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The Influence of Market Competition, Company Size, and Corporate Governance on Environmental Management Accounting and Environmental Performance

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ABSTRACT

Purpose – This study examines the influence of market competition, company size, and corporate governance on environmental performance, with Environmental Management Accounting (EMA) as a mediating variable.
Design/methodology/approach – This study uses a quantitative approach involving managers and accounting professionals from manufacturing and industrial companies listed on the Indonesia Stock Exchange. The data were analyzed using SEM-PLS.
Findings/Results – The findings show that market competition, company size, corporate governance, and EMA positively affect environmental performance. EMA also mediates the relationship between market competition, company size, corporate governance, and environmental performance.
Originality/Value – This study highlights EMA as a strategic mechanism that connects competitive pressure, organizational capacity, and governance practices with improved environmental performance.

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1. Introduction

Environmental sustainability has become one of the most critical strategic concerns for modern corporations due to increasing ecological degradation, climate change, and stakeholder pressure for responsible business practices. Companies are no longer evaluated solely based on financial performance, but also on their ability to manage environmental impacts and contribute to sustainable development (Andersson et al., 2022; Zhou et al., 2022). In recent years, environmental performance has emerged as an essential indicator of organizational legitimacy because governments, investors, and consumers increasingly demand transparency regarding corporate environmental practices (Volkova et al., 2021a). The growing implementation of environmental regulations and sustainability standards has also encouraged companies to integrate ecological considerations into managerial decision-making processes (Achmad et al., 2023; Hristov & Searcy, 2024). Furthermore, firms with strong environmental performance tend to achieve better reputational advantages, customer trust, and long-term competitiveness in highly dynamic markets (Salam & Jahed, 2023). This condition has shifted environmental management from a voluntary activity into a strategic necessity for organizational survival and sustainability. As a result, many companies have begun adopting managerial systems capable of supporting environmentally oriented operational and strategic decisions. Within this context, Environmental Management Accounting (EMA) has gained considerable attention as a managerial mechanism for integrating environmental information into organizational decision-making processes.

The urgency of environmental management is particularly evident in manufacturing and industrial sectors because these sectors contribute significantly to environmental pollution, carbon emissions, waste generation, and excessive resource consumption. Industrial activities often generate environmental externalities that create serious ecological and social consequences when not managed effectively (Lecocq et al., 2023; Meade, 2024). In developing countries such as Indonesia, the environmental impact of industrial expansion has become increasingly visible due to rapid economic growth and weak environmental monitoring systems. Several environmental cases involving manufacturing companies have intensified public criticism regarding corporate accountability and sustainability commitment. In addition, stakeholders now expect companies to demonstrate environmental responsibility not only through compliance with regulations but also through measurable environmental performance improvements (Al Amosh & Khatib, 2025; Hossain et al., 2026). This situation creates substantial pressure for companies to adopt more transparent and accountable environmental management systems. Firms that fail to respond to these expectations may experience reputational damage, declining stakeholder trust, and reduced market competitiveness. Therefore, understanding the factors that influence environmental performance has become increasingly important for both academics and practitioners. The growing complexity of environmental challenges also indicates that environmental performance cannot be separated from organizational, competitive, and governance-related factors.

One important factor influencing environmental performance is market competition, which encourages companies to improve efficiency, innovation, and sustainability-oriented practices to maintain competitive advantages. Intense market competition often motivates firms to differentiate themselves through environmentally friendly products, green innovation, and sustainable operational strategies (Lopes et al., 2022). Companies operating in highly competitive environments are more likely to implement environmental initiatives because

consumers and investors increasingly prefer organizations with strong sustainability reputations (Nagiah & Mohd Suki, 2024). Competitive pressure also encourages firms to reduce environmental costs and improve resource efficiency to achieve long-term operational effectiveness. In addition, company size plays an important role in shaping environmental strategies because larger firms generally possess more financial, technological, and managerial resources to support environmental initiatives (Lutfi et al., 2023). Large organizations are also more visible to regulators, media, and society, causing them to face greater reputational risks when environmental failures occur. Consequently, larger firms tend to invest more heavily in sustainability practices and environmental reporting systems. Besides market competition and company size, corporate governance has also become a crucial determinant of environmental accountability and strategic sustainability implementation.

Corporate governance is widely recognized as a mechanism that strengthens organizational accountability, transparency, and ethical managerial behavior, particularly regarding sustainability-related issues. Effective governance structures can improve oversight of environmental practices and ensure that sustainability objectives become integrated into corporate strategic agendas (Ramayah et al., 2024). Governance mechanisms such as board independence, audit committees, and sustainability oversight structures enable organizations to monitor environmental risks more effectively and reduce opportunistic managerial behavior (Yahaya, 2026). Strong governance also encourages companies to provide transparent environmental disclosures and improve environmental accountability toward stakeholders (Fontaine et al., 2022). Moreover, firms with strong governance systems are generally more responsive to environmental pressures because governance mechanisms facilitate long-term strategic orientation rather than short-term profit maximization. However, environmental performance improvement requires not only governance commitment but also the availability of relevant managerial information capable of supporting environmental decision-making. In this regard, Environmental Management Accounting (EMA) becomes highly relevant because it enables firms to identify, measure, and manage environmental costs and impacts systematically. EMA provides both financial and non-financial environmental information that assists managers in improving operational efficiency and environmental sustainability simultaneously (Appannan et al., 2023; Deb et al., 2022). Therefore, EMA can function as an important strategic mechanism connecting organizational factors with environmental performance improvement.

Previous studies have extensively examined the relationship between environmental management practices and corporate environmental performance. Several studies found that market competition positively influences environmental innovation and sustainability performance because competitive environments encourage firms to improve green practices and operational efficiency (Awwad et al., 2025; Ha et al., 2024). Other studies reported that company size significantly affects environmental disclosure and environmental performance because larger organizations possess greater organizational capabilities and stakeholder visibility (Damtoft et al., 2025; Liu et al., 2023). Research on corporate governance also demonstrated that governance quality positively contributes to sustainability performance through stronger managerial oversight and accountability mechanisms (Sari, 2023; Yang et al., 2024). Furthermore, EMA has been identified as an important managerial tool for improving environmental performance through better environmental information management and resource efficiency (Appannan et al., 2023; Zatini et al., 2025). Several scholars also emphasized that EMA supports sustainability-oriented strategic planning because it enables organizations

to integrate environmental considerations into managerial decisions (Swalih et al., 2024; Zatini et al., 2025). These findings indicate that environmental performance is influenced by a combination of external pressures, organizational characteristics, governance quality, and environmental accounting systems. Nevertheless, despite the growing number of studies in this area, several important conceptual and empirical limitations remain insufficiently addressed.

Most previous studies have primarily examined the direct relationship between market competition, company size, corporate governance, and environmental performance without adequately explaining the mediating role of Environmental Management Accounting. Existing research tends to treat EMA merely as an independent predictor of environmental performance rather than as a strategic mechanism linking organizational characteristics with sustainability outcomes (Kong et al., 2022). In addition, prior studies often focused on developed countries with relatively strong environmental governance systems, while empirical evidence from developing countries remains limited. The Indonesian context is particularly important because manufacturing and industrial companies operate under increasing environmental pressure but still face substantial challenges in implementing sustainability-oriented managerial systems. Furthermore, previous findings regarding the relationship between organizational characteristics and environmental performance remain inconsistent. Some studies reported strong positive effects of company size and governance on environmental performance, whereas others found weak or insignificant relationships depending on institutional context and organizational capability (Hyun & Yu, 2024). Another limitation is that many studies focused only on environmental disclosure rather than actual environmental performance improvement. Consequently, there is still limited understanding regarding how EMA mediates the relationship between market competition, company size, corporate governance, and environmental performance in emerging economies. This gap indicates the need for further investigation to develop a more comprehensive explanation of environmental performance determinants within sustainability-oriented management systems.

In addition to the empirical limitations, theoretical integration within previous studies also remains fragmented. Several studies relied heavily on stakeholder theory to explain environmental accountability, while others emphasized legitimacy theory, contingency theory, or institutional theory independently (Akhter et al., 2022). However, limited research has attempted to integrate these perspectives to explain how organizational pressures, governance mechanisms, and managerial systems interact in shaping environmental performance outcomes. Contingency theory suggests that management accounting systems should align with organizational and environmental conditions to achieve optimal performance, whereas institutional theory emphasizes organizational responses to external legitimacy pressures (Alnaim & Metwally, 2024). Meanwhile, legitimacy theory explains that companies adopt sustainability practices to maintain public acceptance and organizational survival, particularly under increasing stakeholder scrutiny (Akhter et al., 2022). The integration of these theoretical perspectives provides a more comprehensive understanding of why firms adopt EMA and how it contributes to environmental performance improvement. Nevertheless, empirical studies integrating these perspectives within the context of environmental accounting remain relatively limited, especially in emerging economies. This condition highlights the importance of examining EMA not only as a technical accounting tool but also as a strategic managerial mechanism shaped by organizational and institutional

pressures. Therefore, further research is required to provide a more integrated explanation regarding the role of EMA in strengthening environmental performance.

Based on these considerations, this study aims to analyze the influence of market competition, company size, and corporate governance on environmental performance with Environmental Management Accounting as a mediating variable. This study specifically focuses on manufacturing and industrial companies listed on the Indonesia Stock Exchange because these sectors face substantial environmental challenges and sustainability pressures. The study contributes theoretically by integrating contingency theory, institutional theory, stakeholder theory, and legitimacy theory to explain the relationship between organizational characteristics, EMA implementation, and environmental performance. In addition, this study contributes empirically by providing evidence from an emerging economy context where environmental accounting practices are still developing. The findings are also expected to enrich the literature on Environmental Management Accounting by positioning EMA as a strategic mediating mechanism rather than merely an operational accounting tool. Practically, this study provides insights for corporate managers regarding the importance of integrating environmental accounting systems into sustainability strategies and governance practices. The study also offers implications for policymakers and regulators in designing sustainability policies that encourage stronger environmental accountability among industrial companies. Ultimately, this research is expected to support the development of more effective sustainability-oriented managerial systems capable of improving corporate environmental performance in increasingly competitive and environmentally sensitive business environments.

2. Literature Review & Hypothesis Development

2.1. Theoretical Foundation

Environmental performance has increasingly become an essential dimension of corporate sustainability because organizations are expected to balance economic objectives with environmental responsibility. The growing awareness of climate change, ecological degradation, and resource scarcity has intensified stakeholder demands for environmentally accountable business practices (Gerged et al., 2021). Within this context, stakeholder theory explains that companies are responsible not only to shareholders but also to broader stakeholder groups, including governments, communities, consumers, employees, and environmental advocacy organizations (Chiang & Chuang, 2024). Stakeholders increasingly expect organizations to demonstrate transparency regarding environmental impacts, sustainability commitments, and ecological accountability. Companies that fail to respond to these expectations may experience declining legitimacy, reputational damage, and reduced market trust. Consequently, firms are encouraged to integrate sustainability principles into managerial and operational strategies to maintain long-term organizational survival. Stakeholder theory therefore provides a conceptual foundation for understanding why companies adopt environmentally oriented practices and sustainability reporting mechanisms. In relation to this study, stakeholder pressure may encourage companies to strengthen environmental management systems and improve environmental performance through Environmental Management Accounting (EMA).

In addition to stakeholder theory, legitimacy theory also provides a strong theoretical foundation for explaining corporate environmental behavior. Legitimacy theory argues that

organizations continuously seek social acceptance by aligning their operational activities with prevailing societal norms, values, and expectations (Volkova et al., 2021b). Environmental accountability has become an important aspect of organizational legitimacy because society increasingly evaluates companies based on their environmental responsibility and sustainability commitment. Firms operating in environmentally sensitive industries often face greater public scrutiny and regulatory pressure regarding pollution, waste management, and ecological impacts (Buallay & Al-Ajmi, 2019). As a result, organizations adopt sustainability-oriented managerial systems and environmental disclosure practices to maintain legitimacy and public trust. Environmental Management Accounting can therefore be viewed as a strategic mechanism that supports organizational legitimacy by enabling firms to monitor environmental impacts and improve environmental transparency. The integration of stakeholder theory and legitimacy theory provides a comprehensive explanation regarding why companies implement EMA and how environmental performance becomes strategically important within modern business environments. These theories collectively suggest that environmental accountability is shaped not only by internal managerial considerations but also by external institutional and societal pressures.

2.2. Environmental Management Accounting and Environmental Performance

Environmental Management Accounting has emerged as an important managerial approach for supporting corporate sustainability and environmental accountability. EMA refers to the identification, measurement, analysis, and utilization of environmental-related financial and non-financial information to support managerial decision-making and sustainability-oriented organizational strategies (Burrit et al., 2024). Unlike conventional accounting systems that primarily focus on financial performance, EMA integrates environmental considerations into operational planning, cost management, and strategic evaluation processes. This system enables organizations to identify hidden environmental costs, improve resource efficiency, reduce waste generation, and strengthen environmental risk management (Qian et al., 2011). EMA also assists managers in evaluating the environmental consequences of operational decisions, thereby supporting more sustainable business practices. Furthermore, the increasing adoption of EMA reflects the growing recognition that environmental sustainability can contribute to long-term organizational competitiveness and operational effectiveness. Previous studies have consistently shown that EMA positively contributes to environmental performance through improved environmental monitoring, transparency, and strategic environmental planning (Hanif et al., 2023; Huynh & Nguyen, 2024). Companies implementing effective EMA systems tend to achieve better environmental outcomes because environmental information becomes integrated into managerial decision-making processes. Therefore, EMA is increasingly recognized not merely as an accounting tool but as a strategic mechanism for improving corporate environmental performance.

Environmental performance itself reflects an organization's ability to minimize negative ecological impacts while maintaining sustainable operational activities. Strong environmental performance is commonly associated with lower emissions, efficient resource utilization, waste reduction, pollution prevention, and compliance with environmental regulations (Prasadhy et al., 2025). Companies with high environmental performance generally possess stronger sustainability reputations and greater stakeholder trust because they demonstrate commitment to responsible environmental practices. Moreover, environmental performance has increasingly become an important determinant of competitive advantage because

environmentally conscious consumers and investors tend to favor sustainable companies (Li et al., 2023). However, achieving strong environmental performance requires substantial organizational commitment, effective governance mechanisms, and reliable environmental information systems. EMA plays a central role in this process because it provides managers with strategic environmental information necessary for evaluating sustainability-related decisions and operational efficiency. Despite the recognized importance of EMA, the effectiveness of its implementation often depends on organizational characteristics and external business pressures. Consequently, understanding the organizational determinants of EMA and environmental performance remains an important area of sustainability accounting research. This study therefore examines how market competition, company size, and corporate governance influence environmental performance through the mediating role of EMA.

2.3. Market Competition, EMA, and Environmental Performance

Market competition has become an increasingly important driver of corporate sustainability practices because firms operating in highly competitive environments must continuously improve efficiency, innovation, and stakeholder responsiveness. Competitive pressure often encourages organizations to adopt environmentally friendly practices as part of product differentiation and sustainability-oriented business strategies (Shahab et al., 2020). Companies facing intense market rivalry are more likely to invest in environmental innovation, green production systems, and sustainability reporting to strengthen their competitive positioning. Moreover, environmentally conscious consumers increasingly prefer organizations demonstrating strong environmental commitment and sustainability accountability. Competitive markets also encourage firms to reduce operational inefficiencies and environmental costs to maintain profitability and long-term business sustainability (Huynh & Nguyen, 2024). In this context, EMA becomes highly relevant because it enables organizations to identify environmental costs, optimize resource utilization, and improve operational efficiency through environmental information integration. Previous studies reported that market competition positively influences the adoption of environmental management practices and green innovation strategies (Mayndarto & Murwaningsari, 2021). However, several studies also suggested that excessive competitive pressure may encourage short-term managerial orientation that prioritizes immediate financial performance over long-term sustainability investment. These contradictory findings indicate that the relationship between market competition and environmental performance remains inconclusive and may depend on the presence of strategic managerial mechanisms such as EMA.

EMA may function as a mediating mechanism through which market competition influences environmental performance. Under competitive pressure, firms are often required to improve efficiency while simultaneously maintaining sustainability credibility among stakeholders. EMA supports this process by providing environmental cost information, sustainability indicators, and resource efficiency evaluations necessary for strategic decision-making (Qian et al., 2011). Firms utilizing EMA can better identify environmental inefficiencies and develop sustainability-oriented operational strategies capable of strengthening both environmental and competitive performance. Hanif et al. (2023) emphasized that organizations integrating EMA into managerial systems tend to improve environmental performance through environmentally informed innovation and strategic planning. Nevertheless, empirical studies examining the mediating role of EMA within the relationship between market competition

and environmental performance remain relatively limited, particularly in emerging economies. Most previous research focused primarily on direct relationships between competition and sustainability outcomes without exploring the managerial mechanisms underlying these relationships. Consequently, the role of EMA as an intermediary process connecting competitive pressure and environmental performance remains insufficiently understood. Based on these arguments, the following hypotheses are proposed:
H1: Market competition has a positive effect on Environmental Management Accounting.
H2: Market competition has a positive effect on environmental performance.
H3: Environmental Management Accounting mediates the relationship between market competition and environmental performance.

2.4. Company Size, EMA, and Environmental Performance

Company size is frequently associated with environmental performance because larger organizations generally possess greater financial resources, technological capabilities, and managerial capacity to implement sustainability initiatives. Large companies often face stronger stakeholder scrutiny regarding environmental responsibility because their operational activities have broader ecological and social impacts. Public visibility and reputational exposure also encourage larger firms to strengthen sustainability practices and environmental accountability mechanisms. Moreover, larger organizations typically have better access to environmental technologies, sustainability expertise, and organizational infrastructure necessary for implementing environmental management systems (García Sánchez et al., 2020). As a result, company size is commonly viewed as an important predictor of environmental performance and sustainability disclosure. However, previous studies also suggested that large organizational structures may create bureaucratic complexity and operational rigidity that hinder effective sustainability implementation. In some cases, organizational complexity may reduce managerial flexibility and delay environmental decision-making processes. These findings indicate that company size alone may not automatically improve environmental performance unless supported by effective managerial systems capable of integrating environmental information into organizational strategies.

Environmental Management Accounting may therefore become an important mechanism through which organizational resources and operational scale are transformed into improved environmental performance. Large companies generally possess greater capability to implement sophisticated accounting systems, including EMA, because they have stronger financial and technological resources (Burrit et al., 2024). EMA enables organizations to manage environmental costs systematically, evaluate operational inefficiencies, and integrate sustainability considerations into strategic planning. Through EMA implementation, large firms may optimize environmental resource utilization and improve sustainability accountability more effectively. Previous studies found that organizations implementing EMA tend to achieve stronger environmental performance because environmental information becomes embedded within managerial decision-making processes (Li et al., 2023). Nevertheless, empirical evidence regarding the mediating role of EMA in the relationship between company size and environmental performance remains relatively scarce, especially in developing countries where environmental accounting adoption is still evolving. Most existing studies focused primarily on direct relationships between organizational characteristics and sustainability outcomes. Therefore, further investigation is needed to

explain how EMA mediates the influence of company size on environmental performance. Based on these considerations, the following hypotheses are proposed:
H4: Company size has a positive effect on Environmental Management Accounting.
H5: Company size has a positive effect on environmental performance.
H6: Environmental Management Accounting mediates the relationship between company size and environmental performance.

2.5. Corporate Governance, EMA, and Environmental Performance

Corporate governance plays a fundamental role in strengthening organizational accountability, transparency, and sustainability-oriented decision-making. Effective governance mechanisms encourage organizations to integrate environmental responsibility into strategic planning and operational oversight processes (Tilba, 2022; Zhou et al., 2022). Governance structures such as independent boards, audit committees, sustainability committees, and executive accountability systems can improve monitoring of environmental risks and sustainability performance. Strong governance systems also reduce managerial opportunism by ensuring that long-term sustainability objectives receive adequate organizational attention (Fu et al., 2020). Furthermore, companies with effective governance mechanisms tend to provide more transparent environmental disclosures and demonstrate stronger commitment toward sustainability practices (Luo & Tang, 2021). Governance quality therefore becomes increasingly important in ensuring that environmental accountability is embedded within organizational strategies rather than treated merely as symbolic compliance. However, several studies suggested that governance effectiveness may vary depending on institutional context, organizational culture, and managerial commitment toward sustainability. Some firms possess formal governance structures but still fail to achieve meaningful environmental performance improvement because sustainability practices are not effectively integrated into operational decision-making processes. These inconsistencies suggest that governance mechanisms alone may not directly improve environmental performance without the support of effective environmental management systems.

Environmental Management Accounting may strengthen the relationship between corporate governance and environmental performance by providing governance structures with reliable environmental information for strategic oversight and sustainability evaluation. EMA enables boards and managerial executives to monitor environmental costs, evaluate environmental risks, and assess sustainability-related operational performance systematically (Qian et al., 2011). Governance structures supported by EMA are more likely to implement evidence-based environmental strategies because sustainability decisions are informed by measurable environmental indicators and accountability mechanisms. Previous studies reported that organizations with strong governance systems and effective environmental accounting practices tend to achieve better environmental outcomes and sustainability performance (Hanif et al., 2023). Nevertheless, limited empirical studies have examined EMA as a mediating mechanism linking corporate governance and environmental performance, particularly in emerging market contexts. Existing research predominantly focused on governance effects on environmental disclosure rather than actual environmental performance improvement. Consequently, there remains insufficient understanding regarding how governance mechanisms utilize EMA to strengthen sustainability-oriented managerial decisions and environmental accountability. This research therefore seeks to address this gap by investigating the mediating role of EMA within the relationship between

corporate governance and environmental performance. Based on these arguments, the following hypotheses are proposed:
H7: Corporate governance has a positive effect on Environmental Management Accounting.
H8: Corporate governance has a positive effect on environmental performance.
H9: Environmental Management Accounting mediates the relationship between corporate governance and environmental performance.

3. Methodology

3.1. Research Design

This study employed a quantitative research approach using a correlational survey design to examine the relationships among market competition, company size, corporate governance, Environmental Management Accounting (EMA), and environmental performance. A quantitative design was selected because the study aimed to test causal relationships among variables and evaluate the mediating role of EMA through statistical analysis. The correlational design was considered appropriate because the research focused on identifying the magnitude and direction of relationships among organizational and environmental variables within a real corporate context without manipulating the research setting. Furthermore, the study utilized a cross-sectional approach in which data were collected at a single point in time from respondents representing manufacturing and industrial companies. This design enabled the researchers to obtain empirical evidence regarding how organizational characteristics and governance mechanisms influence environmental performance through EMA implementation. The study also adopted a positivist research paradigm because it emphasized objective measurement, hypothesis testing, and statistical generalization. Structural Equation Modeling based on Partial Least Squares (SEM-PLS) was applied to evaluate both direct and indirect relationships among the variables simultaneously. This analytical approach was considered suitable because the proposed model involved multiple latent variables and mediation effects within a relatively complex conceptual framework.

3.2. Research Location and Time

The research was conducted in manufacturing and industrial companies listed on the Indonesia Stock Exchange (IDX). These sectors were selected because manufacturing and industrial activities are closely associated with environmental impacts such as carbon emissions, resource consumption, industrial waste, and environmental pollution. In addition, companies within these sectors are increasingly required to implement sustainability-oriented management systems and environmental accountability practices due to growing regulatory and stakeholder pressure. The research focused on companies operating in several major industrial regions in Indonesia, including Jakarta, West Java, Banten, East Java, and Central Java, where industrial activities are highly concentrated. Data collection was conducted between January and April 2026. This period was considered appropriate because it allowed the researchers to obtain updated information regarding environmental management practices and sustainability-related managerial systems within the participating companies. The research timeline included instrument preparation, expert validation, pilot testing, questionnaire distribution, data verification, and statistical analysis. The selected timeframe also ensured sufficient opportunity for respondents to complete the questionnaires accurately and comprehensively.

3.3. Population and Sample

The target population of this study consisted of managers, accounting professionals, and sustainability-related executives working in manufacturing and industrial companies listed on the Indonesia Stock Exchange. These respondents were selected because they possessed direct knowledge regarding organizational environmental strategies, governance mechanisms, accounting systems, and sustainability practices implemented within their companies. The study specifically targeted Chief Financial Officers (CFOs), accounting managers, environmental managers, internal auditors, sustainability directors, and operational managers who were actively involved in managerial decision-making processes related to environmental management and corporate sustainability.

The sampling process used purposive sampling because the study required respondents with specific professional expertise and direct involvement in environmental management practices. Several inclusion criteria were established to ensure the quality and relevance of the collected data. First, respondents had to occupy managerial or supervisory positions related to accounting, finance, sustainability, or environmental management. Second, respondents were required to have at least two years of professional experience within their current company to ensure adequate organizational understanding. Third, the participating companies had to operate within manufacturing or industrial sectors and publish sustainability-related information in annual or sustainability reports. Respondents who did not complete the questionnaire fully or failed to meet these criteria were excluded from the analysis.

A total of 180 questionnaires were distributed electronically and directly to selected respondents. After the screening and verification process, 126 valid responses were retained for final analysis. This sample size was considered adequate for SEM-PLS analysis because it exceeded the minimum recommended sample size based on the ten-times rule and statistical power requirements for structural equation modeling. The sample also represented various industrial subsectors, thereby improving the generalizability of the findings within the context of Indonesian manufacturing and industrial companies.

3.4. Research Instruments

Data were collected using a structured questionnaire developed from previously validated instruments in sustainability accounting and environmental management studies. The questionnaire consisted of six sections, including respondent demographic information and five latent constructs representing the research variables. All construct items were measured using a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). The use of the Likert scale enabled respondents to express their perceptions consistently while facilitating quantitative analysis.

Market competition was measured using indicators adapted from Porter’s competitive framework and previous sustainability management studies. The indicators included competitive pressure, customer bargaining power, supplier influence, market rivalry intensity, and pressure from substitute products. Company size was measured using organizational characteristics such as number of employees, operational scale, organizational complexity, and business expansion level. Corporate governance was measured through indicators related to board independence, sustainability oversight, audit committee involvement, environmental disclosure transparency, and executive accountability mechanisms.

Environmental Management Accounting (EMA) was measured using indicators reflecting environmental cost identification, environmental reporting practices, resource efficiency monitoring, environmental information integration in strategic planning, and environmental risk assessment. Environmental performance was assessed using indicators related to waste reduction, energy efficiency, pollution control, regulatory compliance, environmental innovation, and stakeholder evaluation of environmental responsibility. The instrument items were adapted and modified from previous studies conducted by Burritt and Christ (2021), Qian et al. (2022), Hanif et al. (2023), and Nguyen et al. (2024) to ensure contextual relevance and conceptual consistency with the objectives of this study.

3.5. Instrument Validity and Reliability

Before the main data collection process, the questionnaire underwent content validation and pilot testing to ensure clarity, relevance, and construct appropriateness. Content validity was evaluated through expert judgment involving three academics specializing in sustainability accounting, environmental management, and quantitative research methodology. The experts reviewed the questionnaire items based on conceptual relevance, clarity of wording, and measurement suitability. Revisions were conducted based on the experts' recommendations to improve item precision and readability.

Following the content validation process, a pilot study involving 30 respondents from manufacturing companies was conducted to evaluate the preliminary reliability and construct validity of the instrument. The pilot data were analyzed using Cronbach's alpha and item-total correlation analysis. The results indicated that all constructs achieved Cronbach's alpha coefficients above 0.70, demonstrating satisfactory internal consistency reliability. During the main analysis stage, convergent validity was assessed using factor loadings and Average Variance Extracted (AVE). Factor loading values above 0.70 and AVE values above 0.50 were considered acceptable indicators of convergent validity. Composite Reliability (CR) values above 0.70 were also used to confirm construct reliability. Furthermore, discriminant validity was evaluated using the Fornell–Larcker criterion and cross-loading analysis to ensure that each construct was empirically distinct from the others.

3.6. Data Collection Procedures

The data collection process was conducted systematically in several stages to ensure the accuracy and credibility of the research data. The initial stage involved identifying eligible manufacturing and industrial companies listed on the Indonesia Stock Exchange and obtaining publicly available company information related to sustainability practices and environmental management activities. After identifying the target companies, the researchers contacted potential respondents through corporate email communication and professional networking channels to explain the objectives and significance of the study.

The questionnaires were distributed both electronically using online survey platforms and directly in printed form to increase response rates and accessibility. Before completing the questionnaire, respondents received an explanation regarding the purpose of the study, confidentiality procedures, and estimated completion time. Respondents were also informed that participation was voluntary and that they could withdraw from the study at any stage without consequences. The researchers monitored questionnaire completion regularly and conducted follow-up communication with respondents to minimize incomplete responses.

After all questionnaires had been collected, the researchers conducted data screening to identify incomplete responses, duplicate submissions, and inconsistent answer patterns. Only

fully completed and valid questionnaires were included in the final analysis. The collected data were subsequently coded, tabulated, and prepared for statistical analysis using SEM-PLS software.

3.7. Data Analysis Techniques

The data were analyzed using Partial Least Squares Structural Equation Modeling (SEM-PLS) with the assistance of SmartPLS version 4. SEM-PLS was selected because it is suitable for analyzing complex structural relationships involving multiple latent variables, mediation effects, and relatively moderate sample sizes. In addition, SEM-PLS does not require strict normality assumptions and is appropriate for predictive and exploratory research models.

The analysis process consisted of two major stages: measurement model evaluation and structural model evaluation. The measurement model evaluation aimed to assess the validity and reliability of the constructs through indicator loadings, Composite Reliability (CR), Cronbach's alpha, Average Variance Extracted (AVE), and discriminant validity analysis. Constructs were considered reliable if Cronbach's alpha and CR values exceeded 0.70, while AVE values above 0.50 indicated acceptable convergent validity.

The structural model evaluation examined the relationships among variables using path coefficient analysis, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping procedures. Hypothesis testing was conducted using bootstrapping with 5,000 resamples to determine the significance of direct and indirect effects. Hypotheses were accepted when the p-value was below 0.05 and the t-statistic exceeded the critical value of 1.96 at the 95% confidence level. Mediation analysis was performed to examine the role of EMA in mediating the relationship between market competition, company size, corporate governance, and environmental performance.

Thus, the second part, "Literature Review" investigates the gap that will be exposed and solved. The flow of all the ideas are required to be clear, linked, well-crafted and well developed. It serves as the source of the research question and especially the base or the hypotheses that respond to the research objective. We advise using current and primary sources from trusted international references (top tier-journals).

4. Result and Discussion

This study aims to examine the influence of market competition, company size, and corporate governance on environmental performance with Environmental Management Accounting (EMA) as a mediating variable in manufacturing and industrial companies listed on the Indonesia Stock Exchange. The analysis was conducted using Structural Equation Modeling based on Partial Least Squares (SEM-PLS) to evaluate both direct and indirect relationships among the proposed variables.

4.1. Model Fit and Quality Indices

The evaluation of model fit was conducted to ensure that the proposed structural model met the statistical adequacy requirements for SEM-PLS analysis. Several goodness-of-fit indicators were assessed, including Average Path Coefficient (APC), Average R-squared (ARS), Average Adjusted R-squared (AARS), Average Variance Inflation Factor (AVIF), Average Full Collinearity Variance Inflation Factor (AFVIF), Tenenhaus Goodness of Fit (GoF), Simpson's Paradox Ratio (SPR), R-squared Contribution Ratio (RSCR), Statistical Suppression Ratio (SSR), and Nonlinear Bivariate Causality Direction Ratio (NLBCDR). The results indicate that

the structural model achieved acceptable fit criteria and demonstrated satisfactory predictive capability.

Table 1. Model Fit and Quality Indices

Model Fit Indicator	Value	Criterion	Interpretation
APC	0.190 (p = 0.007)	p < 0.05	Accepted
ARS	0.398 (p < 0.001)	p < 0.05	Accepted
AARS	0.379 (p < 0.001)	p < 0.05	Accepted
AVIF	1.706	< 5.00	Accepted
AFVIF	2.233	< 5.00	Accepted
GoF	0.465	> 0.36	Strong
SPR	1.000	≥ 0.70	Accepted
RSCR	1.000	≥ 0.90	Accepted
SSR	1.000	≥ 0.70	Accepted
NLBCDR	0.857	≥ 0.70	Accepted

The results presented in Table 1 demonstrate that the structural model satisfied the recommended fit criteria for SEM-PLS analysis. The APC, ARS, and AARS values were statistically significant, indicating that the structural relationships among variables were adequately supported by the empirical data. The AVIF and AFVIF values were below the threshold of 5.00, suggesting that multicollinearity was not a significant issue in the model. Furthermore, the GoF value of 0.465 indicated a strong overall model fit, demonstrating satisfactory explanatory and predictive capability. The SPR, RSCR, SSR, and NLBCDR values also exceeded the recommended thresholds, confirming the absence of statistical suppression problems and supporting the robustness of the proposed model.

4.2. Measurement Model Evaluation

The measurement model was evaluated to examine the validity and reliability of the latent constructs used in this study. Convergent validity was assessed using factor loadings, while reliability was evaluated through Composite Reliability (CR), Cronbach's Alpha (CA), and Average Variance Extracted (AVE). All measurement indicators demonstrated satisfactory loading values exceeding the recommended threshold of 0.70.

Table 2. Combined Loadings and Cross-Loadings

Variable	Indicator	Loading
Market Competition	MC1	0.742
	MC2	0.768
	MC3	0.801
	MC4	0.824
	MC5	0.779
Company Size	OS1	0.812
	OS2	0.784
	OS3	0.836
Corporate Governance	CG1	0.748
	CG2	0.781
	CG3	0.826
	CG4	0.853

	CG5	0.819
Environmental Management Accounting	EMA1	0.774
	EMA2	0.846
	EMA3	0.803
	EMA4	0.858
	EMA5	0.831
Environmental Performance	EP1	0.768
	EP2	0.792
	EP3	0.861
	EP4	0.844

Table 2 indicates that all measurement indicators achieved satisfactory loading values above 0.70, confirming adequate convergent validity. The highest loading within the market competition construct was represented by competitive market pressure, indicating that competitive intensity strongly reflected organizational responses toward sustainability-oriented practices. Within the corporate governance construct, the strongest indicator was related to executive accountability and sustainability oversight, suggesting that governance effectiveness was highly associated with environmental strategic commitment. Meanwhile, the environmental performance construct was strongly reflected by environmental efficiency and sustainability-related operational outcomes. These findings demonstrate that the measurement indicators appropriately represented their respective latent constructs and were suitable for structural analysis.

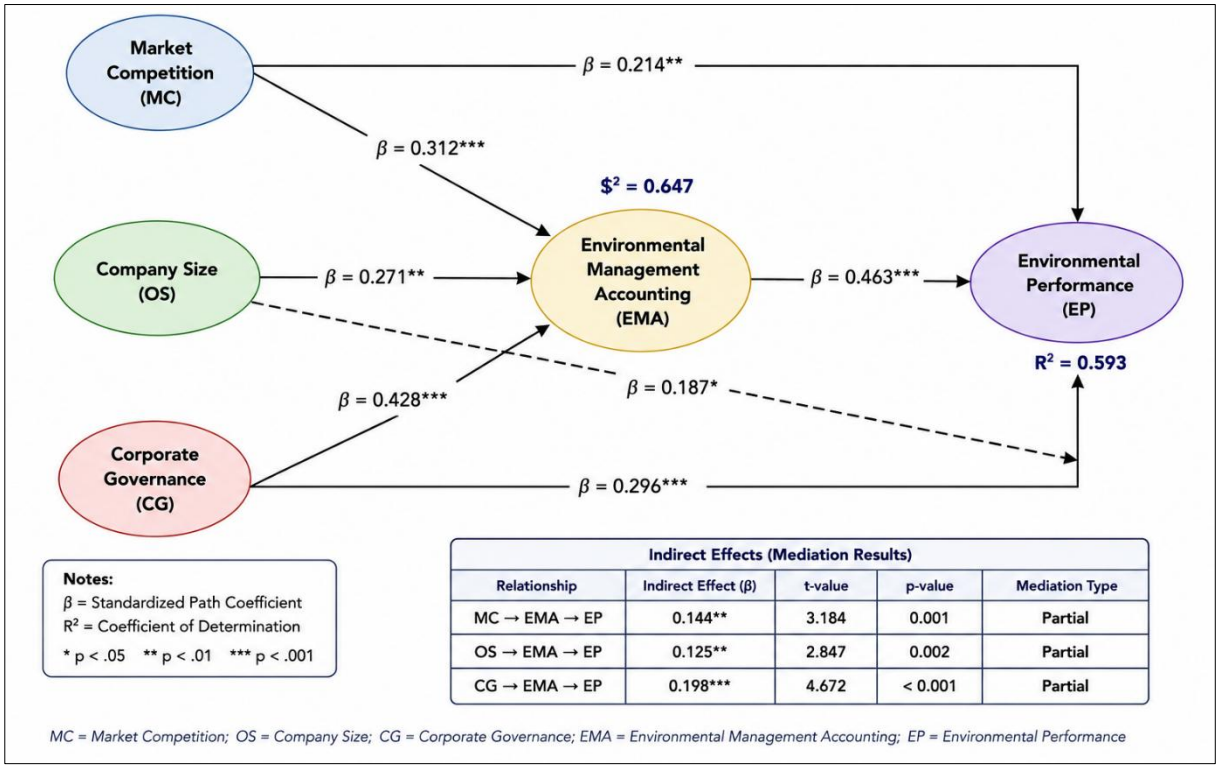
Table 3. Reliability and Validity Results

Variable	Composite Reliability	Cronbach's Alpha	AVE	Full Collinearity VIF
Market Competition	0.874	0.821	0.582	2.571
Company Size	0.841	0.781	0.639	2.168
Corporate Governance	0.906	0.872	0.658	2.624
Environmental Management Accounting	0.912	0.894	0.674	2.783
Environmental Performance	0.891	0.846	0.621	1.020

Based on Table 3, all constructs achieved Composite Reliability and Cronbach's Alpha values exceeding 0.70, confirming strong internal consistency reliability. The AVE values for all variables were above the recommended threshold of 0.50, indicating satisfactory convergent validity. In addition, the Full Collinearity VIF values remained below 5.00, suggesting that multicollinearity was not present within the measurement model. These results collectively demonstrate that the research instrument possessed adequate validity and reliability for further structural model evaluation.

4.3. Structural Model Analysis

The structural model evaluation was conducted to examine the direct relationships among market competition, company size, corporate governance, EMA, and environmental performance. The analysis also assessed the explanatory capability of the proposed model using the coefficient of determination (R^2).



R² Environmental Performance = 0.593

Figure 1. Structural Model Results Based on SEM-PLS

The structural model presented in Figure 1 demonstrates the relationships among the research variables. The R² value for Environmental Management Accounting was 0.647, indicating that market competition, company size, and corporate governance collectively explained 64.7% of the variance in EMA implementation. Meanwhile, the R² value for environmental performance was 0.593, suggesting that the proposed model explained 59.3% of the variance in environmental performance. These findings indicate that the model possessed moderate to strong explanatory capability in predicting sustainability-related organizational outcomes.

4.4. Hypothesis Testing

The hypothesis testing process was conducted using bootstrapping procedures with 5,000 resamples to evaluate the significance of direct relationships among variables. The results are presented in Table 4.

Table 4. Direct Effect Results

Relationship	β	p-value	Decision
Market Competition → EMA	0.312	< 0.001	Supported
Company Size → EMA	0.271	< 0.01	Supported
Corporate Governance → EMA	0.428	< 0.001	Supported
EMA → Environmental Performance	0.463	< 0.001	Supported
Market Competition → Environmental Performance	0.214	< 0.01	Supported
Company Size → Environmental Performance	0.187	< 0.05	Supported
Corporate Governance → Environmental Performance	0.296	< 0.001	Supported

The findings in Table 4 demonstrate that market competition positively influenced Environmental Management Accounting, indicating that firms operating in competitive

business environments tend to strengthen environmental accounting practices to improve operational efficiency and sustainability-oriented decision-making. Company size also showed a positive effect on EMA, suggesting that larger organizations possess greater organizational resources and managerial capability to implement sophisticated environmental accounting systems. Similarly, corporate governance significantly influenced EMA implementation, indicating that governance mechanisms strengthen sustainability accountability and environmental oversight within organizational operations.

The results further revealed that Environmental Management Accounting positively affected environmental performance. This finding confirms that organizations integrating environmental information into managerial decision-making processes are more capable of improving environmental efficiency, sustainability performance, and ecological accountability. In addition, market competition, company size, and corporate governance also demonstrated significant direct effects on environmental performance. These findings indicate that both organizational characteristics and governance quality play important roles in supporting sustainability-oriented organizational practices and environmental responsibility.

4.5. Mediation Analysis

The mediation analysis was conducted to examine whether Environmental Management Accounting mediated the relationships between market competition, company size, corporate governance, and environmental performance. The results are presented in Table 5.

Table 5. Indirect Effect and Mediation Results

Relationship	Indirect Effect	p-value	Mediation Type
Market Competition → EMA → Environmental Performance	0.144	< 0.01	Partial Mediation
Company Size → EMA → Environmental Performance	0.125	< 0.01	Partial Mediation
Corporate Governance → EMA → Environmental Performance	0.198	< 0.001	Partial Mediation

The mediation analysis presented in Table 5 confirms that Environmental Management Accounting significantly mediated the relationships between market competition, company size, corporate governance, and environmental performance. The indirect effect of market competition on environmental performance through EMA indicates that competitive business environments encourage firms to adopt environmental accounting practices that subsequently improve sustainability outcomes. Likewise, the mediating role of EMA within the relationship between company size and environmental performance suggests that organizational resources and operational scale contribute to environmental improvement when supported by effective environmental accounting systems.

Furthermore, the mediation effect between corporate governance and environmental performance demonstrates that governance mechanisms strengthen sustainability accountability through environmental information integration and strategic environmental oversight. The mediation findings collectively indicate that Environmental Management Accounting functions as a strategic managerial mechanism that transforms organizational pressure, governance quality, and operational capability into improved environmental performance. These results therefore emphasize the importance of integrating environmental

accounting systems into sustainability-oriented organizational strategies to strengthen long-term environmental accountability and operational sustainability.

4.6. Discussion

The findings of this study demonstrate that market competition positively influences the implementation of Environmental Management Accounting (EMA), indicating that competitive business environments encourage organizations to strengthen sustainability-oriented managerial systems. This finding suggests that environmental accountability is no longer treated merely as a compliance-oriented activity, but increasingly functions as a strategic instrument for maintaining competitiveness and organizational legitimacy. From the perspective of contingency theory, the result confirms that management accounting systems evolve in response to external environmental pressures and organizational demands. Firms operating under intense competition tend to require more integrated environmental information systems to improve operational efficiency, cost control, and sustainability responsiveness. This finding supports previous studies emphasizing that competitive pressure stimulates green innovation and sustainability-oriented managerial adaptation (Appannan et al., 2023; Ha et al., 2024; Lopes et al., 2022). However, the present study extends prior research by demonstrating that the influence of competition on environmental performance is not merely direct, but also operates through the strategic integration of environmental accounting systems. In the Indonesian industrial context, where companies increasingly face pressure from regulators, investors, and environmentally conscious consumers, EMA appears to function as a mechanism that translates competitive pressure into sustainability-oriented organizational behavior.

The results further reveal that company size significantly affects EMA implementation, indicating that larger firms possess stronger organizational capability to adopt sophisticated environmental accounting systems. This finding reflects the argument that organizational scale provides access to financial resources, technological infrastructure, and managerial expertise necessary for sustainability integration. Larger companies are generally more exposed to public scrutiny and reputational risk, causing them to prioritize environmental accountability more seriously than smaller firms. From the perspective of legitimacy theory, large organizations tend to strengthen sustainability-oriented managerial systems to maintain social acceptance and reduce external criticism related to environmental impacts. This result is consistent with previous studies showing that larger firms demonstrate stronger sustainability disclosure and environmental management practices due to higher stakeholder visibility (Damtoft et al., 2025; Lutfi et al., 2023; Liu et al., 2023). Nevertheless, this study also provides a more nuanced explanation by indicating that organizational size alone does not automatically improve environmental performance unless supported by effective environmental information systems such as EMA. In practice, this finding implies that organizational resources become strategically meaningful only when they are transformed into structured managerial mechanisms capable of supporting sustainability-oriented decision-making processes.

Another important finding is the strong positive influence of corporate governance on EMA implementation, highlighting the strategic role of governance structures in strengthening environmental accountability. This result indicates that governance mechanisms such as board oversight, executive accountability, and sustainability supervision encourage firms to institutionalize environmental management practices more systematically. Stakeholder theory

provides an important explanation for this relationship because governance structures function as instruments that align managerial decisions with broader stakeholder expectations regarding sustainability and environmental responsibility. Effective governance enables organizations to integrate environmental concerns into strategic planning rather than treating sustainability merely as symbolic compliance. This finding supports prior studies emphasizing that governance quality contributes significantly to sustainability management and environmental disclosure practices (Fu et al., 2020; Hristov & Searcy, 2024; Yang et al., 2024). However, the current study extends existing literature by positioning EMA as an operational bridge through which governance mechanisms influence environmental outcomes. In emerging economies such as Indonesia, governance effectiveness often depends not only on formal structures but also on the organization's ability to operationalize sustainability information into measurable managerial actions. Consequently, the findings suggest that governance quality becomes more meaningful when supported by accounting systems capable of translating sustainability commitments into strategic environmental decisions.

The positive relationship between EMA and environmental performance confirms that environmental accounting functions as a strategic managerial mechanism rather than merely an administrative reporting tool. Organizations implementing EMA more effectively were found to achieve stronger environmental outcomes through improved resource efficiency, waste reduction, environmental monitoring, and sustainability-oriented operational planning. This finding reinforces contingency theory, which argues that organizational performance improves when managerial systems align with environmental and operational conditions. EMA enables firms to integrate financial and non-financial environmental information into decision-making processes, thereby reducing inefficiencies and strengthening environmental responsiveness. The result is consistent with previous studies demonstrating that EMA positively contributes to sustainability performance and environmental accountability (Deb et al., 2022; Hanif et al., 2023; Huynh & Nguyen, 2024). Nevertheless, this study contributes conceptually by emphasizing that EMA should not be viewed solely as a technical accounting innovation, but as a strategic organizational capability shaped by institutional pressure, governance commitment, and competitive dynamics. In the Indonesian manufacturing sector, where environmental issues are increasingly associated with public legitimacy and operational sustainability, EMA appears to function as a mechanism that transforms environmental concerns into measurable organizational actions.

The findings also reveal that market competition, company size, and corporate governance directly influence environmental performance, indicating that environmental accountability is shaped by both external pressure and internal organizational capability. Competitive markets encourage firms to adopt environmentally responsible practices to maintain reputational advantage and strengthen market legitimacy among stakeholders. Similarly, larger organizations tend to possess stronger environmental capacity because they have greater access to sustainability resources, environmental technologies, and managerial expertise. Meanwhile, governance quality enhances environmental performance by ensuring that sustainability objectives receive strategic attention and organizational oversight. These findings support institutional theory, which emphasizes that organizations adapt to environmental and societal pressures to maintain legitimacy and long-term survival. The results align with previous studies conducted in sustainability and environmental governance contexts (Awwad et al., 2025; Nagiah & Mohd Suki, 2024; Zhou et al., 2022). However, unlike

several previous studies that reported inconsistent relationships between organizational characteristics and environmental outcomes, the present findings indicate relatively stable positive relationships across all variables. One possible explanation is that Indonesian manufacturing firms are increasingly experiencing converging institutional pressures from government regulations, global sustainability standards, and stakeholder expectations, causing environmental accountability to become strategically unavoidable.

A particularly significant contribution of this study lies in the mediation findings, which demonstrate that EMA partially mediates the relationships between market competition, company size, corporate governance, and environmental performance. These results suggest that organizational and external factors do not influence environmental performance automatically, but rather through the organization's ability to integrate environmental information into managerial systems and strategic decision-making. This finding expands previous sustainability accounting literature by positioning EMA as a strategic mediating mechanism connecting organizational capability and sustainability outcomes. Prior studies largely examined EMA as either an independent predictor or a technical accounting instrument, whereas the current study conceptualizes EMA as an organizational process through which competitive pressure, governance quality, and operational capacity are translated into environmental performance improvement (Kong et al., 2022; Swalih et al., 2024; Zatini et al., 2025). The mediation results also indicate that sustainability performance is multidimensional and depends not only on organizational intentions, but also on the existence of structured environmental information systems capable of supporting evidence-based managerial decisions. From a theoretical perspective, the findings contribute to the integration of contingency theory, institutional theory, legitimacy theory, and stakeholder theory by demonstrating that environmental performance emerges through interactions among external pressure, organizational structures, governance mechanisms, and managerial information systems.

Despite the significant findings, the results should be interpreted within broader contextual and organizational considerations. The Indonesian manufacturing sector operates within an institutional environment characterized by evolving sustainability regulations, uneven environmental monitoring, and varying levels of organizational commitment toward environmental accountability. Consequently, the effectiveness of EMA implementation may differ substantially across companies depending on managerial competence, sustainability orientation, technological readiness, and organizational culture. Another important issue is that environmental performance may also be influenced by factors beyond the current model, including green innovation capability, digital sustainability transformation, leadership orientation, and stakeholder activism. Moreover, because the study relied primarily on perceptual survey data, there remains the possibility that respondents overestimated organizational sustainability practices due to reputational concerns or social desirability bias. Nevertheless, the findings still provide important evidence that environmental performance in emerging economies cannot be explained solely through external regulation or organizational size, but also through the strategic integration of environmental information into managerial systems. Therefore, this study contributes to the global sustainability literature by offering a more integrated explanation regarding how organizational pressures and governance structures interact through EMA to shape environmental accountability and sustainability-oriented performance.

5. Limitations and Future Research

This study provides important insights into the relationships among market competition, company size, corporate governance, Environmental Management Accounting (EMA), and environmental performance within manufacturing and industrial companies in Indonesia. Nevertheless, several limitations should be acknowledged to provide a balanced interpretation of the findings and to identify opportunities for future research development.

First, this study employed a cross-sectional research design in which data were collected at a single point in time. Consequently, the findings only reflect organizational conditions and managerial perceptions during the period of data collection and do not fully capture the dynamic nature of sustainability practices and environmental management over time. Future studies are therefore encouraged to apply longitudinal approaches to examine how changes in governance structures, competitive pressure, and environmental accounting practices influence environmental performance across different periods.

Second, the study relied primarily on self-reported questionnaire data obtained from managers and accounting professionals. Although the respondents were selected based on their professional involvement in environmental management and sustainability practices, self-reported data may still contain subjective bias, social desirability bias, or perceptual inconsistency. Some respondents may provide responses that reflect organizational expectations rather than actual environmental practices implemented within their companies. Future research may strengthen empirical validity by combining survey data with secondary data sources such as sustainability reports, carbon emission disclosures, environmental ratings, or audited environmental performance indicators to provide more objective measurements.

Third, this study focused exclusively on manufacturing and industrial companies listed on the Indonesia Stock Exchange. While these sectors are highly relevant to environmental sustainability issues due to their significant ecological impacts, the findings may not be fully generalizable to other sectors such as service industries, financial institutions, small and medium enterprises, or public sector organizations. Organizational characteristics, sustainability priorities, and environmental pressures may differ substantially across industries and institutional settings. Future research is therefore recommended to expand the research context by involving different sectors, cross-country comparisons, or multinational corporate environments to improve external validity and broader theoretical generalization.

Fourth, the present study examined Environmental Management Accounting as the primary mediating mechanism linking organizational factors and environmental performance. However, environmental performance is a multidimensional construct that may also be influenced by additional organizational and contextual variables not included in the current model. Factors such as green innovation, environmental leadership, organizational culture, digital sustainability transformation, stakeholder engagement, environmental strategy, and regulatory pressure may also play significant roles in shaping sustainability outcomes. Future studies are encouraged to incorporate these variables into more comprehensive conceptual frameworks to provide deeper understanding regarding the mechanisms underlying environmental performance improvement.

Finally, this study primarily emphasized the direct and mediating relationships among the proposed variables using SEM-PLS analysis. Although this approach provided valuable predictive insights, it did not fully explore the potential moderating effects that may influence the strength or direction of the relationships among variables. Future research may therefore

investigate moderating variables such as organizational culture, environmental uncertainty, sustainability orientation, or institutional pressure to develop a more nuanced understanding of corporate environmental management practices. In addition, future studies may adopt mixed-methods approaches by integrating quantitative analysis with qualitative interviews or case studies to explore how Environmental Management Accounting is implemented operationally within organizations and how managerial actors interpret sustainability-related accounting information in strategic decision-making processes.

6. Conclusion and Suggestion

This study concludes that market competition, company size, and corporate governance play significant roles in improving environmental performance, both directly and indirectly through Environmental Management Accounting (EMA). The findings indicate that companies operating in competitive markets, larger organizational structures, and stronger governance systems are more likely to implement EMA as a strategic managerial mechanism for integrating environmental information into decision-making processes. EMA was also proven to have a positive effect on environmental performance, demonstrating its importance in supporting resource efficiency, environmental monitoring, waste reduction, and sustainability-oriented operational practices. Furthermore, the mediation results confirm that EMA partially mediates the relationships between market competition, company size, corporate governance, and environmental performance, meaning that organizational pressure, resource capacity, and governance quality become more effective when translated into structured environmental accounting practices. Therefore, this study emphasizes that EMA should not be viewed merely as a technical accounting tool, but as a strategic system that strengthens corporate environmental accountability and supports sustainable business performance in manufacturing and industrial companies in Indonesia

7. Declaration of AI and AI-assisted technologies in the writing process

During the preparation of this manuscript, the authors used AI-assisted language technology to support language refinement, grammar improvement, sentence restructuring, and readability enhancement. The use of AI tools was limited to assisting the writing process and did not replace the authors' intellectual contribution, data analysis, interpretation of findings, or scientific decision-making. All conceptual development, research design, data collection, statistical analysis, interpretation of results, and final conclusions were conducted entirely by the authors. The authors carefully reviewed, edited, and validated all content generated or assisted by AI technologies to ensure academic accuracy, originality, integrity, and compliance with ethical publication standards. The authors also take full responsibility for the content of this manuscript, including the accuracy of the data, interpretations, and conclusions presented in the study.

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