

CORPORATE SUSTAINABILITY PERFORMANCE IMPROVEMENT BASED ON ENVIRONMENTAL COST EFFICIENCY AND CARBON ACCOUNTING PRACTICES

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ABSTRACT

This study explores the role of environmental cost efficiency and carbon accounting practices in improving corporate sustainability performance. The study focuses on how organizations integrate environmental management strategies, carbon accounting systems, and sustainability-oriented governance practices to strengthen environmental accountability and long-term organizational sustainability. An exploratory study using a qualitative literature review approach was conducted by examining international journal articles, books, conference proceedings, and institutional reports related to environmental cost management, carbon accounting, and corporate sustainability published between 2015 and 2026. The collected literature was analyzed using content analysis techniques involving categorization, interpretation, comparison of findings, and thematic synthesis to identify conceptual relationships and major research trends. The findings reveal that environmental cost efficiency significantly contributes to improving corporate sustainability performance through resource optimization, waste reduction, operational efficiency, and environmental accountability. Organizations implementing effective environmental cost management systems demonstrate stronger governance quality and better sustainability performance. Drawing from the findings, the study proposes a conceptual perspective that corporate sustainability performance improvement depends on the integration of environmental cost efficiency and carbon accounting practices. Organizations capable of combining environmental accountability, strategic cost management, and sustainability-oriented governance are more likely to achieve stronger sustainability performance and long-term organizational sustainability.

Keywords: Carbon Accounting, Corporate Sustainability, Environmental Accountability, Environmental Cost Efficiency, Sustainability Performance

1. INTRODUCTION

Corporate sustainability performance has become a major concern for organizations worldwide due to increasing environmental challenges, regulatory pressures, and stakeholder expectations regarding sustainable business practices. Companies are no longer evaluated solely based on financial profitability but also on their ability to maintain environmental responsibility and social accountability. In recent years, environmental sustainability has become a strategic component of corporate governance, particularly in industries with significant environmental impacts. Organizations are therefore required to implement sustainability-oriented management systems capable of balancing economic growth with environmental protection and long-term organizational resilience (Elkington, 2018).

One of the important approaches in improving corporate sustainability performance is the implementation of environmental cost efficiency. Environmental costs include expenditures related to waste management, pollution prevention, energy efficiency, carbon reduction programs, and environmental restoration activities. Effective environmental cost management enables organizations to reduce operational inefficiencies, optimize resource utilization, and improve environmental performance simultaneously. According to Burritt and Christ (2016), environmental management accounting provides organizations with strategic information for identifying environmental costs and improving sustainability-related decision-making processes.

The growing global concern regarding climate change has also increased the importance of carbon accounting practices in corporate sustainability strategies. Carbon accounting refers to the process of measuring, recording, reporting, and managing greenhouse gas emissions generated by organizational activities. Through carbon accounting, companies can monitor environmental impacts, improve transparency, and comply with environmental regulations and sustainability standards. Carbon accounting practices also support organizational accountability and stakeholder trust regarding corporate environmental responsibility (Schaltegger & Csutora, 2017).

The integration of carbon accounting into corporate governance systems has become increasingly relevant due to the expansion of environmental regulations and sustainability reporting frameworks. Organizations implementing carbon accounting are more capable of identifying carbon emission sources, evaluating environmental risks, and developing mitigation strategies to improve sustainability performance. According to Tang and Luo (2018), carbon accounting significantly contributes to corporate sustainability because it enhances environmental transparency, operational efficiency, and strategic environmental management.

Corporate sustainability performance is also influenced by strategic leadership and organizational adaptability in responding to environmental challenges. Suseno (2022) emphasized that organizational sustainability in the modern era requires adaptive governance, strategic innovation, and effective resource management to maintain competitiveness amid

global uncertainty. Companies that integrate sustainability principles into their operational and financial management systems tend to demonstrate stronger organizational resilience and long-term performance.

Furthermore, environmental cost efficiency contributes not only to environmental improvement but also to financial performance enhancement. Organizations capable of reducing environmental waste and optimizing resource consumption may achieve lower operational costs and higher profitability. Research conducted by Porter and Kramer (2019) explained that sustainability-oriented business strategies create shared value by improving both corporate competitiveness and social welfare. Therefore, environmental efficiency should be viewed as a strategic investment rather than merely a compliance obligation.

In addition, stakeholder theory explains that companies are increasingly pressured to fulfill environmental expectations from governments, investors, consumers, and society. Organizations failing to address environmental sustainability issues may experience reputational damage, declining stakeholder trust, and increased regulatory risks. According to Freeman, Dmytriiev, and Phillips (2021), sustainable corporate governance requires organizations to integrate environmental accountability into strategic decision-making and organizational management systems.

The advancement of sustainability reporting standards has further encouraged companies to adopt carbon accounting practices and environmental cost management systems. Sustainability disclosure frameworks such as the Global Reporting Initiative (GRI) and carbon emission reporting standards require organizations to provide transparent information regarding environmental impacts and sustainability performance. Companies implementing transparent environmental accounting systems are more capable of strengthening organizational legitimacy and improving investor confidence (KPMG, 2022).

Suseno et al. (2021) also highlighted that organizational innovation and collaborative governance are important drivers of sustainability performance in contemporary organizations. The integration of sustainability-oriented accounting systems, technological innovation, and environmental governance contributes significantly to organizational adaptability and long-term competitiveness. In this context, carbon accounting and environmental cost efficiency become essential instruments supporting sustainable corporate transformation.

Despite the increasing importance of environmental sustainability, many organizations still face challenges in implementing effective environmental accounting systems and cost efficiency strategies. Limited environmental awareness, inadequate sustainability governance, and weak carbon emission monitoring systems often hinder sustainability performance improvement. According to Deegan (2019), organizations frequently struggle to integrate sustainability accounting into strategic management due to organizational resistance, resource limitations, and governance complexity.

Moreover, Suseno (2023) explained that sustainability-oriented governance requires organizations to strengthen strategic adaptability and innovation capability in responding to environmental uncertainty and stakeholder expectations. Companies implementing integrated sustainability accounting systems tend to achieve stronger governance quality and organizational sustainability compared to organizations relying solely on conventional financial performance measures.

Based on these conditions, this study aims to examine how environmental cost efficiency and carbon accounting practices contribute to improving corporate sustainability performance. The study is expected to provide theoretical contributions to sustainability accounting literature and practical implications for organizations seeking to strengthen environmental governance, operational efficiency, and long-term sustainability performance.

Research on corporate sustainability performance has experienced substantial development over the last decade, particularly in the areas of environmental accounting, carbon management, sustainability governance, and environmental efficiency. Previous studies generally focused on sustainability disclosure, environmental responsibility, and green innovation as determinants of organizational sustainability. However, limited studies have specifically integrated environmental cost efficiency and carbon accounting practices as strategic mechanisms for improving corporate sustainability performance comprehensively.

Earlier studies emphasized the importance of sustainability accounting in strengthening organizational environmental performance and governance quality. Gray (2010) explained that sustainability accounting plays a critical role in improving environmental transparency and organizational accountability by integrating environmental considerations into corporate reporting systems. Similarly, Burritt and Schaltegger (2014) argued that environmental management accounting supports organizational sustainability by helping companies identify environmental costs, improve resource efficiency, and strengthen strategic environmental decision-making. Nevertheless, these studies mainly concentrated on environmental reporting and accounting frameworks rather than examining the combined role of environmental cost efficiency and carbon accounting in sustainability performance improvement.

The increasing global concern regarding climate change has also encouraged research on carbon accounting and carbon disclosure practices. Ascui (2014) highlighted that carbon accounting has evolved into an important strategic instrument for measuring greenhouse gas emissions and supporting environmental governance. Carbon accounting enables organizations to improve transparency, comply with environmental regulations, and develop sustainability-oriented operational strategies. However, many previous studies primarily discussed carbon reporting compliance without linking carbon accounting practices directly to environmental cost efficiency and long-term sustainability performance.

Research conducted by Suseno et al. (2021) emphasized that organizational innovation and collaborative governance significantly contribute to sustainability and institutional resilience.

The study highlighted the importance of adaptive governance, strategic collaboration, and innovation capability in maintaining organizational sustainability amid environmental uncertainty and global competition. This finding indicates that sustainability performance improvement requires integrated governance mechanisms supported by strategic environmental management and organizational adaptability.

Studies related to environmental efficiency also demonstrated that organizations implementing green operational systems tend to achieve stronger sustainability performance. Hart and Dowell (2011) explained that natural-resource-based strategies improve organizational competitiveness by integrating environmental efficiency and sustainability-oriented innovation into business operations. Companies capable of reducing environmental waste and optimizing resource utilization tend to improve both environmental and financial performance simultaneously.

Furthermore, sustainability governance research has increasingly emphasized the relationship between environmental accountability and corporate legitimacy. Eccles, Ioannou, and Serafeim (2014) found that organizations implementing sustainability-oriented governance systems demonstrate stronger long-term financial performance and stakeholder trust. Sustainability-oriented organizations are more capable of responding to environmental risks, improving governance quality, and maintaining corporate resilience. However, the study did not specifically address the role of carbon accounting and environmental cost efficiency integration in supporting sustainability performance.

In addition, Suseno (2023) argued that organizational sustainability in the modern era requires adaptive governance systems capable of integrating innovation, strategic management, and sustainability-oriented operational practices. Companies implementing integrated sustainability strategies tend to achieve stronger competitiveness and long-term organizational resilience. This perspective strengthens the argument that environmental cost efficiency and carbon accounting should be integrated into corporate governance systems to support sustainability performance improvement.

Previous studies also explored the influence of environmental innovation on sustainability performance. Chen, Lai, and Wen (2006) explained that green innovation positively affects corporate competitive advantage and environmental sustainability. Organizations investing in environmentally efficient technologies and sustainability-oriented operational systems tend to improve organizational adaptability and market performance. Nevertheless, the integration of carbon accounting practices with environmental cost management remains relatively underexplored in the sustainability literature.

Based on the previous studies, it can be concluded that existing research has mainly focused on sustainability reporting, environmental governance, green innovation, and carbon disclosure practices. Limited research has comprehensively examined how environmental cost efficiency and carbon accounting practices can be integrated to improve corporate sustainability

performance. Therefore, this study offers novelty by developing an integrated perspective that combines environmental cost efficiency and carbon accounting practices as strategic mechanisms for strengthening sustainability performance, governance quality, and long-term organizational resilience

Research Questions: 1) How does environmental cost efficiency contribute to improving corporate sustainability performance based on findings from previous literature? 2) How do carbon accounting practices support sustainability governance and environmental accountability in corporate organizations?

2. LITERATURE REVIEW

2.1 Environmental Cost Efficiency Theory

Environmental cost efficiency refers to organizational efforts to manage environmental expenditures effectively while maintaining operational productivity and sustainability performance. Environmental costs include expenses related to pollution prevention, waste management, emission reduction, environmental restoration, and sustainable resource utilization. According to Hansen and Mowen (2015), environmental cost management enables organizations to identify hidden environmental expenditures and improve operational efficiency through sustainability-oriented accounting practices.

The concept of environmental cost efficiency is closely related to environmental management accounting (EMA), which integrates environmental information into organizational financial decision-making processes. Burritt, Schaltegger, and Zvezdov (2019) explained that EMA helps organizations reduce environmental risks, improve resource efficiency, and strengthen sustainability governance. Through effective environmental cost management, companies can minimize unnecessary operational expenditures while simultaneously improving environmental performance and corporate legitimacy.

Environmental cost efficiency is also associated with the natural-resource-based view (NRBV) theory developed by Hart (1995). The theory emphasizes that environmental capabilities and sustainable resource management can become strategic sources of competitive advantage. Organizations implementing environmentally efficient operational systems tend to achieve stronger sustainability performance because they can reduce waste, optimize energy consumption, and improve operational resilience. In addition, Porter and van der Linde (2015) argued that environmental efficiency and innovation positively influence organizational competitiveness by encouraging companies to adopt cleaner production systems and sustainability-oriented operational strategies.

Moreover, stakeholder theory explains that environmental efficiency is increasingly important because stakeholders demand greater environmental accountability and sustainability commitment from organizations. According to Hörisch, Freeman, and Schaltegger (2014), organizations capable of managing environmental costs efficiently tend to improve stakeholder trust and strengthen long-term organizational sustainability. Therefore, environmental cost

efficiency is not merely an operational mechanism but also a strategic governance instrument supporting corporate sustainability performance.

2.2 Carbon Accounting Practices Theory

Carbon accounting refers to the process of measuring, recording, monitoring, and reporting greenhouse gas emissions generated by organizational activities. Carbon accounting practices have become increasingly important due to growing global concern regarding climate change, environmental regulation, and sustainability reporting requirements. According to Stechemesser and Guenther (2012), carbon accounting enables organizations to evaluate environmental impacts systematically and develop strategic mitigation initiatives to reduce carbon emissions and improve sustainability performance.

The theoretical foundation of carbon accounting is closely linked to legitimacy theory, which explains that organizations seek social legitimacy by aligning their activities with societal expectations and environmental norms. De Villiers and van Staden (2011) argued that organizations implementing transparent carbon reporting practices tend to strengthen corporate legitimacy and improve stakeholder confidence. Carbon accounting therefore functions not only as an environmental reporting mechanism but also as a strategic communication tool supporting corporate sustainability governance.

Carbon accounting practices are also associated with institutional theory, which explains that organizations adopt sustainability-oriented accounting systems due to regulatory pressures, stakeholder expectations, and industry standards. According to Herold and Lee (2019), institutional pressures encourage companies to implement carbon disclosure and environmental accountability systems to maintain organizational legitimacy and competitiveness. Organizations operating in environmentally sensitive industries are more likely to adopt carbon accounting practices because of higher public scrutiny and sustainability demands.

Furthermore, carbon accounting contributes significantly to strategic environmental management and sustainability-oriented governance. Schaltegger and Burritt (2017) emphasized that carbon management accounting supports organizations in identifying emission sources, improving environmental transparency, and integrating sustainability objectives into strategic decision-making. Companies implementing carbon accounting systems are generally more capable of improving environmental performance, operational efficiency, and long-term organizational resilience.

The implementation of carbon accounting also supports the development of sustainability reporting systems aligned with international standards such as the Global Reporting Initiative (GRI) and carbon disclosure frameworks. Luo and Tang (2016) found that organizations with strong carbon disclosure practices tend to demonstrate higher sustainability performance and governance quality. Therefore, carbon accounting practices are increasingly recognized as essential instruments for improving environmental accountability and corporate sustainability performance.

3. METHODS

3.1 Research Approach

This study uses a qualitative research approach to explore corporate sustainability performance improvement through environmental cost efficiency and carbon accounting practices. Qualitative research is appropriate because it enables researchers to analyze concepts, theories, and empirical findings comprehensively based on existing literature. According to Creswell (2014), qualitative research emphasizes interpretative understanding and contextual analysis of social and organizational phenomena.

3.2 Research Design

The study applies a literature review design with a conceptual analysis approach. This method focuses on reviewing, comparing, and synthesizing scientific findings related to environmental cost efficiency, carbon accounting, and corporate sustainability performance. Literature review research helps identify theoretical developments, research gaps, and conceptual relationships among variables (Snyder, 2019).

3.3 Data Sources

The data used in this study are secondary data obtained from international scientific journals, books, conference proceedings, sustainability reports, and other academic publications published between 2015 and 2026. The selected literature specifically discusses environmental accounting, carbon management, sustainability governance, and environmental cost efficiency within corporate organizations.

3.4 Data Collection Technique

Data collection was conducted through documentation techniques by systematically reviewing and selecting relevant literature sources. The documentation process involved identifying, categorizing, and organizing scientific publications related to the research topic. Bowen (2009) explained that document analysis is an effective qualitative method for obtaining systematic and meaningful information from written sources.

3.5 Data Analysis Technique

The collected data were analyzed using content analysis techniques. The analysis process included data reduction, classification, interpretation, and synthesis of findings from previous studies. Content analysis enables researchers to identify patterns, themes, and relationships among concepts discussed in the literature (Krippendorff, 2018). The findings were then interpreted descriptively to develop theoretical insights regarding the role of environmental cost efficiency and carbon accounting practices in improving corporate sustainability performance.

3.6 Research Validity

To ensure research validity, this study applies source triangulation by comparing findings from various scientific publications and theoretical perspectives. The use of multiple literature sources from reputable international journals strengthens the credibility and consistency of the analysis results. According to Flick (2018), triangulation improves the reliability and trustworthiness of qualitative research findings through cross-verification of data and interpretations.

4. RESULTS AND DISCUSSION

4.1 Environmental Cost Efficiency and Corporate Sustainability Performance

The findings of this study indicate that environmental cost efficiency significantly contributes to improving corporate sustainability performance. Organizations implementing efficient environmental cost management practices tend to achieve better operational efficiency, lower environmental risks, and stronger sustainability governance. Environmental cost efficiency enables companies to optimize resource utilization, reduce environmental waste, and improve long-term organizational resilience.

The literature analysis identified several major dimensions of environmental cost efficiency implementation in corporate organizations, as presented in Table 1.

Table 1. Environmental Cost Efficiency and Sustainability Performance

No	Environmental Cost Efficiency Dimension	Organizational Implementation	Sustainability Impact
1	Waste Reduction	Minimizing production and operational waste	Improves environmental performance
2	Energy Efficiency	Reducing energy consumption through sustainable technology	Lowers operational costs
3	Pollution Prevention	Environmental protection and emission reduction programs	Strengthens corporate reputation
4	Resource Optimization	Efficient use of raw materials and natural resources	Enhances operational sustainability
5	Environmental Investment	Investment in green technology and eco-friendly systems	Supports long-term sustainability

Table 1 shows that organizations integrating environmental cost efficiency into operational management demonstrate stronger sustainability performance. Waste reduction and energy efficiency programs help companies reduce operational expenditures while simultaneously minimizing environmental impacts. This finding supports the study conducted by Christ and Burritt (2017), which emphasized that environmental management accounting improves

sustainability performance by supporting resource efficiency and environmental decision-making.

The findings also reveal that pollution prevention initiatives significantly contribute to strengthening corporate legitimacy and stakeholder trust. Companies implementing sustainability-oriented environmental programs are more likely to improve organizational reputation and social acceptance. According to Clarkson, Li, Richardson, and Vasvari (2015), organizations with stronger environmental performance tend to disclose more transparent sustainability information and demonstrate higher corporate accountability.

Resource optimization emerged as another important factor influencing sustainability performance. Companies capable of utilizing resources efficiently are better prepared to maintain operational continuity amid environmental uncertainty and increasing stakeholder expectations. This finding aligns with the study by Wagner (2015), which explained that sustainability-oriented operational efficiency positively influences corporate competitiveness and organizational resilience.

Furthermore, environmental investment in green technologies and environmentally friendly operational systems contributes significantly to long-term sustainability. Organizations adopting green innovation strategies tend to achieve stronger environmental and financial performance simultaneously. According to Albino, Balice, and Dangelico (2019), green innovation improves sustainability performance by enhancing organizational adaptability and environmental responsibility. Therefore, environmental cost efficiency should be considered a strategic governance mechanism supporting corporate sustainability and long-term competitiveness.

The literature findings also reveal that organizational strategy and adaptive governance significantly influence the effectiveness of environmental cost efficiency implementation. Companies with sustainability-oriented leadership and innovation capability tend to achieve stronger environmental performance and operational resilience. Environmental efficiency is not only influenced by technical operational systems but also by organizational commitment, collaborative governance, and sustainability-oriented strategic planning.

The analysis identified several strategic organizational factors supporting environmental cost efficiency, as presented in Table 3.

Table 2. Strategic Organizational Factors Supporting Environmental Cost Efficiency

No	Strategic Factor	Organizational Application	Strategic Benefit
1	Sustainability Leadership	Leadership commitment toward green governance	Improves sustainability culture
2	Green Innovation	Development of eco-friendly operational systems	Enhances environmental efficiency
3	Collaborative Governance	Cooperation with stakeholders and regulators	Strengthens environmental legitimacy

4	Employee Awareness	Environmental Sustainability	Sustainability training and environmental engagement	Improves operational responsibility
5	Digital Systems	Sustainability Technology-based monitoring	environmental	Supports efficient decision-making

Table 2 demonstrates that organizational leadership and innovation significantly influence environmental cost efficiency effectiveness. Companies implementing sustainability leadership are more capable of integrating environmental efficiency into strategic management systems. This finding supports the study conducted by Suseno et al. (2021), which emphasized that collaborative governance and innovation strategies improve organizational sustainability and adaptability in dynamic environments.

Green innovation also emerged as a critical strategic factor supporting environmental efficiency. Organizations implementing environmentally friendly technologies and sustainability-oriented operational systems tend to reduce environmental costs and improve organizational competitiveness simultaneously. Suseno (2023) explained that adaptive governance and innovation capability are essential components in maintaining sustainability performance and organizational resilience amid environmental uncertainty.

Furthermore, collaborative governance strengthens organizational legitimacy and stakeholder trust regarding environmental responsibility. Companies collaborating with regulators, communities, and environmental stakeholders are better prepared to implement sustainability-oriented governance systems. The findings indicate that environmental cost efficiency becomes more effective when integrated with organizational innovation, strategic collaboration, and sustainability-oriented governance practices.

4.2 Carbon Accounting Practices and Sustainability Governance

The second finding demonstrates that carbon accounting practices play a significant role in strengthening sustainability governance and environmental accountability in corporate organizations. Carbon accounting enables organizations to measure, monitor, and manage greenhouse gas emissions systematically, thereby supporting environmental transparency and sustainability-oriented decision-making.

The literature analysis identified several important dimensions of carbon accounting practices, as presented in Table 2.

Table 3. Carbon Accounting Practices and Sustainability Governance

No	Carbon Accounting Dimension	Organizational Implementation	Governance Contribution
1	Carbon Emission Measurement	Monitoring greenhouse gas emissions	Improves environmental transparency
2	Carbon Disclosure	Sustainability and emission reporting	Strengthens stakeholder trust
3	Carbon Risk Management	Identification and mitigation of environmental risks	Enhances governance quality

No	Carbon Accounting Dimension	Organizational Implementation	Governance Contribution
4	Sustainability Reporting	Integration of carbon data into sustainability reports	Supports organizational legitimacy
5	Environmental Compliance	Compliance with environmental standards and regulations	Reduces regulatory risk

Table 3 indicates that organizations implementing comprehensive carbon accounting systems demonstrate stronger sustainability governance and environmental accountability. Carbon emission measurement enables organizations to identify major emission sources and evaluate environmental impacts systematically. According to Qian, Burritt, and Monroe (2018), carbon accounting supports strategic environmental management by improving organizational awareness regarding environmental risks and sustainability performance.

The findings also reveal that carbon disclosure significantly contributes to stakeholder trust and corporate legitimacy. Transparent sustainability reporting strengthens organizational accountability and improves investor confidence. This result is consistent with the research conducted by Hahn, Reimsbach, and Schiemann (2015), which found that sustainability disclosure positively influences organizational credibility and governance transparency.

Carbon risk management also emerged as an important dimension supporting sustainability governance. Organizations integrating carbon accounting into risk management systems are more capable of responding to environmental uncertainty and regulatory changes. According to Tang and Demeritt (2018), carbon management systems improve organizational adaptability and sustainability-oriented strategic planning.

In addition, sustainability reporting integrated with carbon accounting practices enables organizations to strengthen governance quality and maintain compliance with environmental regulations. Companies implementing transparent carbon reporting frameworks tend to reduce environmental risks and improve organizational legitimacy. This finding aligns with the study conducted by Milne and Gray (2016), which emphasized that sustainability accounting contributes significantly to organizational accountability and long-term sustainability governance.

Overall, the findings of this study confirm that environmental cost efficiency and carbon accounting practices are essential strategic mechanisms for improving corporate sustainability performance. The integration of sustainability-oriented environmental management and carbon governance systems enables organizations to strengthen operational efficiency, environmental accountability, and long-term organizational resilience

The findings additionally indicate that carbon accounting practices contribute strategically to improving corporate sustainability performance through governance integration, environmental transparency, and long-term strategic planning. Organizations implementing comprehensive carbon accounting systems are more capable of aligning sustainability objectives with operational and financial management processes.

Several strategic contributions of carbon accounting practices are summarized in Table 4.

Table 4. Strategic Contributions of Carbon Accounting Practices

No	Carbon Accounting Strategy	Organizational Practice	Sustainability Contribution
1	Sustainability Integration	Incorporating carbon data into corporate strategy	Improves long-term sustainability
2	Environmental Decision Support	Carbon-based operational evaluation	Enhances strategic planning
3	Regulatory Readiness	Compliance with environmental policies	Reduces compliance risk
4	Stakeholder Communication	Transparent environmental disclosure	Strengthens corporate reputation
5	Corporate Sustainability Measurement	Evaluation of environmental performance indicators	Supports governance effectiveness

Table 4 indicates that carbon accounting practices provide strategic value beyond environmental reporting functions. Organizations integrating carbon accounting into sustainability governance systems are better prepared to manage environmental risks and improve corporate accountability. According to Suseno (2022), organizational sustainability requires adaptive strategic management capable of integrating innovation, governance, and sustainability-oriented operational systems to maintain competitiveness in rapidly changing environments.

The findings also reveal that carbon accounting improves environmental decision-making quality. Companies utilizing carbon information within strategic planning processes tend to develop more effective sustainability policies and operational mitigation strategies. Suseno (2023) emphasized that sustainability-oriented governance systems support organizational adaptability and improve institutional resilience through integrated strategic management practices.

In addition, transparent stakeholder communication through sustainability disclosure strengthens organizational legitimacy and investor confidence. Organizations implementing comprehensive carbon accounting systems are more likely to improve environmental accountability and governance transparency. The study confirms that carbon accounting practices become increasingly effective when integrated with adaptive governance, collaborative sustainability strategies, and long-term organizational planning.

5. CONCLUSION AND LIMITATION

Based on the results and discussion, this study concludes that environmental cost efficiency plays a significant role in improving corporate sustainability performance. The implementation of waste reduction, energy efficiency, resource optimization, and green innovation strategies

enables organizations to strengthen operational efficiency, reduce environmental impacts, and improve long-term organizational resilience. Companies integrating sustainability-oriented environmental management into corporate governance systems tend to demonstrate stronger competitiveness, accountability, and environmental legitimacy.

Furthermore, this study concludes that carbon accounting practices contribute substantially to strengthening sustainability governance and environmental accountability within corporate organizations. Carbon accounting supports organizations in measuring environmental impacts, improving transparency, managing environmental risks, and enhancing strategic sustainability planning. The integration of carbon accounting with adaptive governance and sustainability-oriented operational systems enables organizations to improve stakeholder trust, regulatory compliance, and long-term sustainability performance in increasingly complex business environments.

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