THE STRATEGIC ROLE OF SUSTAINABILITY REPORTING IN ACHIEVING NET ZERO EMISSIONS PLATES

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ABSTRACT: The escalating climate crisis necessitates corporate commitment to achieving Net Zero Emissions (NZE). This study investigates the strategic contribution of Sustainability Reporting (SR) to NZE through a systematic literature review of 37 peer-reviewed articles (2020-2025). Analysis reveals SR fulfills three strategic functions: legitimacy enhancement (89.2% of studies), transparency improvement (75.7%), and green innovation facilitation (67.6%). Significant implementation obstacles include standard inconsistency (64.9%) and greenwashing vulnerability (59%). Digital technology integration (AI, blockchain) is a promising solution (43.2%). Findings urge regulatory strengthening (78.4%) and digital adoption. For Indonesia, where only 42% of large firms report consistently, mandatory SR and a national ESG assurance institute are critical to accelerate a credible low-carbon transition.

Keywords : *Greenwashing, Artificial Intelligence, Blockchain, Decarbonization, Corporate Accountability, Environmental Social Governance Disclosure, Climate Governance, Carbon Accounting, Global Reporting Initiative Standards, Task Force on Climate-related Financial Disclosures Framework*

Code JEL : Q56, M14, G34, M41

INTRODUCTION

The climate change crisis has evolved into a multidimensional global challenge with far-reaching impacts. According to the 2023 Intergovernmental Panel on Climate Change (IPCC) report, even a global temperature increase below 1.5 degrees Celsius could trigger significant consequences for ecosystems, human welfare, and economic stability. In response, the international community through the Paris Agreement and COP26 Glasgow Conference 2021 established Net Zero Emission (NZE) targets to be achieved by mid-century. Achieving this ambitious goal requires substantial contributions from the corporate sector, as business operations and global supply chains constitute primary emission sources.

Within the NZE transition framework, Sustainability Reporting (SR) emerges as a strategic instrument bridging corporate strategy with global sustainability agendas. Despite significant potential, `global SR implementation faces structural constraints including inconsistent reporting standards (GRI, TCFD, ISSB), voluntary reporting practices triggering greenwashing, and inadequate verification systems. These challenges are particularly acute in developing nations where regulatory frameworks remain nascent.

Indonesia's situation reflects specific implementation challenges. Financial Services Authority (OJK) data indicates only 42% of large corporations consistently issue sustainability reports, significantly lagging behind regional peers such as Malaysia and Singapore. This contrasts sharply with

progressive regulations including Presidential Regulation No. 98/2021 on Carbon Economic Value and the Sustainable Finance Roadmap 2021-2025. The disconnect between regulatory advancement and practical implementation reveals a critical research gap requiring systematic investigation This study addresses these challenges by systematically analyzing the strategic role of Sustainability Reporting in achieving Net Zero Emissions, with particular attention to implementation barriers and mitigation strategies in developing economy contexts like Indonesia.

THE LITERATURE REVIEW

Sustainability reporting is now an important tool in modern corporate management, which is not only used to report economic results, but also as a form of social and environmental responsibility. Basically, this reporting plays a big role in increasing transparency, building trust, and strengthening the credibility of the organization in the eyes of the relevant parties. The advancement of the concept of sustainability reporting is supported by three main theories, namely the theory of legitimacy [47] which emphasizes the importance of companies adapting to societal values, stakeholder theory [48] which considers reporting as a response to stakeholder expectations, and the tripartite bottom line paradigm [49] positing a harmonization among financial, social, and environmental performance.

In the context of achieving net zero emissions, sustainability reporting has undergone a major shift, from simply implementing rules to being an essential part of a sustainable business strategy. A harmonized blend of carbon accounting, integrated reporting, and green technology is an important foundation in creating a business model oriented towards reducing carbon emissions [11]. These changes show that sustainability reporting plays an inseparable part of the traditional accounting system, by furnishing critical non-monetary disclosures, encompassing environmental , social , and governance factors [8].

The evolutionary perspective suggests that the development of sustainability reporting is not going straight, but rather is dynamically influenced by the conceptual theoretical constructs from ecological anthropology and industrial ecology, which elucidate the adaptive nexus between

human populations, organizations, and the environment [27]. As in [7] analysis of 59 articles, Sustainability Reporting (SR) has evolved into a research field with high relevance. This context reinforces the contributive value of follow-up studies including this one that explored the correlation between SR implementation and the achievement of Net Zero Emission (NZE). Empirical evidence also supports this argument by showing a discernible correlation exists between the regularity of environmental, social, and governance disclosures and the company's commitment to achieving net zero emissions targets [1].

However, there are complex challenges in implementing sustainability reporting, especially related to data reliability and greenwashing risks. Advances in digital technology offer innovative solutions, for instance, the application of artificial intelligence in identifying indicators of environmental deception and enhancing the caliber of environmental, social, and governance reporting [50], as well as the application of blockchain to create a decentralized emissions recording system that is safer from manipulation [51]. Overall, the existing knowledge confirms the strategic value of sustainability transitioning toward an economy with reduced carbon emissions is underway, while also identifying complexities in its implementation challenges. This study shows the direction of convergence between the sustainability reporting framework and digital technology innovations as a path to increase the credibility and effectiveness concerning the reporting that aids in achieving net zero emissions.

The comprehensive literature review above reveals that while Sustainability Reporting's theoretical foundations and strategic potential are well- established, three critical gaps persist in current scholarship. First, existing studies predominantly focus on developed economies (Europe, North America), leaving implementation mechanisms in developing countries particularly those with nascent regulatory frameworks like Indonesia inadequately documented. Second, the causal pathways through which SR quality translates into verified emission reductions remain incompletely mapped, with most research examining disclosure-performance correlations rather than mechanistic explanations. Third, despite promising technological innovations (AI, blockchain), systematic analysis of digital integration strategies for enhancing SR credibility across diverse organizational contexts is lacking.

To address these gaps, this study establishes three specific research objectives:

RQ_1 : To systematically identify and categorize the strategic mechanisms through which Sustainability Reporting contributes to Net Zero Emission achievement across global and developing economy contexts.

RQ_2 :To comprehensively document implementation barriers—structural, technological, and institutional—that impede effective SR adoption, with particular attention to challenges facing Indonesian corporations.

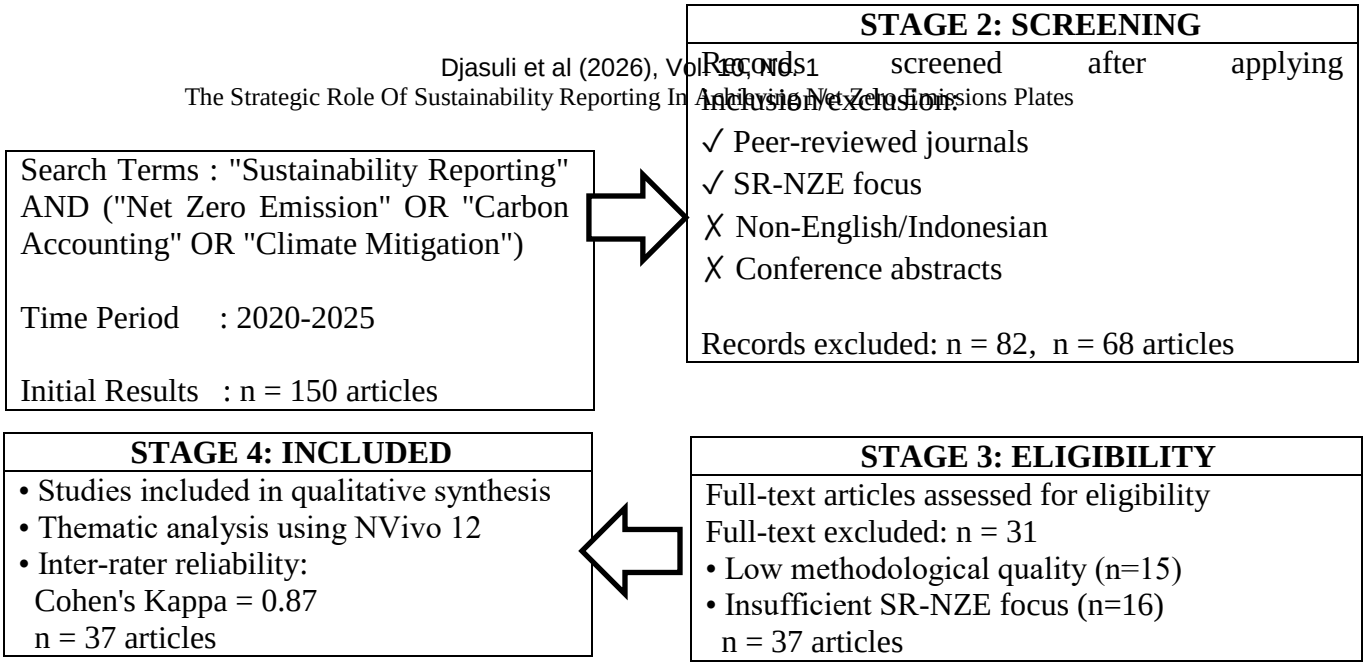
RQ_3 :To synthesize evidence-based mitigation strategies that leverage regulatory frameworks, technological innovations, and capacity-building initiatives to enhance SR reliability.

Based on the theoretical framework and empirical evidence reviewed, this study proposes that effective SR implementation, supported by digital technologies and standardized regulatory frameworks, significantly accelerates organizational transitions toward Net Zero Emissions.

METHODS

This study employs Systematic Literature Review (SLR) methodology following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency and replicability. The systematic review followed four sequential stages aligned with PRISMA standards [28]. Stage 1 (Identification) involved comprehensive database searches using Boolean operators ("Sustainability Reporting" AND "Net Zero Emission" OR "Carbon Accounting"), yielding 150 initial articles from Scopus, Emerald Insight, and Google Scholar. Stage 2 (Screening) applied predefined inclusion criteria: (a) peer-reviewed journal publication, (b) 2020-2025 publication window capturing post-Paris Agreement discourse, (c) English or Indonesian language, (d) substantive focus on SR-NZE relationship. This reduced the sample to 68 potentially eligible articles. Stage 3 (Eligibility Assessment) involved full-text review evaluating methodological rigor, substantive contribution, and evidence quality. Thirty-one articles were excluded due to insufficient methodological clarity (n=15) or tangential SR-NZE focus (n=16), resulting in 37 articles meeting all criteria. Stage 4 (Data Extraction & Analysis) employed structured coding framework capturing study characteristics, SR strategic roles, implementation barriers, and mitigation strategies. Thematic analysis using NVivo 12 software identified recurring patterns, with inter-rater reliability assessed through independent dual-coding (Cohen's Kappa = 0.87), ensuring analytical rigor and minimizing researcher bias.

STAGE 1: IDENTIFICATION
Database : Scopus, Emerald Insight, Google Scholar



Source : Data Collection Procedure (2025)

RESULT AND DISCUSSION

Table 1. Characteristics of Reviewed Literature

Characteristic	Number of Articles	Percentage
Publication Year		
2020-2021	8	21.6%
2022-2023	15	40.5%
2024-2025	14	37.9%
Geographic Focus		
Developed Countries	22	59.5%
Developing Countries	10	27.0%
Global/Multi-country	5	13.5%
Industry Sector		
Multi-sector	15	40.5%
Energy & Utilities	8	21.6%
Manufacturing	6	16.2%
Financial Services	5	13.5%

Source : Data in Process (2025)

The analysis of the 37 articles shows increasing scholarly attention to the SR-NZE nexus, with 40.5% of studies published in 2022-2023, reflecting heightened post-COP26 momentum. Geographically, the literature is dominated by a focus on developed economies (59.5%), confirming the identified gap regarding developing country contexts. The reviewed studies spanned multiple sectors, with a significant portion being multi-sectoral (40.5%) or focused on high-impact industries like Energy & Utilities (21.6%). Analysis revealed three main roles of Sustainability Reporting (SR) with strong empirical support:

Table 2. Strategic Roles of Sustainability Reporting in NZE Achievement

Strategic Role	Articles	Percentage	Key Evidence
Legitimacy & Accountability	33	89.2%	Demonstration of corporate climate commitment
Value Integration	28	75.7%	Integrated financial-nonfinancial disclosure
Green Innovation	25	67.6%	Adoption of low-carbon technologies

Source : Data in Process (2025)

The high prevalence of the legitimacy function (89.2%) aligns with Legitimacy Theory, emphasizing organizational adaptation to societal values. However, this also creates a potential "legitimacy-action gap" where reporting becomes symbolic rather than substantive. The value integration function (75.7%) reflects SR's evolution into a strategic management instrument, enhancing investor confidence and economic resilience. Furthermore, SR acts as a catalyst for green innovation, encouraging investments in low-carbon technologies.

Table 3. The Significance of Sustainability Reporting in Attaining Net Zero Emissions (NZE)

No	Author	Outcome
1.	[25] Towards net-zero carbon emissions: A systematic review of carbon sustainability reporting based on GHG protocol framework	Utilizing the Greenhouse Gas Protocol, carbon reporting is a crucial component of the net-zero strategy within the oil and gas sector & gas sector; Finding gaps in measurement quality, transparency, and independent assurance needs.
2.	[4] The role of sustainability reporting and governance in achieving sustainable development goals: An international investigation	Ascertain the correlation between the caliber of sustainability and governance disclosures and the successful attainment of sustainable development objectives; better reporting related to the implementation of green policies and environmental performance indicators.
3.	[35] Corporations and climate change: An overview	Emphasizing the influence of organizational directives and transparency pronouncements (such as published documents) in formulating strategies for risk reduction; reporting affects stakeholders and regulatory pressures accelerating the move towards net-zero
4.	[12] How sustainability reporting shapes dividend policy: evidence from Vietnam's listed companies	*Sustainability Reporting* that adheres to the Sustainable Development Goals (SDGs) standards serves as an important signal that shows stability and strong corporate governance to investors. The research outcomes indicate a tendency for corporations that furnish more comprehensive disclosures pertaining to Sustainable Development Goals (SDGs) to distribute dividends with a higher frequency, and this high level of disclosure has a positive relationship with the size of dividend payments. In other words, solid reporting practices help build investor confidence and contribute to economic resilience, especially in markets that are vulnerable to climate risks.

No	Author	Outcome
5.	[19] The Role of Sustainability Reporting in Strategic Management	*Sustainability Reporting* is a key instrument in strategic management. This reporting facilitates the implementation of the strategy by helping companies identify irregularities, determine corrective actions, and clarify responsibilities. At the same time, this reporting also supports strategy formulation through materiality analysis, benchmarking with competitors, and strategy adjustment. In this context, sustainability reporting allows companies, especially in resource-intensive sectors, to align their sustainability goals with the company's overall strategic direction, an important step towards achieving goals such as *Net Zero*.
6.	[14] Regulatory technologies for enhancing sustainability compliance: a multivocal literature review	Regulation Technology *(RegTech)* is emerging as an important solution in the face of increasingly stringent sustainability regulations. The integration of Regulatory Technology (RegTech) facilitates the automated oversight of adherence to established regulations, ESG risk management, and significantly improves reporting transparency. This tool is essential in efforts to mitigate the risk of greenwashing due to its ability to process large amounts of ESG data more reliably. To maximize its potential in supporting *Net Zero* goals, interdisciplinary collaboration between academia, industry, and policymakers is needed to address challenges such as data fragmentation and lack of unified standards.
7.	[29] Mandatory sustainability reporting and the disclosure-performance gap: insights from the EU directive	The repercussions of the European Union's mandates on sustainability disclosures for corporate accountability. The findings indicate that these regulatory frameworks frequently exacerbate the disparity between reported information and prevailing operational realities, signaling a trend toward symbolic transparency or *greenwashing.* This happens when disclosure is made solely to meet regulatory compliance without any real performance improvement. Nonetheless, countries with *civil-law* systems tend to show a better degree of alignment. These findings are important for policymakers to design rules that encourage real action, not just reporting on paper.

Source : Data in Process (2025)

Table 4. NZE Implementation Challenges by Category

Challenge Category	Articles	Percentage	Severity Level
Structural & Economic			
Standard Inconsistency	24	64.9%	Highest
Fossil Sector Resistance	19	51.4%	High
Technology & Funding			
Technology Limitations	17	45.9%	Medium
Funding Deficits	16	43.2%	Medium
Implementation & Sectoral			
Implementation Complexity	20	54.1%	High
Policy Fragmentation	18	48.6%	Medium

Source **:** Data in Process (2025)

Standard inconsistency (64.9%) was the most cited challenge, creating reporting burdens and hindering comparability. In the Indonesian context, specific challenges include heavy fossil fuel dependency, limited technical capacity, and a persistent voluntary reporting culture, where SR is often viewed as an administrative formality rather than a strategic tool.

Table 5. Net Zero Emission Mitigation Challenges

No	Author	Outcome
1.	[24] Charting the UK's path to net zero emissions by 2050: Challenges, strategies, and future directions.	Net Zero Emission (NZE) *mitigation pathways* , such as those in the UK, are hampered by deep-rooted systemic and institutional challenges. The main obstacles include the great need for the modernization of obsolete energy infrastructure and inadequate research-development (R&D) investment in new decarbonization technologies. In addition, economic resistance from fossil energy-dependent sectors, as well as policy frameworks that are often not integrated or inconsistent, slow the transition. Effective mitigation demands synergy between technology, progressive fiscal policies, and strong regulation.
2.	[18] The Role of Sustainability Reporting in Supporting Net Zero Emissions: Challenges, Opportunities, and Mitigation Strategies	A primary obstacle in substantiating claims of achieving Net Zero Emissions (NZE) pertains to the rigorous verification of the environmental impact data furnished by corporate entities. These difficulties are exacerbated by complex Scope 3 data acquisition, a lack of global standardization in *Sustainability Reporting* (SR), and a high risk of *greenwashing*. Without verified and transparent reporting, green investments risk being diverted away from actual decarbonization projects. Mitigation solutions require the adoption of AI and *Blockchain* technologies to improve the reliability of rigorous third-party measurement and verification, in order to maintain *stakeholder trust*.

No	Author	Outcome
3.	[11] Carbon accounting and integrated reporting for net-zero business models towards sustainable development: a systematic literature review	Net *Zero Emission* (NZE) mitigation faces serious constraints from the inadequacy and unreliability of carbon accounting data at the enterprise level. This literature review emphasizes that existing reporting frameworks have not been adequately integrated with core business decision-making, resulting in low-quality information for decarbonization strategies. The challenge is to develop an integrated accounting model that is able to translate emissions into accountable performance metrics. Failure to bridge this gap will hamper the business model's transition towards sustainable *Net Zero Emission* (NZE) goals.
4.	[13] The Optimization of Power Generation Mix to Achieve Net Zero Emission Pathway in Indonesia without Specific Time Target	In countries that rely heavily on fossil energy such as Indonesia, Attaining Net Zero Emissions (NZE) is significantly impeded by the economic and intricate nature of optimizing the energy supply. The central difficulty lies in establishing a cost-minimal NZE trajectory, concurrently necessitating the systematic discontinuation of coal-fired power generation, an endeavor that demands decisive and frequently contentious policy measures. Substantial capital infusion is imperative to facilitate the incorporation of intermittent renewable energy technologies, alongside addressing the political and temporal challenges associated with the formulation and execution of policies designed to expedite the cessation of coal-fired power plant operations.
5.	[17] Determining the carbon footprint of Australia's electricity, gas, water and waste services sector	A fundamental challenge in mitigation is the difficulty of accurately quantifying *sectoral carbon footprints*, particularly within the public utilities sector (electric, gas, water, and waste management), which significantly contributes to emissions. Despite the high potential for reductions, mitigation strategies are hampered by the lack of a universal and scalable methodology for calculating total emissions per sub-sector and supply chain. As a result, targeting emissions reduction strategies becomes less effective because it is based on data that is not fully detailed. It is necessary to develop a detailed hybrid *input-output* methodology so that mitigation targets truly produce efficient national impacts.
6.	[5] Sustainability reporting in Spanish public hospitals: has it become an institutionalized norm among these organizations?	Net *Zero Emission* (NZE) mitigation often fails at the implementation level due to the lack of institutionalization of sustainable practices within organizations. An examination of public healthcare facilities in Spain revealed that the integration of sustainability reporting into the established operational procedures and daily practices has not yet materialized as a customary aspect. Despite external pressure to report, the internal normative motivation that drives ethical belief in *Net Zero Emission* (NZE) practices is still weak. The challenge is to transform sustainable practices from mere external compliance obligations to internally embraced organizational values, requiring strategies that focus on cultural change and leadership education.

No	Author	Outcome
7.	[37] Achieving social impact through business research aimed at contributing to climate change mitigation	Climate change mitigation at the consumer and business levels faces a major challenge: the gap between academic theory and the implementation of socially effective practical solutions (Mode 2). Decarbonization strategies require widespread changes in pro-environmental behavior. The challenge is to identify and leverage non-cognitive factors (such as empathy or respect for authority) that have been shown to trigger sustained behavior. Therefore, business research needs to shift away from a purely theoretical focus, to actively test practical solutions in the field to ensure effective *adoption of Net Zero Emission* (NZE) mitigation by the wider community.

Source : Data in Process (2025)

Table 6. Mitigation Strategy Frequency and Application

Mitigation Strategy	Articles	Percentage	Implementation Examples
Regulatory Strengthening	29	78.4%	Mandatory standards, framework harmonization
Digital Technology	16	43.2%	AI, blockchain for verification
Capacity Development	12	32.4%	Environmental auditor training
Multi-stakeholder Collaboration	14	37.8%	Public-private partnerships

Source : Data in Process (2025)

The most frequently recommended strategy is regulatory strengthening (78.4%), advocating for mandatory and harmonized SR standards. Digital technology integration (43.2%) is recognized as a transformative solution, with RegTech, AI, and blockchain offering powerful tools for automation, verification, and greenwashing prevention. These strategies must be supported by capacity building and robust multi-stakeholder collaboration.

Table 7 : Net Zero Emission Mitigation Strategy

No	Author	Outcome
1	[42] The Corporate Net-Zero Standard (V1.3)	A credible corporate *Net Zero Emission* (NZE) strategy should focus on very deep emissions reductions across the value chain. Its main obligations are to achieve rapid short-term emission reductions (around 50% by 2030) and achieve long-term emissions reductions of more than 90%. Unavoidable residual emissions must be neutralized only through the permanent carbon removal method (*Carbon Removal*). This standard limits non- permanent *offsetting*, ensuring fundamental decarbonization remains a top priority of the company's strategy.

2.	[1] The Role of Sustainability Reporting in Supporting Net Zero Emissions: Challenges, Opportunities, and Mitigation Strategies	Net *Zero Emission* (NZE) mitigation is strengthened through improved quality of sustainability reporting that is integrated with core business strategies. This methodological approach integrates cutting-edge innovations, including Artificial Intelligence (AI) and Blockchain technology, with the express purpose of enhancing the precision, opaqueness, and operational effectiveness of Scope 3 emissions quantification. These emissions, by their nature, present considerable measurement challenges. Furthermore, the imperative for third-party assurance of emissions data reporting cannot be overstated. These measures aim to build strong market credibility, attract green investments, and effectively prevent *greenwashing* practices related to *Net Zero Emission* (NZE) claims.
3.	[44] Navigating the nuances	An effective mitigation strategy must explicitly prioritize direct emission reductions (decarbonization). There is caution against *carbon offsetting* because it is often not permanent and can delay substantive reduction actions. This strategy emphasizes that valid *Net Zero Emission* (NZE) claims must be achieved by reducing emissions to close to zero. Only minimal residual emissions can be balanced, and must use scientifically verified, long-term permanent carbon removal methods. This ensures a focus on fundamental transformation, not just compensation.
4.	[47] An Energy Sector Roadmap to Net Zero Emissions in Indonesia (Executive Summary)	The main key to mitigating *Net Zero Emission* (NZE) in Indonesia is highly dependent on a radical transition in the energy sector. The main strategy includes three strict policy steps: 1) The establishment of a prohibition on the construction of novel electricity generation facilities utilizing coal; 2) Contract reform so that existing coal- fired power plants can operate more flexibly and accelerate their termination; 3) Encourage the adoption and massive investment in New and Renewable Energy (NRE), especially solar power (Solar PV) and wind, supported by conducive regulations. The implementation of this policy is the key to the decarbonization of the national electricity system.
5.	[17] Determining the carbon footprint of Australia's electricity, gas, water and waste services sector	Net *Zero Emission* (NZE) mitigation strategies for the utility sector (electricity, gas, water, and waste) should be based on sector-specific identification and targeting of emissions. As this sector is the largest source of CO2e emissions, its potential for mitigation is also significant. The strategy is to accurately measure *the carbon footprint* of each sub-sector and implement targeted reduction targets tailored to the emission contribution of each utility service. This focused strategy is needed to efficiently maximize the impact of national mitigation.

6.	[37] Achieving social impact through business research aimed at contributing to climate change mitigation	Net *Zero Emission* (NZE) mitigation strategies need to be supported by business research that is oriented towards practical solutions (Mode 2) that have a high social impact. The focus is on driving change in pro- environmental behavior at the level of individuals, consumers, and business actors. This strategy emphasizes the need for research to identify and utilize non-cognitive factors (such as empathy) that can trigger sustained behavior. The implementation of these solutions in the real world, for example in the tourism or consumption sectors, is key to achieving effective and socially acceptable mitigation.
7.	[23] Optimizing Sustainability Reporting in the Indonesian Public Sector: Climate Change Mitigation Strategies	Strategies to optimize public sector Sustainability Reporting (SR) in climate mitigation demand structural and regulatory changes [23]. The main obstacles, namely inconsistent standards and complicated carbon emission measurements, are overcome through mandatory regulations from the government. The necessity of this reporting must be integrated with the strengthening of Good Governance principles so that the foundation of accountability becomes solid. Furthermore, this study urges a more comprehensive harmonization of reporting standards. The ultimate goal of these measures is to transform SR into an effective instrument of transparency, rather than mere formality, to measure performance and advance the achievement of real national climate targets.

Source : Data Collection Procedure (2025)

Research findings confirm the tri-functional role of SR in NZE transition. The high prevalence of legitimacy function (89.2%) aligns with legitimacy theory [47] emphasizing organizational adaptation to societal values. However, there is potential for "legitimacy-action gap" where reporting becomes symbolic without substantive implementation, as identified by [29] in the EU directive context. The value integration function (75.7%) reflects SR's evolution from compliance tool to strategic management instrument. Duong & Nguyen (2025) demonstrate how quality SR enhances investor confidence and economic resilience, particularly in climate-vulnerable markets.

Standard inconsistency (64.9%) as the primary challenge confirms the complexity of sustainability regulatory landscape. Fragmentation of GRI, TCFD, and ISSB frameworks creates reporting burdens that hinder comparability, as identified by [18]. Developing country-specific challenges in Indonesia include, First, Fossil energy dependency [13]. Second, Limited technical capacity (46% of articles). Third, Voluntary reporting culture (54% of articles).

Digital technology integration (43.2%) emerges as a transformative solution. [14] demonstrate RegTech potential in compliance automation and transparency enhancement. Similarly, AI and blockchain offer solutions for verification challenges and greenwashing prevention. Based on findings, three policy recommendations for Indonesia: First, Accelerate mandatory SR with harmonized standards. Second, Invest in digital infrastructure for enhanced verification. Third, Strengthen institutional capacity through training and development. Strategy regarding new coal plant moratorium and EBT acceleration is relevant to Indonesia's coal-dependent context. Study

limitations include temporal coverage and reliance on published literature. Future research could, First, Conduct longitudinal studies on SR's impact on actual emissions. Second, Research digital technology effectiveness in SR verification. Third, Develop context-specific SR frameworks for developing countries.

CONCLUSION

This systematic analysis of 37 peer-reviewed articles establishes three principal empirical contributions. First, quantitative evidence confirms Sustainability Reporting's tri-functional strategic role: legitimacy enhancement (89.2%), transparency improvement (75.7%), and green innovation facilitation (67.6%). Second, implementation barriers exhibit hierarchical severity with global standard inconsistency (64.9%) as primary obstacle, followed by greenwashing vulnerability (59%) and weak verification (51.4%). Third, effective mitigation demands integrated approaches combining mandatory regulatory frameworks (78.4%), digital technology adoption (43.2%), and capacity development (32.4%). For Indonesian policymakers, three urgent interventions emerge. OJK should mandate SR for all listed companies with GHG Protocol compliance by 2026. Government must establish National ESG Assurance Institute providing affordable verification services. Ministry of Communication should integrate SR digitalization into national transformation initiatives. Results demonstrate that transitioning from voluntary to strategic SR integration enhances Net Zero Emission credibility and accelerates low-carbon economic transition. Future research should examine longitudinal SR-emission relationships, test digital technology effectiveness, and develop context-specific frameworks for developing economies.

Author contribution

Conceptualization: M.D., A.F.,R.M.,F.R.,A.P.N
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Writing-review and editing: M.D., A.F.,R.M.,F.R.,A.P.N

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