ISSN: 2338-8412 e-ISSN : 2716-4411

Ekombis Review – Jurnal Ilmiah Ekonomi dan Bisnis
Available online at : https://jurnal.unived.ac.id/index.php/er/index
DOI: https://doi.org/10.37676/ekombis.v13i4

Entering The ESG Era And Carbon Business Opportunities: A Literature Review Of The Role Of Strategic Management Accounting In The Sustainability Transition In Indonesia

Fredy Rizaldi [1)]; Fabryan Suhandi [2)]; Yanuar Ramadhan [3)]
[1,2,3)] Faculty of Economics and Business, Esa Unggul University , Jakarta
Email: [1)] fredyriz1503@student.esaunggul.ac.id ,[2)] fabryansuhandi@student.esaunggul.ac.id
[3)] yanuar.ramadhan@esaunggul.ac.id

How to Cite :
Rizaldi, F., Suhandi, F., Ramadhan, Y. (2025). Entering The ESG Era And Carbon Business Opportunities: A Literature Review Of The Role Of Strategic Management Accounting In The Sustainability Transition In Indonesia .EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 13(4). DOI: https://doi.org/10.37676/ekombis.v13i4

ARTICLE HISTORY
Received [14 May 2025]
Revised [24 September 2025]
Accepted [29 September 2025]

KEYWORDS
Strategic Management Accounting, ESG, Carbon Trading, Sustainability, Literature Review./

ABSTRACT

The transformation towards a low-carbon economy encourages companies to align their business strategies with sustainability principles, including ESG integration and participation in carbon trading. This study aims to explore the role of strategic management accounting (SMA) in supporting the sustainability transition, particularly through the integration of emissions reporting, ESG strategy, and utilization of carbon business opportunities in Indonesia. This study uses a systematic literature review approach by analyzing 20 journals and professional reports published in the period 2020–2024. The results of the study indicate that SMA has the potential to be an information system that can bridge reporting compliance, environmental performance evaluation, and carbon-based strategic decision making. This study offers an initial conceptual model that simultaneously connects SMA, ESG, and carbon trading and identifies gaps in the literature and reporting practices in Indonesia. These findings provide conceptual contributions to the development of sustainability research and serve as a strategic reference for companies in adopting an adaptive business approach to climate pressures and green regulations.

INTRODUCTION

In recent years, global awareness of climate change has triggered a fundamental shift in business strategy (Swiss Re Institute, 2021). Companies are no longer judged solely on their financial performance, but also on their contribution to sustainability (Busch *et al.,* 2022).

Initiatives such as carbon trading, emissions reporting, and integration of ESG principles have become new indicators of corporate competitiveness (World Bank, 2021). Effective implementation of ESG aspects can help companies manage risks, improve operational efficiency, enhance reputation, and create a competitive advantage(Perdiansyah & Ulpah, 2024). Although these initiatives are growing rapidly at the global level, in Indonesia, the literature on how companies respond strategically is still relatively limited (Indonesia Carbon Trading Handbook, 2022). Therefore, this study aims to explore the role of Strategic Management Accounting (SMA) as an internal information system that connects ESG pressures and carbon market opportunities within the framework of the transition to sustainability.

Climate change risks have been identified as one of the most serious threats to global economic stability. Gross Domestic Product (GDP)—representing the total value of goods and services produced in a region over a given period—is used as a key indicator to measure the economic impact of global warming. According to the report Swiss Re Institute (2021) If global temperatures rise by 2.6°C–3.2°C by mid-century, global economic losses could reach 13.9% to 18.1% of aggregate GDP. The Asian region, including ASEAN countries such as Indonesia, is projected to be one of the most affected regions, with potential losses of up to 26.5%–37.4% of regional GDP in extreme temperature scenarios. These findings emphasize that the transformation to a low-carbon economy is no longer just an ethical choice, but an urgent long-term economic protection strategy. Therefore, the integration of climate mitigation approaches with economic incentives, such as carbon trading and ESG policies, is increasingly important to prevent global systemic losses.

In 2015, the world agreed to the Paris Agreement, which set targets for guard increase global temperature increase to not more than 2°C, with the ambition to reach 1.5°C. Therefore , participating countries , including Indonesia, set national targets . To achieve net-zero emissions. Indonesia itself targets neutral carbon in 2060 or even faster, as stated in the Enhanced NDC 2022 document (Indonesia Carbon Trading Handbook, 2022). Commitment This demand transformation is comprehensive in the sector of energy, industry, and finance, including the adoption approach new approaches in accounting and reporting emissions. In this context, sustainability strategies and systems information based on accountancy become a key instrument in supporting target achievement of national targets.

As part of the global effort to reduce greenhouse gas emissions, carbon trading mechanisms have evolved into market instruments that allow companies to gain economic incentives for their emissions efficiency. This system essentially works through a *cap-and-trade scheme*, where the government sets national emission quotas, and companies are allocated emission rights (*carbon allowances*) that can be traded if not fully utilized. In Indonesia, this mechanism has begun to be implemented through the Economic Value of Carbon (NEK) stipulated in the Presidential Regulation. (PERPRES No 98, 2021), as well as the establishment of the Indonesian Carbon Exchange in 2023. Katadata Insight Centre (2022) Explains that companies can trade emissions in two main schemes: mandatory (*compliance market*) and voluntary (*voluntary market*), with the energy, forestry, and carbon-intensive industries sectors as the main focus. Meanwhile, (World Bank, 2021) It emphasizes the importance of system design that includes fair quota setting, emission monitoring, and registration and verification to ensure transparency. The study (Y. Zhang *et al.,* 2023) Also shows that carbon quota management strategies greatly influence prices and investment decisions, especially in sectors such as shipping and energy. In the Indonesian context, PWC (2023) Notes that the mining sector faces complex challenges in managing these carbon obligations due to the limited integrated environmental accounting system.

In responding to this complexity, SMA can be a connecting pillar between sustainability information and business strategy. SMA provides a structure for calculating environmental costs, integrating ESG data into planning processes, and supporting carbon-based risk management.

Emissions Trading in Practice (World Bank, 2021) emphasizes that the success of an emissions trading system is highly dependent on the accuracy and transparency of reporting, which can be supported by a strategic accounting approach. SMA not only presents data but also facilitates the transformation of business strategies towards being more adaptive to climate change. Despite the availability of various regulations, the practice of reporting emissions and ESG in Indonesia is still administrative and has not become part of the company's strategic decisions. A study by Gunawan & Berliyanda (2024) on CSR revealed that sustainability practices are still used as a symbol of compliance, not as a source of long-term value creation. PWC Mining Guide (2023) also noted that the extractive sector has not fully integrated decarbonization strategies into business planning, despite facing increasing ESG pressures. This indicates a significant gap in the integration of sustainability information systems.

The need for a credible sustainability information system comes not only from within the company but also from financial institutions. Recent standards such as the Global GHG Accounting and Reporting Standard (PCAF, 2022) Require financial institutions to calculate financed emissions, or indirect emissions from their financing portfolios. This shows that carbon accounting is now part of financial risk management. Therefore, the SMA approach is needed to help companies present more accurate, integrated, and accessible ESG and carbon information to investors and regulators. However, literature examining the relationship between SMA, ESG, and carbon economic opportunities is still very rare, especially in the Indonesian context. Previous studies tend to isolate the sustainability reporting aspect from management strategy or examine carbon trading only from the policy side. There is no conceptual model that explains how the SMA system can be used to optimize ESG and carbon opportunities simultaneously. Therefore, this study is here to compile a systematic literature review that unites these three important components and offers an initial conceptual framework as a foundation for further empirical research and corporate strategic decision-making in the green economic era.

Amidst increasing global pressure for the transition to a low-carbon economy, companies are required to not only implement sustainability principles but also take advantage of economic opportunities from initiatives such as carbon trading and credible ESG reporting. In Indonesia, policies such as the launch of the Carbon Exchange and (PERPRES No 98, 2021) Demonstrate the government's readiness, but many companies still face challenges in building strategic and measurable internal information systems. In this context, Strategic Management Accounting (SMA) becomes very relevant because it can connect sustainability data with management decision-making. Unfortunately, literature that integrates the role of SMA with ESG and carbon markets simultaneously is still very limited. Therefore, this study was conducted to explore the strategic role of SMA in supporting corporate sustainability transitions through a systematic literature review approach, focusing on opportunities for ESG and carbon integration as part of long-term value creation in Indonesia.

LITERATURE REVIEW

Strategic Management Accounting and Carbon Emissions Disclosure

Management accounting strategic (SMA) developed as an expansion from traditional management accounting, with a focus on providing supporting information for superior competitive decisions and making decisions making (Langfield-Smith, 2008). In the context of sustainability, high school does not only count the cost of production or profit, but also includes variable external factors like environmental impact, social risk, and regulatory pressure, so that the information generated becomes more relevant for planning strategic decisions. This theory states that accountancy should not nature reactive, but rather proactive in helping organizations face external uncertainty, including crisis climate and economic transition to green economy.

Strategic management accounting (SMA) functions as an internal information system that supports long-term decision making by considering the sustainability dimension. In the context

of sustainability, SMA plays a role in integrating non-financial indicators such as carbon emissions, energy efficiency, and environmental costs into the planning and evaluation process of company performance. (Busch *et al.,* 2022; Berg *et al.,* 2024). Several studies have examined the relationship between environmental accounting practices and reporting transparency. Deswanto (2022) emphasized that green accounting in the digital era can optimize information system-based emission tracking and reporting. The study by Gunawan & Berliyanda (2024) also Surianti *et al.,* (2024) also showed that green accounting and carbon emission disclosure have not had a significant effect on company value in Indonesia, allegedly due to the lack of standards and symbolic implementation. On the other hand, strengthening environmental performance through the PROPER mechanism has been shown to increase trust (Fransisca Gunawan & Aryati, 2024). Research by Doloksaribu *et al.,* (2024) underlines that data limitations, literacy, and regulatory incentives are the main barriers to carbon emissions disclosure. The importance of carbon accounting is that many disciplines must work together to solve this complex sustainability problem, particularly corporate CO2 emissions (Taufiq & Pratiwi, 2022). Therefore, the role of SMA in structuring sustainability information internally is crucial, both for strategic decision-making and credible external reporting.

Carbon Trading and Market Mechanisms as Strategic Opportunities

Carbon trading is a market-based mechanism that aims to encourage emission efficiency by providing economic incentives to companies that can reduce emissions below quotas. This system has been implemented in various countries and has begun to be developed in Indonesia through Presidential Regulation No. 98 of 2021 and the Carbon Exchange (2023). Research conducted by Zha *et al.,* (2022) and S. Hu *et al.,* (2023) Shows that the implementation of carbon trading policies in China has a positive impact on corporate energy efficiency and encourages a shift in investment to more sustainable sectors.

This is achieved through adjustments to the internal cost structure due to emission obligations and quota mechanisms. Furthermore,P. C. Zhang & Cheng (2024) Found that carbon prices in the market are influenced not only by supply and demand dynamics, but also by investor expectations, psychological behavior, and investment time scales. The findings confirm that the carbon market is not just an environmental policy, but also a strategic arena that is strongly influenced by managerial behavior and corporate decision-making structures.

In practice, China's carbon trading scheme involves multiple actors: industrial companies as sellers of carbon units (if their emissions are below quota), high-emitting companies as buyers, and entities such as regional carbon exchanges (e.g., in Shenzhen, Shanghai, and Hubei) that act as trading intermediaries. In addition, the government acts as a quota regulator and compliance monitor, while independent verification agencies are responsible for monitoring and reporting emissions. This system reflects an incentive-based carbon market structure, which in turn encourages internal corporate transformation to adjust risk and financial management strategies to emission dynamics.

In Indonesia, OJK, through POJK No. 51/2017, requires financial services companies to publish sustainability reports. Studies in Indonesia by Putra *et al.,* (2024) and Meila *et al.,* (2024) Underline that carbon taxes and carbon trading can contribute to state revenue and fiscal sustainability, but only if supported by a strong emissions accounting and reporting system. This is where SMA can play a role as a strategic navigation tool in assessing carbon opportunities and risks as part of business decision-making.

Integration, Sustainable Finance, and the Role of Strategic Management Accounting

The ESG function has expanded from merely non-profit financial reporting to a corporate sustainability evaluation system integrated with business strategy. ESG is also increasingly linked to financial performance and access to sustainable capital (green finance). This is where strategic

accounting becomes key to bridging internal data and investor information needs. Research by Y. Zhang *et al.,* (2023) Shows that China's carbon trading policy has a direct impact on improving companies' ESG scores, through improving internal controls and R&D activities. The study by Mashari *et al.,* (2023) Strengthens this finding by revealing that the simultaneous integration of green finance and carbon trading has not been widely studied in the literature, and emphasizes the important role of financial institutions in supporting sustainability implementation. Green financing models, such as *green bonds,* are also studied by Y. Hu *et al.,* (2023) In the context of the influence of carbon quotas and subsidies on *green bond prices*. This finding confirms that investment decisions and corporate management strategies in the ESG and carbon era are in great need of accounting-based strategic information, including estimates of the economic value of carbon, reputational risks, and potential regulatory incentives.

Sustainability Strategy and Accounting Integration

An effective sustainability strategy not only relies on a company's commitment to the environment but also requires a reliable and strategic internal information system. SMA offers a holistic approach to integrating sustainability variables into performance measurement, cost control, and long-term planning. The study Manurung *et al.,* (2023) Found that companies implementing SMA-based eco-control systems showed better environmental and economic performance. This approach provides a basis for companies to not only comply with regulations but also create competitive advantages through emission efficiency and green product innovation.

Emissions Reporting and Carbon Accounting Standards

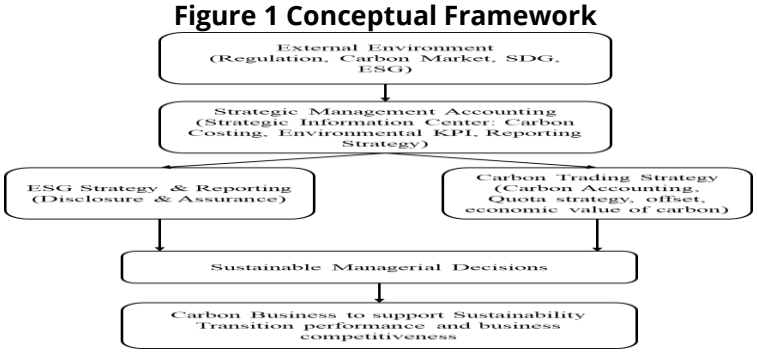
Emissions reporting is a crucial part of sustainability strategy. Global standards such as the GHG Protocol, PCAF (2022), and most recently, IFRS S2 requires companies to transparently calculate, disclose, and manage climate risks. In Indonesia, emissions reporting is still not mandatory for all sectors, but pressure from the market and regulators is slowly driving the adoption of carbon-based reporting. PCAF (2022) Provides a carbon accounting standard for the financial sector, including an approach to calculating financed emissions. SMA can help companies map direct and indirect emissions (Scope 1, 2, and 3), calculate internal carbon costs, and develop economically viable and credible offset policies.

In general, the literature suggests that strategic management accounting, when expanded to include sustainability and carbon emissions dimensions, can be a bridge between regulatory compliance and adaptive business decision-making. However, studies that directly link the role of SMA to ESG integration and carbon business opportunities simultaneously, especially in the Indonesian context, are still very limited.

Therefore, this study is strategically positioned to develop a conceptual model and framework that can be used as a guide for companies' transition to a green economy based on relevant accounting data.

Conceptual Framework

Figure 1 Conceptual Framework



The conceptual framework in the study describes the relationship between external pressures, strategic accounting information systems, corporate sustainability strategies, and transition performance outcomes. At the highest level, companies are currently facing the dynamics of an ever-evolving external environment, especially in the form of carbon regulatory pressures, ESG reporting obligations, carbon market developments, and sustainable development targets (SDGs). ESG and trade integration efforts, carbon is also relevant in support of the Sustainable Development Goals (SDGs), especially SDG 13: *Climate Action*, which encourages action quickly to overcome climate change and its impacts.

The company is expected not only to comply with regulations but also to contribute actively in the mitigation of emissions and adapting to climate change through data-driven strategies and measurable reporting. SMA can become a tool to help main in describe contributions in a systematic and measurable This pressure requires companies to not only survive, but also adapt strategically within a sustainability framework. In response to these pressures, Strategic Management Accounting (SMA) plays a central role as an internal information system that enables companies to identify, measure, and manage environmental impacts in a structured manner. SMA provides tools such as carbon costing, environmental performance indicators (*KPI's*), and sustainability reporting strategies that support strategic decision making.

From this SMA system, two main strategic paths are formed. First, *ESG Strategy & Reporting*, which is how companies build measurable and reliable sustainability strategies through reporting and *assurance*, both to meet stakeholder demands and access to financing. Second, *Carbon Trading Strategy*, which is how companies manage their participation in the carbon market through activities such as emission calculations, quota management, offsets, and optimization of carbon economic value. Both strategic pathways directly contribute to sustainable management decisions, which are strategic corporate decisions that consider climate risk, potential incentives, operational efficiency, and stakeholder expectations. These decisions ultimately contribute to corporate sustainability transition performance, as reflected in improved emissions efficiency, ESG scores, innovative competitiveness, and long-term economic value creation.

Thus, this framework positions SMA as a key link between external pressures and corporate adaptive strategies, and opens up opportunities for further studies on the impact of ESG integration and carbon markets on sustainability performance in Indonesia.

METHODS

Types and Approaches of Research

This research is qualitative research with a systematic literature review (*SLR*) approach. SLR was chosen to develop a conceptual framework on the relationship between strategic management accounting, ESG integration, and carbon trading opportunities, with a focus on the Indonesian context. This approach allows the identification of patterns, gaps, and theoretical contributions from various current academic and professional literature. The SLR approach draws on a methodological model developed by Tranfield *et al.,* (2003), which adapts systematic review practices from the health sciences to the management field. Methodological support is also drawn from guidelines formulated by Snyder (2019), as well as a reporting format based on PRISMA 2020 (Page *et al.,* 2021).

Data source

The data sources in this study were obtained from various relevant and credible secondary literature. First, scientific journals published in the period 2020 to 2024 were used, both from

national and international scopes, with a main focus on the fields of accounting, strategic management accounting, sustainability, and environmental economics. In addition, this study also refers to several professional reports from global organizations such as PWC (2023)*Partnership for Carbon Accounting Financials* or PCAF (2022), and the GHG *Protocol*, which provides practical perspectives on ESG reporting standards and carbon emission management in the corporate sector. Academic literature in the form of books and scientific publications is also an important reference, including studies on CSR and ESG compiled by Puspaningsih (2020), as well as conceptual sources that underlie the discussion of strategic management accounting. In addition, this study utilizes regulatory documents such as Presidential Regulation of the Republic of Indonesia No. 98 of 2021 concerning the Economic Value of Carbon and OJK Regulation No. 51/POJK.03/2017, as a reference to understand the policy context and institutional readiness of Indonesia in adopting carbon trading and sustainability reporting.

Literature Collection Techniques

Data collection was conducted through systematic searches on *online databases* such as Google Scholar, Scopus, ScienceDirect, and MDPI. Keywords used in the search process include: " *strategic management accounting* ", " *ESG implementation* ", " *carbon trading* ", " *sustainability strategy* ", " *carbon reporting* ", "Indonesia". The literature inclusion criteria are: Published in the period 2020–2024, relevant to the research variables, available in full access, and from trusted sources (peer-reviewed journals or professional institutions). Exclusion criteria included: Popular documents that were not academically based, literature outside of an economic/business focus, and references with limited context (e.g., only discussing technical aspects of carbon without management relevance).

Data Selection and Analysis Process

The literature selection process in this study began with data collection, consisting of scientific journals and professional reports from various trusted sources. After a filtering process based on topic relevance, suitability of the research context, and elimination of duplicate or less relevant literature, 20 core literatures were obtained that met the criteria for further analysis. Each document was analyzed by identifying the name of the researcher and year of publication, the focus of the variables studied (namely Strategic Management Accounting, ESG, and Carbon Trading), the approach or method used, and the main findings reported. All of the literature was then grouped into three main thematic clusters to facilitate in-depth analysis, namely: the first cluster includes studies on accounting and reporting of emissions based on strategic information systems (SMA), the second cluster discusses carbon market mechanisms and carbon trading dynamics, while the third cluster focuses on the integration of ESG and sustainable finance. The analysis process was carried out using a thematic narrative synthesis approach, allowing the identification of patterns, relationships between variables, and relevant gaps in the existing literature. Documentation of the entire search, selection, and analysis process is written transparently and can be replicated. This study does not use quantitative analysis methods, due to the diversity of methodological approaches and conceptual study contexts.

RESULTS

Synthesis of Related Literature Review Results

The results of a review of 20 recent scientific journals and reports indicate that there has been rapid development in the integration of strategic management accounting (SMA) practices, ESG initiatives, and carbon trading mechanisms globally. However, in Indonesia, the integration of the three is still not optimal and has not been studied much in a structured manner. Based on the classification and thematization process, all literature is grouped into three main clusters: (A)

Carbon Emission Accounting and Reporting, (B) Carbon Trading Mechanisms, and (C) Integration of ESG and Sustainable Finance.

Cluster A: The Role of Strategic Management Accounting in Carbon Emissions Reporting

Studies in this cluster show that green accounting and carbon disclosure practices have begun to be adopted by companies, but their implementation is still administrative and does not fully support strategic decision-making. Several studies *(Doloksaribu et al., 2024; Gunawan & Berliyanda, 2024)* Highlight the weak carbon reporting standards in Indonesia, as well as the limited internal capacity of companies in managing emission data. The role of SMA is important here because it allows the preparation of quantitative environmental performance information and can be used to design strategies for reducing emissions, energy efficiency, and responding to external pressures (investors and regulators). This approach is also supported by the importance of the assurance of carbon reports. (Busch *et al.,* 2022)To increase market confidence.

Cluster B: Opportunities and Challenges of Carbon Trading Implementation

In this cluster, the majority of the international literature *(Zha et al., 2022; S. Hu et al., 2023; P. C. Zhang & Cheng, 2024)* Proves that carbon trading can be an effective market tool to drive efficiency and internalize emission costs. In China, the Emission Trading Scheme (ETS) has successfully reduced emission intensity through market-based incentives and penalties. However, studies in Indonesia show that readiness for this system is still low. Based on Putra *et al.,* (2024) Both in terms of institutions, reporting capacity, and understanding of the economic value of carbon. This is where SMA can play an important role as a measurement and control system for emission quotas, which is in line with production cost calculations and efficiency strategies.

Cluster C: ESG, Green Finance, and Corporate Strategic Readiness

The third cluster strengthens the link between ESG performance and the success of companies in entering the carbon market. The study Y. Zhang *et al.,* (2023) Found that carbon trading policies significantly improve companies' ESG scores through increased R&D investment and strengthened internal controls. On the other hand, Mashari *et al.,* (2023) It emphasize that the integration of green finance, ESG, and carbon is still rarely discussed in an integrated manner, especially in developing countries. SMA here functions as an enabler that compiles ESG information into a strategic financial framework, including investment decision-making, environmental risk calculations, and green project assessments such as *green bonds.* (Y. Hu *et al.,* 2023).

Analysis of the Relationship between SMA, ESG, and Carbon Trading

From the literature reviewed, it can be concluded that SMA has a strategic role in supporting ESG integration and carbon market utilization. SMA allows companies to calculate the costs and benefits of sustainability initiatives, including potential savings from energy efficiency, carbon compliance costs, and earnings from emissions trading. In addition, SMA can serve as a link between standards-based emission measurements (e.g., GHG Protocol or PCAF) and internal control systems. For example, SMA can help set internal emission reduction targets that are aligned with a company's ESG strategy, while encouraging the optimization of green investments that generate financial and non-financial returns. This relationship becomes even more important when companies operate in high-emission sectors, such as coal and mining, which are currently the main targets of the sustainability transition. In this context, SMA not only supports compliance but also creates new opportunities to extract value from emissions reduction activities. The synthesis results show that SMA is at the center of the nexus between ESG and carbon business opportunities. SMA not only supports accountability through reporting but also

enables the transformation of corporate strategy towards sustainability. These three clusters are interconnected:
Cluster A → B: Reliable carbon reporting forms the basis for participation in carbon markets.
Cluster B → C: Carbon market participation strengthens ESG scores and corporate reputation.
Cluster C → A: ESG pressures drive the development of SMA systems for sustainability.

Weaknesses of Previous Approaches and Gaps in the Literature

Although several studies have discussed aspects of *green accounting*, *carbon disclosure*, and *ESG performance*, some of which big approach, previous Still nature been partial and sectoral. Many studies focus on one dimension only — for example, only on the influence of *green accounting* on to market company. *(Gunawan & Berliyanda, 2024)*, or the connection between *environmental performance* with transparency emission *(Fransisca Gunawan & Aryati, 2024)* Without seeing the integration of concepts between information accounting, sustainability strategy, and the opportunities economy based on carbon. This causes limitations in capturing the real dynamics of businesses that are currently required to transform holistically within the ESG and green transition framework.

The weakness of the previous approach is the lack of a deep methodological framework, especially in linking strategic management accounting (SMA) to ESG decision-making. SMA has an important function in designing internal information systems that can be used to evaluate carbon efficiency, manage emission quotas, and support company participation in carbon trading. Studies on the role of SMA are more dominant in the context of conventional finance or operational efficiency, not in sustainability. In addition, most of the literature on carbon trading and carbon policy is macro and global (e.g., ETS systems in Europe and China), and does not provide enough space for the institutional context and readiness of business actors in Indonesia. Few studies have identified how local business characteristics, cost structures, and internal reporting systems in Indonesia can affect a company's ability to access the carbon market.

Another important gap is the lack of literature that integrates ESG, *carbon trading*, and SMA into a comprehensive conceptual model. The interconnectedness of the three is fundamental in supporting the success of a company's sustainability transition. For example, companies need strategic information about emissions and environmental costs (SMA function) to develop an emission reduction strategy (ESG), as well as make decisions about participating in a carbon trading scheme based on economic value (*carbon opportunity*). Therefore, this study fills the gap by offering a literature approach that unites the three pillars in one framework. This not only strengthens the theoretical foundation in the field of sustainability accounting but also opens up space for the development of a more applicable strategic model for the business world in Indonesia, in the face of the ESG era and the carbon economy.

Theoretical and Practical Implications

Theoretically, this study confirms that strategic management accounting can no longer be separated from the context of sustainability and external environmental pressures. SMA needs to be adapted to be able to answer the challenges of ESG and carbon trading, especially in developing countries like Indonesia. This study fills the literature gap on the simultaneous relationship between SMA, ESG, and carbon trading, especially in Indonesia, and offers a literature-based conceptual model that can be the basis for further quantitative research. In practice, companies, especially in the energy and coal sectors, need to develop a management information system that can integrate emissions data, carbon costs, and ESG targets into the strategic planning and control process. This is important so that the transition to green business is not just about compliance, but also creates added value through carbon credits, market reputation, and operational efficiency. Companies can use SMA as a system to support ESG transition readiness and participation in the carbon market. Governments and regulators can encourage SMA adoption through incentives for reporting and strategic carbon literacy.

DISCUSSION

The role of Strategic Management Accounting (SMA) in addressing ESG and carbon market demands in Indonesia remains an essential area of inquiry. As a core element of internal decision-making systems, SMA must evolve in tandem with external pressures related to sustainability. Understanding how current SMA practices respond to ESG frameworks and carbon pricing mechanisms is critical to improving corporate reporting systems and enhancing long-term business strategies. Particularly in carbon-intensive sectors such as energy and mining, the readiness of SMA systems is highly consequential. These industries are most exposed to climate-related regulations and possess significant potential in the carbon market. Assessing whether existing accounting structures within these firms are adequate to support participation in emissions trading schemes (ETS) is essential to evaluate the implementation gap between policy aspirations and operational realities. Moreover, integrating carbon-related information into strategic planning and performance measurement poses its challenges. The effectiveness of this integration determines how well a company can align operational decisions with decarbonization goals. It also opens a pathway for developing management performance indicators that reflect the actual impact of climate strategies and ensure accountability.

Another critical aspect is understanding the true drivers of ESG and carbon disclosure. It is necessary to distinguish whether companies report sustainability performance as a response to regulatory obligations, investor expectations, or merely for administrative compliance. Identifying the dominant influence among these stakeholders helps to determine the authenticity and strategic orientation of corporate disclosures. In the context of implementation, several barriers may hinder the adoption of SMA-based carbon reporting. These may arise from limitations in internal information systems, insufficient human capital, or regulatory fragmentation. Recognizing the nature of these obstacles is crucial in formulating effective interventions, whether through training, digital transformation, or targeted policy support.

SMA also plays a transformative role in quantifying and monetizing carbon emissions. By translating emission data into financial terms, SMA enables firms to evaluate the economic implications of their environmental performance. This capability is especially vital in supporting participation in carbon markets, internalizing carbon costs, and guiding investment decisions under carbon pricing regimes. Beyond risk mitigation, the potential for ESG and carbon trading to evolve into structured business opportunities should be further examined. The extent to which companies embed these elements into innovation and business model transformation reflects their strategic maturity. SMA frameworks can support this shift by integrating ESG into value creation processes. Furthermore, carbon information asymmetry continues to challenge managerial decision-making and limits access to green finance. This asymmetry weakens market credibility and erodes investor trust. Addressing it through enhanced SMA transparency would improve capital allocation toward sustainable practices and strengthen market efficiency. There is also a growing need to conceptualize an ideal reporting framework that effectively integrates ESG performance, carbon emission data, and corporate strategic outcomes. Such a model must be both strategic and measurable, offering clarity to stakeholders while guiding managerial decisions that align with long-term environmental goals. Finally, the SMA approach holds promise as a tool for supporting national decarbonization targets and the broader Sustainable Development Goals (SDGs). By serving as a bridge between corporate sustainability strategies and public policy objectives, SMA can foster alignment between private sector initiatives and national development agendas, thus offering a foundation for future collaborative research and cross-sectoral integration.

CONCLUSION

This study was conducted to systematically examine the role of Strategic Management Accounting (SMA) in supporting corporate sustainability transitions through the integration of ESG practices and the utilization of opportunities from carbon trading. This study was motivated by increasing external pressure on companies to adopt low-carbon strategies, as well as the still limited understanding and readiness of internal information systems, especially in Indonesia, to answer these challenges.

Thus, the role of SMA is not only strategic in supporting the transition of corporations to an economy with low carbon emissions, but also supports the achievement of SDG target 13 (Climate Action), namely, pushing for strengthening climate action based on a system accountable, adaptive, and integrated information in business processes. Through a systematic literature review (SLR) approach to 20 recent scientific journals and reports, it was found that carbon and ESG reporting practices have developed globally, especially in the context of an increasingly mature carbon market. However, in Indonesia, these practices are still fragmented and have not been strategically integrated into the management accounting system. Previous studies have focused on environmental reporting (disclosure) or performance separately, without linking aspects of strategic decision-making that can be facilitated by SMA.

The synthesis of the reviewed literature, organized into three thematic clusters, reveals several key insights. First, Strategic Management Accounting (SMA) demonstrates significant potential in designing and presenting sustainability-related information in a manner that supports strategic decision-making. Its role is not only instrumental in internal reporting but also in aligning financial performance with environmental objectives. Second, while carbon trading mechanisms offer promising new economic opportunities for companies, their effectiveness depends heavily on the availability of a robust, transparent, and auditable emissions reporting infrastructure. Without such a foundation, participation in carbon markets may lead to inefficiencies or even credibility issues. Third, Environmental, Social, and Governance (ESG) considerations are becoming increasingly influential in shaping a company's access to capital, public reputation, and long-term sustainability. ESG performance is no longer peripheral but central to how firms are evaluated by investors, regulators, and broader stakeholder groups. Based on these findings, this study concludes that SMA can serve as a link between ESG pressures and participation strategies in carbon markets, as well as being a management instrument that drives corporate efficiency, innovation, and competitiveness in the era of sustainability transition.

LIMITATION

This study presents several limitations that should be taken into account when interpreting the findings and drawing conclusions. First, it employs a secondary literature-based approach through a systematic literature review, without incorporating primary data or direct empirical observation. As a result, the conclusions offered are conceptual and interpretive and cannot yet provide statistical evidence of variable relationships. Second, despite efforts to incorporate literature relevant to the Indonesian context, the available sources remain largely dominated by global studies, particularly from Europe and China. This geographic concentration may limit the applicability of the proposed model to Indonesia's unique social, institutional, and regulatory environments. Third, the review focuses on literature published between 2020 and 2024 to ensure alignment with recent ESG and carbon policy developments. However, this temporal limitation may have excluded earlier studies or theoretical models that could offer valuable comparative insights. Finally, the conceptual framework developed in this study has not undergone practical validation. Further empirical research—both qualitative, such as in-depth

case studies, and quantitative, such as hypothesis testing—will be necessary to assess the framework's validity, relevance, and applicability in real-world corporate settings..

REFERENCES

Alfianda, M. R., Pohan, P. A., & Muda, I. (2024). Carbon accounting and Green House Gas Accounting (GHG): the implementation of green accounting and Corporate Social Responsibility (CSR) in Indonesia. Brazilian Journal of Development, 10(1), 906–918. https://doi.org/10.34117/bjdv10n1-059

Berg, F., Huidobro, J. O., & Rigobon, R. (2024). On the Importance of Assurance in Carbon Accounting.

Busch, T., Johnson, M., & Pioch, T. (2022). Corporate carbon performance data: Quo vadis? Journal of Industrial Ecology, 26(1), 350–363. https://doi.org/10.1111/jiec.13008

Deswanto, V. (2022). Literature Review Green Acc-Vero-2022.

Doloksaribu, R. P., Asya,) ;, Silkapianis, A., Firmansyah, A., & Korespondensi, P. (2024). BAGAIMANA PELUANG DAN TANTANGAN IMPLEMENTASI ATAS PENGUNGKAPAN EMISI KARBON DI INDONESIA? (Vol. 4, Issue 2).

Fransisca Gunawan, O., & Aryati, T. (2024). The Influence of Company Profitability, Liquidity, Leverage, Environmental Performance, And Managerial Ownership on Carbon Emissions Disclosure.

Grubb, M., Jordan, N. D., Hertwich, E., Neuhoff, K., Das, K., Ranjan Bandyopadhyay, K., Van Asselt, H., Sato, M., Wang, R., Pizer, W. A., & Oh, H. (2025). Annual Review of Environment and Resources Carbon Leakage, Consumption, and Trade. 10, 53. https://doi.org/10.1146/annurev-environ-120820

Gunawan, B., & Berliyanda, K. L. (2024). Pengaruh Green Accounting, Pengungkapan Emisi Karbon, dan Kinerja Lingkungan Terhadap Nilai Perusahaan. Reviu Akuntansi Dan Bisnis Indonesia, 8(1), 33–50. https://doi.org/10.18196/rabin.v8i1.22027

Hu, S., Li, D., & Wang, X. (2023). Study on the influence of the carbon trading pilot policy on energy efficiency in the power industry. International Journal of Climate Change Strategies and Management, 15(2), 159–175. https://doi.org/10.1108/IJCCSM-04-2022-0046

Hu, Y., Tian, Y., & Zhang, L. (2023). Green Bond Pricing and Optimization Based on Carbon Emission Trading and Subsidies: From the Perspective of Externalities. Sustainability (Switzerland), 15(10). https://doi.org/10.3390/su15108422

Indonesia -, P. E., & Team, R. (2023). Mining in Indonesia: Investment, Taxation and Regulatory Guide 2023. www.pwc.com/id

Indonesia Carbon Trading Handbook. (2022). Indonesia Carbon Trading Handbook.

Katadata Insight Centre. (2022). Indonesia Carbon Trading Handbook.

Manurung, K. A., Rendy Nugroho, L., Lubis, F. A., Triastuti, H., & Ningsih, K. (2023). Analisis Valuasi Saham Dengan Menggunakan Metode Price Book Value (Pbv) Dan Metode Price Earning Ratio (Per) Studi Pada Saham PT. Intiland Development Tbk Yang Terdaftar di Bursa Efek Indonesia Pada Tahun 2018-2021. Jurnal Bisnis Net, 1, 6.

Mashari, D. P. S., Zagloel, T. Y. M., Soesilo, T. E. B., & Maftuchah, I. (2023). A Bibliometric and Literature Review: Alignment of Green Finance and Carbon Trading. In Sustainability (Switzerland) (Vol. 15, Issue 10). MDPI. https://doi.org/10.3390/su15107877

Meila, K. D., Dianty, A., & Veronica, L. (2024). Penerapan Pajak Karbon dalam Mewujudkan Sustainability Development Goals Serta Dampaknya Terhadap Penerimaan Pajak di Indonesia. Owner, 8(2), 1849–1864. https://doi.org/10.33395/owner.v8i2.2001

Meng, R. (2023). A Comparative Study of Carbon Trading in China and Internationally. Advances in Economics, Management and Political Sciences, 5(1), 6–12. https://doi.org/10.54254/2754-1169/5/20220052

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. In The BMJ (Vol. 372). BMJ Publishing Group. https://doi.org/10.1136/bmj.n71

PCAF. (2022). Review accounting and reporting principles and rules. Review and apply accounting methodologies for each asset class. Report emissions Table of contents. In Financed Emissions-Second Edition.

Perdiansyah, F., S., Ulpah, M. (2024). The Effect Of Environmental, Social, Governance (ESG) Pillars and State Ownership on Firm Costs of Debt.EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 12(3). Doi: https://doi.org/10.37676/ekombis.v12i3

PERPRES No 98. (2021). Salinan Presiden Republik Indonesia Peraturan Presiden Republik Indonesia.

Puspaningsih. (2020). Implementasi Corporate Social Responsibility dan Dampaknya Terhadap Nilai Perusahaan.

Putra, S. N., Astuti, M., & Munandar, A. (2024). Literature Review: Implementation of Carbon Tax in Indonesia. In Indonesian Interdisciplinary Journal of Sharia Economics (IIJSE) (Vol. 7, Issue 1).

PWC. (2023). Mining in Indonesia: Investment, Taxation and Regulatory Guide 2023. www.pwc.com/id

Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of Business Research, 104, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Surianti, M., Sibarani, A. G., Sibarani, J. L., Ginarti, C., & Gultom, S. A. (2024). The Impact of Green Accounting, Carbon Emission Disclosure, and Environmental Performance on Mining Companies' Valuation. JASa (Jurnal Akuntansi, Audit Dan Sistem Informasi Akuntansi), 8(3), 688–700. https://doi.org/10.36555/jasa.v8i3.2707

Swiss Re Institute. (2021). swiss-re-institute-expertise-publication-economics-of-climate-change.

Taufiq, E., Pratiwi. S. (2022). Pengaruh Carbon Management Accounting dan Pengungkapan Lingkungan pada Perusahaan Pertambangan yang Terdaftar di Bursa Efek Indonesia. Ekombis Review: Jurnal Ilmiah Ekonomi Dan Bisnis,10(1). DOI: https://doi.org/13.11114/ekombisreview.1.x.x1-x2

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review*. In British Journal of Management (Vol. 14).

Wang, H., & Fujita, T. (2023). A Review of Research on Embodied Carbon in International Trade. In Sustainability (Switzerland) (Vol. 15, Issue 10). MDPI. https://doi.org/10.3390/su15107879

World Bank. (2021). Emission Trading in Practice: A Handbook on Design and Implementation.

Zha, D. S., Feng, T. T., & Kong, J. J. (2022). Effects of enterprise carbon trading mechanism design on willingness to participate——Evidence from China. Frontiers in Environmental Science, 10. https://doi.org/10.3389/fenvs.2022.986862

Zhang, C., Zhang, Y., & Huang, Z. (2023). Optimal Reutilization Strategy for a Shipbuilder under the Carbon Quota Policy. Sustainability (Switzerland), 15(10). https://doi.org/10.3390/su15108311

Zhang, P. C., & Cheng, J. (2024). The price behavior characteristics of China and Europe carbon emission trading markets based on the perspective of time scaling and expected returns. PLoS ONE, 19(2 February). https://doi.org/10.1371/journal.pone.0298265

Zhang, Y., Zhang, Y., & Sun, Z. (2023). The Impact of Carbon Emission Trading Policy on Enterprise ESG Performance: Evidence from China. Sustainability (Switzerland), 15(10). https://doi.org/10.3390/su15108279