of:

- “ESG disclosure” OR “ESG performance”
- “carbon emission disclosure” OR “carbon reporting”
- “carbon emission intensity” OR “carbon performance”
- “corporate carbon emissions” AND “ESG”

Search syntax was adapted to the requirements of each database.

Inclusion and Exclusion Criteria

To ensure the relevance and quality of the selected literature, the following **inclusion criteria** were applied:

1. Empirical studies using quantitative methods
2. Corporate-level or firm-level analysis
3. Examined variables related to ESG disclosure, ESG performance, or carbon emission disclosure
4. Reported carbon-related outcomes (e.g., carbon emission intensity, carbon performance)
5. Published in peer-reviewed journals between 2017–2025
6. Available in full-text

Studies were **excluded** if they:

1. Were conceptual papers, reviews, conference proceedings, or book chapters
2. Did not measure ESG or carbon-related variables
3. Focused on national, household, or non-corporate emission contexts
4. Lacked methodological clarity
5. Used incomplete or unverified data
6. Were not accessible in full-text format

PRISMA-Based Literature Screening Process

The PRISMA flow process ensured that literature selection was carried out systematically and transparently through four stages:

a. Identification

A total of 472 articles were retrieved from the four target databases using the search terms. An additional 17 studies were identified through citation searching.

b. Screening

After removing 103 duplicate records, 386 unique articles remained for screening. Titles and abstracts were reviewed to eliminate articles not relevant to ESG, carbon emissions, or corporate-level analysis. As a result, 282 articles were excluded.

c. Eligibility

The remaining 95 articles underwent full-text review to ensure alignment with inclusion criteria. Articles were excluded for reasons such as lacking empirical analysis, missing carbon outcome variables, or insufficient methodological transparency. A total of 35 articles were excluded at this stage.

d. Inclusion

Finally, 60 empirical studies met all criteria and were included in the Systematic Literature Review. These studies form the basis for the synthesis presented in subsequent sections.

PRISMA Flow Diagram

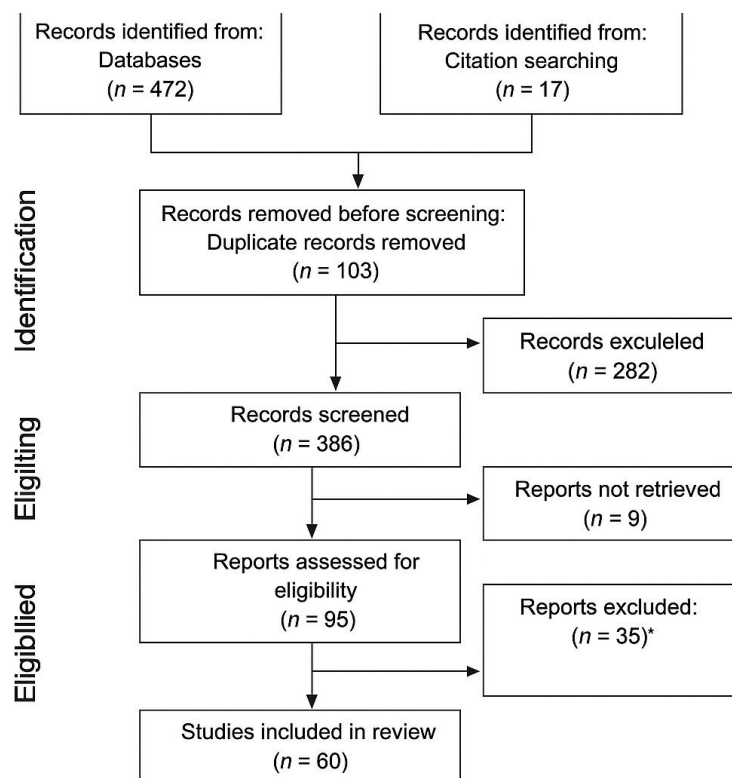


Figure 1. PRISMA Flow Diagram

To visually represent the SLR process, the PRISMA flow diagram summarizes the number of studies identified, screened, excluded, and ultimately selected for final inclusion.

Quality Assessment

Each included study was assessed based on standard SLR quality criteria, including:

- Clarity of research purpose
- Appropriateness of research design
- Transparency of ESG and carbon variable measurement

- Robustness of empirical methods (e.g., panel regression, GMM, SEM)
- Completeness of reporting

Only studies meeting the minimum quality threshold were retained.

Data Extraction and Coding

A structured extraction matrix was used to collect key information from each study, including:

- Author(s) and year
- Journal and publication details
- Country or regional focus
- Sample characteristics
- Variables (ESG disclosure, carbon emission disclosure, carbon emission intensity)
- Analytical methods used
- Main empirical findings (positive, negative, mixed, or insignificant)

The coding and categorization of findings enabled the identification of trends, inconsistencies, and contextual influences across the 60 studies reviewed.

RESULT AND DISCUSSION

The synthesis of 60 empirical studies reveals that the relationship between ESG disclosure and carbon emission intensity is complex, heterogeneous, and largely context-dependent. While ESG disclosure is often expected to promote transparency, improve accountability, and encourage firms to adopt environmentally responsible practices, evidence from prior research shows that its actual impact varies widely across countries, industries, and methodological approaches. This section discusses the major themes emerging from the literature, including the inconsistency of ESG effects, the stronger role of carbon-specific disclosure, institutional dynamics in developing countries, methodological disparities, and the broader conditions under which ESG becomes effective in reducing carbon emission intensity.

Table 1. Article Systematic Literature Review

No	Article	Author	Journal	Year
1	Can ESG enhance the efficacy of emissions trading systems on enterprise productivity: Evidence from China	Qiang Tu, Jianing Wang, Limei Zuo, Ye Yao, Qiang Ji	Research in International Business and Finance	2025
2	The real effects of ESG reporting and GRI standards on carbon mitigation : International evidence	LeLuo, QingliangTang	Wiley Business strategy and Environment	2022
3	A Sustainable Development Evaluation Framework for Chinese Electricity Enterprises Based on SDG and ESG Coupling	Ruiyu Dong, Chaofeng Shao, Shuqi Xin dan Zhirui Lu	Sustainability	2023

4	Board gender diversity reform and corporate carbon emissions	Raúl Barroso, Tinghua Duan, Siyue (Sarina) Guo Oskar Kowalewski	Journal of Corporate Finance. Tahun	2024
5	Can ESG rating reduce corporate carbon emissions? – An empirical study from Chinese listed companies	Jinlong Li, Xiaoguang Xu	Journal of Cleaner Production	2024
6	Carbon Emission Disclosure: Strategies for Addressing External Pressures in Indonesia	Wiyasto Dwi Handono, Dian Indri Purnamasari , Noto Pamungkas.	Proceeding of internasional conference on accounting and finance	2025
7	Carbon Emissions Disclosure: Financial Performance and Industry Characteristics of companies rated by Morningstar Sustainalytics		Proceedings of the 9th International Conference on Accounting, Management, and Economics (ICAME)	2024
8	Carbon emissions, carbon disclosure and organizational performance	Yang Stephanie Liu, Xiaoyan Zhou, Jessica Hong Yang, Andreas G.F. Hoeper, Nada Kakabadse	International Review of Financial Analysis	2025
9	CARBON FOOTPRINT AND PRODUCTIVITY: DOES THE “E” IN ESG CAPTURE EFFICIENCY AS WELL ASENvironment?	Gerald T. Garvey, Mohanaraman Iyer and Joanna Nash	Journal Of Investment Management	2018
10	Carbon reduction effect of ESG: empirical evidence from listed manufacturing companies in China	Jian Ye and Wenhua Xu	Frontiers in Ecology and Evolution	2023
11	Climate change, ESG criteria and recent regulation: challenges and opportunities	Mónica Oliver Yébenes	Eurasian Economic Review	2024
12	Corporate climate scores, carbon emissions, and investment in decarbonisation in the steel industry. What do ratings tell us?	Charlie Cregan, J. Andrew Kelly, J. Peter Clinch	Environmental and Sustainability Indicators	2024
13	Corporate Governance, Green Investment, and Carbon Emission Disclosure	I Made Dwi Kusumajaya, I Gusti Ayu Nyoman Budiasih	E-JURNAL AKUNTANSI	2025
14	Determinants of carbon emission disclosure and the moderating role of environmental performance	I. F. S. Wahyuningrum, M. Ihlashul’amal, S. Utami, H. G. Djajadikerta & S. Sriningsih	Cogent Business & Management	2024

15	Do corporate sustainability initiatives improve corporate carbon performance? Evidence from European firms	Faizul Haque, Collins G.Ntim	Wiley Business strategy and Environment	2022
16	Does Corporate ESG Performance Influence Carbon Emissions?	Ziyang Liu, Baogui Yang, Bernadette Andreosso-O'Callaghan, Xiaobao Zhang	Sustainability	2025
17	Does environmental, social, and governance (ESG) disclosure matter for carbon intensity? Evidence from S&P 500 firms	Rupjyoti Saha, Santi Gopal Maji.	Journal of Environmental Management	2025
18	Does ESG investment reduce carbon emissions in China?	Yingnan Cong, Chen Zhu, Yufei Hou, Shuairu Tian and Xiaojing Cai		
19	Does genetic diversity on corporate boards lead to improved environmental performance?	Renatas Kizysa, Emmanuel C. Mamatzakis, Panagiotis Tzouvanas	Journal of International Financial Markets, Institutions & Money	2023
20	Driving toward sustainable cities: The interplay between Chinese emerging corporate ESG performance and climate finance in achieving low-carbon development	Muxin Liu, Changyou Xia, Hailin Lan, Zhihao Gao, Xiaojie Yu, Li Wang, Xi Liang, Yi Wu	Urban Climate	2024
21	Environmental, social and governance (ESG) disclosure quality in developing countries: evidence from the ASEAN region	Malik Abu Afifa; Nha Minh Nguyen; Duong Van Bui	Corporate Governance	2025
22	ESG Disclosure and Sustainability Transition: A New Metric and Emerging Trends in Responsible Investments	Maurizio Pompella dan Lorenzo Costantino	TalTech Journal of European Studies	2023
23	ESG performance and corporate carbon emission intensity: based on panel data analysis of A-share listed companies	Hanjin Xie, Zilong Qin, Jun Li.	frontiers in Environmental Science	2024
24	ESG Performance and Firm Value: An Empirical Study in Indonesia	Isti Rahayu, Muhammad Isnanda Nurman Sanjaya	Review of Integrative Business and Economics Research	2024
25	ESG performance, board diversity and tax avoidance: empirical evidence from the UK	Elgharabawy Adel, Aladwey, Laila Mohamed Alshawadfy	Journal of Financial Reporting and Accounting	2025
26	ESG Scores, Financial Performance, and Carbon	Eko Putri Setiani, Patriani Wahyu Dewanti, Stefanie Cortez		

Emissions: Evidence from Southeast Asian Companies			
27	ESG strategic choices under product Innovation Financing	Shuli Yang, Junwu Chai, Zhifeng Qian	Journal of Environmental Management 2025
28	Evaluating Corporate Carbon Emissions Reporting: Assessing Transparency and Completeness with the Carbon Integrity Index	José Traub, Carlos Morillas, Rodrigo Gil, Sergio Álvarez and Sara Martínez	Sustainability 2023
29	Evolution of corporate carbon information disclosure considering the reward and punishment mechanism and new media environment	Tianjiao Jiang, Hua Li, Qiubai Sun	International Review of Financial Analysis 2025
30	Funding sustainable shipping: A Fuzzy Cognitive Mapping approach to the Poseidon Principles	Omer Soner	Transportation Research Part D 2025
31	GHG and Carbon Emission Intensity: Examining Their Impact on Financial Performance	Yamunah Vaicondam, Amira Mas Ayu Amir Mustafa, Siti Nurul Munawwarah Roslan, Kelvin Lee Yong Ming, Malarvilly Ramayah.	
32	Green bond issuance and corporate ESG performance: Steps toward green and low-carbon development	Jinlin Zheng, Yaohui Jiang, Yadong Cui, Yue Shen	Research in International Business and Finance 2023
33	Greenwashing in environmental, social and governance disclosures	Ellen Pei-yi Yua, Bac Van Luub, Catherine Huirong Chen	Research in International Business and Finance 2020
34	Greenwashing, carbon emission, and ESG	Sirimon Treepongkaruna, Hue Hwa AuYong, Steen Thomsen, Khine Kyaw	Wiley Business Strategy and Business Environment 2024
35	How does environmental information disclosure affect carbon emissions? Evidence from China	Shi He, Lulu Xu & Daqian Shi	Environmental Science and Pollution Research 2023
36	How Green Finance Drives the Synergy of Pollution Reduction and Carbon Mitigation: Evidence from Chinese A-Share Firms	Xiaoqing Li, Jingjing Deng	Sustainability 2025
37	Impacts of ESG Disclosure on Corporate Carbon Performance: Empirical Evidence from Listed	Fengxue Yin ,Yanling Xiao, Rui Cao and Jianhua Zhang	Sustainability 2023

Companies in Heavy Pollution Industries				
38	Is corporate green investment a determinant of corporate carbon emission intensity? A managerial perspective	Sisi Zheng, Shanyue Jin	Heliyon	2023
39	Mandatory environmental disclosure policy in the largest carbon emission country	Wei Cai; Min Bai; Howard Davey	Pacific Accounting Review	2024
40	Research on the impact of the ESG rating divergence of manufacturing firms on carbon emission intensity	Jialu Deng, Wenhe Lin, Jiuzhen Huang, Yuning Cai, Wenbao Wang	PLOS One	2025
41	ROE as A Moderating Influence of ESG, Green Innovation and Carbon Emission Disclosure on Firm Value	Andri Indrawan, Irfan Sophan Himawan, Elan Eriswanto, Salma Amelia Rahmadini	BALANCE : Economic, Business, Management, and Accounting Journal	2025
42	Study on the effect of carbon trading on the carbon emission intensity of enterprises—a mechanism test based on ESG performance. Penulis : Anzi Han, Tinglei Yu, Yihu Ke, Chang Liu, Yunqiang Liu. Penerbit :. Tahun : 2024	Anzi Han, Tinglei Yu, Yihu Ke, Chang Liu, Yunqiang Liu	Front. Environ Sec. Environmental Policy and Governance	2024
43	The effect of carbon regulation initiatives on corporate ESG performance in real estate sector: International evidence	Chyi Lin Lee, Jian Liang	Journal of Cleaner Production	2024
44	The Effect of Environmental, Social and Governance (ESG) Assessment on Firm Value with Profitability as a Mediating Variable	Devi Cheilsa Sumarno, Wuryan Andayani, Yeney Widya Prihatiningtias	Asia-Pacific Management and Business Application	2023
45	The Effect of Environmental, Social, and Governance Disclosure on Firm Value	Thalia Angela, and Nuraini Sari	Jambura Economic Education Journal	2023
46	The Effect of ESG Disclosure, Green Investment, and Carbon Emission Disclosure on the Value of Energy Companies in Indonesia (2019–2023)	Alyssa Aulya Putri, Veronika Santi Paramita	Sinergi International Journal of Accounting & Taxation (Non Scopus)	2025
47	The Effect of Female Personnel on the Voluntary Disclosure of Carbon Emissions Information.	Eunsoo Kim	Sustainability	2022

Penulis : Eunsoo Kim. Penerbit : Tahun : 2022				
48	THE IMPACT OF ESG ON FIRM VALUE WITH AUDIT COMMITTEE AS VARIABLE MODERATING	Al Dimas Saputra, Eddy Suranta, Lisa Martiah Nila Puspita	Jambura Economic Education Journal	2024
49	The impact of ESG ratings on low carbon investment: Evidence from renewable energy companies	Juan Lu, He Li	Renewable Energy	2024
50	The Impact of ESG Regulation on Environmental Decoupling—An Exploratory Study on Polish Listed Companies	Marco Papa, Monika Wiecezorek-Kosmala, Anna Losa and Aleksandra Swalek	Sustainability	2024
51	The influence of institutional contexts on the relationship between voluntary carbon disclosure and carbon emission performance	Le Luo	Accounting and Finance	2017
52	The real effects of ESG reporting and GRI standards on carbon mitigation: International evidence	LeLuo, QingliangTang	Wiley Business Strategy and Business Environment	2022
53	The relationship between ESG, financial performance, and cost of debt: the role of independent assurance	Darsono Darsono, Dwi Ratmono, Abas Tujori & Tiara Yuni Clarisa	Cogent Business & Management	2025
54	Time-frequency connectedness among traditional/new energy, green finance, and ESG in pre- and post-Russia-Ukraine war periods	Wei Jiang, Lingfei Dong, Yunfei Chen	Resources Policy	2023
55	Unveiling the effects of the Corporate Sustainability Reporting Directive (CSRD) on company sustainability reporting practices : a case of German companies	Rabin Sharma	Sustainability Accounting, Management and Policy Journal	2025
56	Voluntary Disclosure of Carbon Emissions and Sustainable Existence of Firms: With a Focus on Human Resources of Internal Control System	Jaehong Lee, Suyon Kim and Eunsoo Kim	Sustainability	2021

Source : data processed by researchers (2025)

Inconsistency of ESG Effects on Carbon Emission Intensity

One of the key findings from this SLR is the notable inconsistency across empirical outcomes. Approximately 27% of the reviewed studies report a significant negative relationship between ESG disclosure and carbon emission intensity, suggesting that ESG transparency can drive firms to reduce emissions by enhancing environmental efficiency and aligning with stakeholder expectations. These

effects are particularly evident in studies conducted in high-polluting industries or in countries with strong regulatory and monitoring environments. However, almost half of the studies exhibit **mixed**, **ambiguous**, or **non-significant** results. Several authors argue that ESG disclosure may sometimes serve more as a symbolic act than a substantive environmental commitment. In such cases, firms disclose ESG information to enhance legitimacy and reputation without implementing real carbon-reduction strategies. This aligns with legitimacy theory, where disclosure is used as a tool to signal compliance rather than to demonstrate genuine environmental performance. The findings highlight that ESG disclosure alone does not guarantee emission reductions unless supported by meaningful operational changes.

Stronger and More Consistent Effects of Carbon Emission Disclosure

Across the literature, carbon emission disclosure appears to have a stronger and more consistent impact on carbon performance compared to general ESG disclosure. Carbon-specific information—such as Scope 1 and Scope 2 emissions—is inherently more measurable, comparable, and verifiable. Thus, stakeholders are better able to assess a firm's actual climate performance, creating greater pressure for reduction initiatives.

In contrast, ESG disclosure encompasses broad dimensions (environmental, social, and governance), which may dilute its predictive power for carbon outcomes. Firms may score highly in social or governance categories while still exhibiting poor environmental performance. This heterogeneity contributes to inconsistent empirical findings. Particularly in emerging markets, ESG disclosure is often narrative-based and lacks standardized measurement, further limiting its usefulness in predicting emission intensity.

Institutional Environment and Emerging Market Dynamics

Differences between developed and developing countries are especially prominent. In emerging markets such as Indonesia, Bangladesh, Vietnam, and Pakistan, ESG disclosure frequently fails to demonstrate significant impact on carbon intensity. This is primarily due to:

- weak regulatory enforcement,
- non-standardized ESG reporting frameworks,
- low levels of external monitoring,
- limited sustainability capabilities within firms,
- and the presence of symbolic or compliance-driven reporting.

Studies from China offer more nuanced insights. Research indicates that ESG disclosure can reduce carbon emissions when supported by strong institutional environments, including media scrutiny, analyst coverage, and robust governance mechanisms. ESG tends to be more effective when firms face real economic, reputational, or regulatory consequences for poor environmental performance. These findings reinforce the argument that institutional strength determines whether ESG disclosure functions as a catalyst for sustainability or merely as a symbolic gesture.

Influence of Methodological and Measurement Differences

Inconsistencies across empirical findings also stem from differences in research design, measurement choices, and analytical techniques. While panel regressions are the most common methodological approach, several studies employ GMM, difference-in-differences, mediation frameworks, or structural equation modeling. These methodological variations lead to differences in effect size, direction, and significance.

Key sources of methodological diversity include:

- the type of ESG measurement (ratings vs. disclosure indices),
- carbon intensity measurement (absolute emissions vs. intensity per revenue or assets),
- time periods and sample firm characteristics,
- sectoral differences (high-pollution vs. non-polluting industries),
- treatment of endogeneity (OLS vs. GMM vs. instrumental variables).

These variations underscore why some studies report strong ESG–carbon links while others observe weak or contradictory outcomes. Understanding these methodological differences is critical for interpreting the literature accurately.

When Does ESG Disclosure Reduce Carbon Emissions?

Based on the synthesis of 60 studies, ESG disclosure is most effective in reducing carbon emission intensity under the following conditions:

1. High-quality, specific, and verifiable environmental disclosure

Firms that provide rigorous environmental data—beyond narrative reporting—tend to exhibit stronger carbon performance improvements.

2. Strong governance structures

Independent boards, internal controls, and sustainability committees enhance the ability of ESG initiatives to translate into emission reductions.

3. Robust institutional and regulatory environments

Countries with strict environmental policies and active monitoring bodies show stronger ESG effectiveness.

4. High stakeholder pressure

Media attention, analyst scrutiny, and ESG-sensitive investors compel firms to take ESG commitments seriously.

5. Industries with high environmental exposure

ESG disclosure has the clearest impact in heavy-polluting sectors where environmental risks are more material.

Conversely, ESG disclosure tends to be less effective when:

- institutional environments are weak,
- disclosure quality is low or symbolic,

- stakeholder pressure is minimal,
- ESG is not linked to performance incentives,
- and environmental data is highly aggregated or unverified.

CONCLUSION AND IMPLICATIONS

Conclusion

This study conducted a Systematic Literature Review (SLR) of 60 empirical studies published between 2017 and 2025 to synthesize evidence on the relationship between ESG disclosure, carbon emission disclosure, and carbon emission intensity. The review demonstrates that the impact of ESG disclosure on carbon emission intensity is **inherently inconsistent and highly context-dependent**. While a notable proportion of studies report that ESG disclosure contributes to reducing carbon intensity through enhanced transparency, operational efficiency, and stakeholder accountability, an equally substantial body of literature reveals mixed, insignificant, or even positive associations. A key finding of this review is that **carbon emission disclosure** shows stronger and more consistent predictive power for carbon reduction compared to general ESG disclosure. Carbon-specific information tends to be more credible, measurable, and verifiable, making it more influential in shaping firm behavior and stakeholder decision-making. Meanwhile, ESG disclosure—because of its broad and heterogeneous nature—can produce contradictory effects, especially when firms receive high ESG scores driven by social or governance dimensions rather than environmental performance.

The review also highlights significant contrasts between developed and developing countries. In emerging markets, ESG disclosure often remains symbolic, driven more by legitimacy-seeking motives rather than substantive environmental strategies. Weak governance, insufficient regulatory enforcement, and fragmented ESG frameworks limit the ability of ESG disclosure to reduce carbon intensities meaningfully. Conversely, in contexts with strong institutions and stakeholder pressure, ESG disclosure is more likely to translate into actual carbon reductions.

Overall, the findings underscore that ESG disclosure is **not a standalone mechanism** for reducing carbon emissions. Its effectiveness depends on institutional conditions, disclosure credibility, governance structures, and industry characteristics. These insights highlight the importance of strengthening disclosure practices, regulatory frameworks, and stakeholder oversight to enhance the decarbonization potential of ESG initiatives.

Implications

Theoretical Implications

This review strengthens the relevance of stakeholder theory, legitimacy theory, and signaling theory in explaining why ESG and carbon disclosure produce varying outcomes across contexts. It also highlights the need for more standardized and consistent measurement of ESG components, especially the environmental dimension, to reduce heterogeneity in empirical results.

Practical Implications

For firms, the findings emphasize the importance of improving accuracy, specificity, and verifiability of environmental disclosure rather than relying on broad ESG reporting. Regulators, particularly in emerging markets, should enhance mandatory carbon disclosure standards, monitoring mechanisms, and third-party verification to increase credibility and limit symbolic reporting. Investors are encouraged to focus more closely on environmental metrics instead of relying solely on aggregated ESG scores.

Policy Implications

Governments should establish harmonized carbon reporting frameworks aligned with international standards and strengthen enforcement to ensure compliance. Targeted support for high-pollution sectors—such as incentives for green technology—can accelerate emission reduction. A more transparent institutional environment will amplify the effectiveness of ESG disclosure in promoting decarbonization.

Future Research

The findings of this review suggest several avenues for future scholarship:

- The need for **standardized ESG and carbon emission measurement frameworks** to reduce heterogeneity.
- Expanded exploration of **mediating mechanisms**, such as financing constraints, green innovation, or operational efficiency.
- Deeper investigation into **moderating factors**, particularly institutional quality and regulatory enforcement.
- More longitudinal and cross-country comparative studies in developing regions.
- Utilization of **advanced methods** including text mining, machine learning, and real-time ESG analytics to detect greenwashing.

Together, these implications contribute to a more nuanced understanding of ESG disclosure's role in corporate decarbonization pathways.

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