IJAMESC, Vol. 3 No. 6, December 2025
DOI: https://doi.org/10.61990/ijamesc.v3i6.650 e-ISSN 2986-8645

THE EFFECT OF GREEN ACCOUNTING AND MATERIAL FLOW COST ACCOUNTING ON CORPORATE SUSTAINABILITY: THE MODERATING ROLE OF GOOD CORPORATE GOVERNANCE

Aqdiah[1]*, Suripto[2], Ani Kusumaningsih[3]
[1.2.3]Master of Accounting, Pamulang University, Indonesia
*Corresponding Author:
aqdiahlatansya@gmail.com

Abstract
This study aims to analyze the influence of green accounting and material flow cost accounting (MFCA) on corporate sustainability with good corporate governance (GCG) as a moderating variable. The research population includes 43 textile and garment manufacturing companies listed on the Indonesia Stock Exchange, Malaysia Stock Exchange, and Singapore Exchange from 2021 to 2023. The research method employs panel data regression analysis with a fixed effect model approach. The results indicate that green accounting does not significantly affect corporate sustainability. MFCA in production flow shows a significant negative effect, while MFCA in production costs and production output show no significant effects. GCG strengthens the effect of MFCA production output on sustainability, but weakens the effect of MFCA production flow, and does not moderate the relationship between green accounting and sustainability. These findings indicate that the implementation of environmental accounting has not been optimal in supporting corporate sustainability, and the role of corporate governance varies depending on the dimensions of environmental accounting practices implemented.

Keywords: Green Accounting, Material Flow Cost Accounting, Corporate Sustainability, Good Corporate Governance, Manufacturing Companies

1. Introduction

Significant population growth in Indonesia, Malaysia, and Singapore has driven rapid industrial development. Population data shows consistent increases from 2021 to 2023, with Indonesia growing from 275.5 million to 282.6 million people, Malaysia from 32.6 million to 33.6 million, and Singapore from 5.9 million to 6.2 million (Country Meters, 2025). This growth has directly increased demand for goods and services, prompting companies to expand their reach and intensify production.

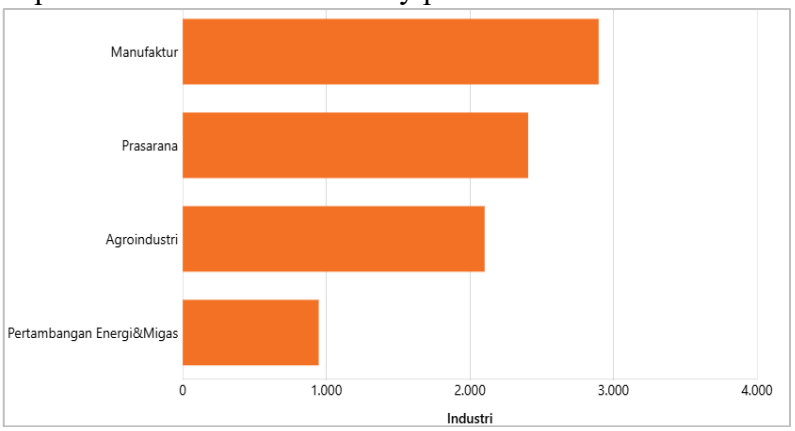

Figure 1. Amount of Waste Generated by Industrial Sector in Indonesia
Source: Databox (2022)

The negative impacts of this industrialization are clearly visible in various environmental pollution cases. In Indonesia, PT Toba Pulp Lestari Tbk (2003) and PT SMART Tbk (2010) serve as concrete evidence of companies paying insufficient attention to environmental concerns, while in 2020, PT Kamarga Kurnia Textile and three other companies were sued by the Ministry of Environment and Forestry for river pollution (Sapulette et al., 2021; Syafrina et al., 2020). Indonesia's B3 waste data reached 60 million tons in 2021, with the manufacturing sector as the largest contributor through 2,897 industries, despite waste utilization realization reaching only 22.5% (Databoks, 2022). In Malaysia, the manufacturing sector contributed 79.8% of the national environmental protection expenditure worth RM2.4 billion in 2021 (Setyorini, 2023). Even Singapore with its strict law enforcement faces cases of illegal waste disposal by Chem-Solv Technologies and NSL OilChem Logistics, fined S$8,500 and S$13,000 respectively (Tham, 2023).

These conditions threaten corporate sustainability and stakeholder trust, thus driving the need for implementing environmental accounting practices. Green accounting enables companies to prepare transparent reports on sustainability practices to meet stakeholder information needs (Hindriani et al., 2024). Meanwhile, Material Flow Cost Accounting (MFCA) provides detailed information on material flows including waste, both in financial and non-financial aspects, as a basis for strategic decision-making for resource efficiency and waste reduction (M. W. Abdullah & Amiruddin, 2017).

However, previous research findings show highly inconsistent results. Some studies such as Rakesa and Werastuti (2022) prove that green accounting and MFCA positively affect corporate sustainability. Conversely, Daromes et al. (2023) found that green accounting has a significant negative effect on corporate sustainability, while MFCA shows varied results depending on its proxies. Research by Rachmawati and Karim (2021) shows green accounting has a positive effect but MFCA has no effect on corporate sustainability. Damayanti and Yanti (2023) found that green accounting does not affect sustainable development, but some elements of MFCA such as production costs and production output have positive effects.

This research inconsistency forms the main basis for this study to re-examine the influence of green accounting and MFCA on corporate sustainability. This research focuses on manufacturing companies in Indonesia, Malaysia, and Singapore by adding Good Corporate Governance (GCG) as a moderation variable. The Asian developing country context aligns with Tran and Herzig's (2020) findings that MFCA implementation is largely focused on developing countries in Asia, despite challenges of accounting system limitations and data availability.

This research is expected to contribute to clarifying the relationship between green accounting and MFCA on corporate sustainability, as well as the role of GCG in strengthening that relationship in the context of three ASEAN countries with different regulatory characteristics and industrial development.

2. Theoretical Background

2.1 Stakeholder Theory

Stakeholder theory emerged in the mid-1980s as a response to the need for a framework adaptable to external environmental dynamics faced by managers. This approach addresses managerial challenges in handling organizational environmental changes, with the primary objective of designing strategies for managing various stakeholder groups and their relationships with the organization strategically.

Stakeholders are defined as individuals or groups who can influence, or are influenced by, the achievement of organizational objectives, classified into primary and secondary stakeholders based on their essentiality to organizational continuity.

Stakeholder theory is one of the main theories widely used to underpin research on sustainable development. The theory assumes that a company's sustainability highly depends on stakeholder support, so every activity conducted by the company must consider the interests and approval of these stakeholders. The theory states that a company's sustainability relies on contributions from various parties with different interests, where each stakeholder plays a crucial role in supporting or influencing the company's existence and operations.

The greater a stakeholder's influence, the higher the level of adaptation the company must undertake to meet that stakeholder's demands and expectations. In this context, social and environmental disclosure represents a form of two-way communication between the company and stakeholders. Several reasons underlie the importance of companies addressing stakeholder interests, including the broad impact of environmental issues on society, international market demands for sustainable products, investor preferences for environmentally conscious companies, and increasing pressure from environmental activists and NGOs.

Based on stakeholder theory, companies position social responsibility as an effort to achieve sustainability and enhance long-term performance value by fulfilling environmental obligations and implementing good governance practices. This theory is particularly relevant to business sustainability concepts, green accounting, material flow cost accounting, and corporate governance as it emphasizes the importance of synergy and integration across all business activities to achieve comprehensive sustainability performance.

2.2 Legitimacy Theory

Legitimacy can be understood as a psychological condition of acceptance or support from individuals or groups sensitive to environmental changes. Societal legitimacy thus becomes a strategic element crucial for supporting company sustainability and future development. Legitimacy theory is closely related to stakeholder theory, with its core premise being that organizations continuously strive to ensure their operational activities remain within the corridor of values, norms, and rules accepted by society at large.

The theory is based on the assumption of a social contract between the company and the society in its operational area. Companies need to demonstrate concern for the surrounding environment to maintain operational continuity and future existence, which helps them gain societal acceptance. This mutual relationship enables society to assess corporate environmental activities while companies monitor their operations to create harmony between organizational and societal values.

Legitimacy theory provides a relevant framework for examining the relationship between environmental accounting practices and corporate sustainability. According to this theory, societal legitimacy is essential for company operational continuity as it provides the "social license" enabling businesses to continue operating. Companies have implicit social responsibilities toward communities in their operational areas, and through sustainability reporting, green accounting plays a vital role in providing transparent environmental information to obtain social legitimacy.

The theory expects companies to produce products providing positive value for society and the environment through environmentally conscious resource management. The

implementation of Material Flow Cost Accounting supports this objective by enhancing material flow efficiency and promoting wise resource management. Good Corporate Governance acts as a moderating factor ensuring that environmental information is conveyed transparently and accountably, thereby strengthening social legitimacy through the synergy of environmental accounting practices and governance principles.

2.3 Corporate Sustainability

Sustainability theory explains that companies tend to achieve sustainable performance by taking responsibility for social factors, human rights, and environmental concerns. This responsibility must be carried out legally and ethically for the company's long-term endurance, encompassing both legal compliance and ethical obligations based on human rights assessments.

Corporate sustainability refers to a company's ability to survive in an ever-evolving industrial environment, reflected in its capacity to generate profit while maintaining long-term viability. The fundamental purpose of establishing a company is to achieve profit, and corporate sustainability factors highly depend on profits obtained. Thus, profitability becomes intrinsically linked to sustainable operations, with greater profits generally enhancing continuity assurance.

Companies striving to enhance sustainability often focus on productivity improvement and cost efficiency through various means including process simplification, reduction of inefficient activities, and efficient resource utilization. Corporate sustainability encompasses multiple dimensions that can be assessed through various indicators reflecting economic, social, environmental, and technological aspects of business operations.

2.4 Green Accounting

The green accounting concept emerged as an approach integrating environmental considerations into financial reporting systems. This accounting process combines the recognition, measurement, recording, summarization, and reporting of financial, social, and environmental information comprehensively in a single report. The objective is to provide information useful for users in evaluating and making both economic and non-economic decisions, particularly regarding corporate environmental performance.

Green accounting represents a significant evolution in corporate reporting, enabling companies to systematically address environmental costs and impacts within their accounting systems. The approach supports business sustainability by linking environmental considerations with financial reporting, promoting transparency and accountability in environmental management. As global environmental awareness has increased, green accounting has gained prominence as a tool for demonstrating corporate commitment to sustainable practices.

The implementation of green accounting varies across jurisdictions, with some countries mandating its application while others rely on voluntary adoption. The development of green accounting reflects growing recognition that traditional financial reporting alone is insufficient for assessing corporate performance in an era of increasing environmental challenges and stakeholder expectations for sustainable business practices.

2.5 Material Flow Cost Accounting (MFCA)

Material Flow Cost Accounting represents an innovative approach to environmental management accounting that focuses on material flows through production processes.

This methodology was developed to assist management in assessing material utilization efficiency and identifying opportunities for resource optimization. The fundamental principle underlying MFCA is the systematic tracking of materials through production systems to identify inefficiencies and potential improvements.

As a tool for supporting decision-making, MFCA provides detailed information on material flows, including waste generation, enabling companies to identify cost-saving opportunities while simultaneously reducing environmental impacts. The method can be applied across various industrial sectors regardless of size or existing environmental management systems, making it a versatile approach for enhancing both economic and environmental performance.

The implementation of MFCA supports corporate sustainability objectives by promoting more efficient resource use, reducing waste generation, and identifying opportunities for process improvements. By making material flows and their associated costs more transparent, MFCA enables managers to make more informed decisions that balance economic and environmental considerations, ultimately contributing to improved sustainability performance.

2.6 Good Corporate Governance (GCG)

Good Corporate Governance encompasses the systems, processes, and sets of rules that govern relationships between various corporate stakeholders, particularly focusing on the relationships between shareholders, the board of commissioners, and the board of directors. The primary objective of corporate governance is to ensure that companies operate effectively, efficiently, and produce optimal output while maintaining accountability to stakeholders.

The development of corporate governance frameworks reflects evolving understandings of corporate responsibility and accountability. Effective governance systems help prevent significant strategic errors and ensure that when problems occur, corrective actions can be implemented promptly and appropriately. Governance principles typically emphasize transparency, accountability, responsibility, independence, and fairness as fundamental components of sound corporate oversight.

The implementation of good corporate governance strengthens company reputation among stakeholders and supports long-term sustainability by creating conducive work environments and ensuring proper oversight mechanisms. Corporate governance interacts with environmental accounting practices by providing the structural framework within which sustainability initiatives are implemented and monitored, making it a crucial element in achieving corporate sustainability objectives.

2.7 Hypothesis Development

2.7.1 The Effect of Green Accounting on Corporate Sustainability

Green Accounting represents a reporting methodology that emphasizes environmental aspects in corporate operational activities. The implementation of green accounting reflects corporate commitment to the social and environmental responsibilities expected by stakeholders. According to stakeholder theory, companies bear responsibility not only to shareholders but also to external parties including communities, governments, and the environment. Stakeholder theory posits that corporate sustainability depends on contributions from various internal and external parties with diverse interests, each playing a crucial role in supporting or influencing corporate existence and operations.

Based on stakeholder theory, green accounting disclosure reflects corporate efforts to create robust sustainability, ultimately enhancing stakeholder trust and encouraging continued cooperation. Meanwhile, legitimacy theory emphasizes the importance of corporate operations aligning with prevailing social norms, boundaries, and expectations. This theory also highlights the significance of analyzing organizational behavior while considering its response to environmental issues.

Previous research findings present mixed results regarding this relationship. Studies indicate that green accounting implementation positively influences corporate sustainability, while other research concludes that green accounting does not significantly affect corporate sustainability.

H1: Green Accounting significantly influences Corporate Sustainability.

2.7.2 The Effect of Material Flow Cost Accounting on Corporate Sustainability

Material Flow Cost Accounting (MFCA) serves as a managerial tool designed to evaluate cost losses arising from material usage in production processes. The evaluation results provide a foundation for decision-making to assist companies in managing and handling generated waste. The application of MFCA models offers various benefits, including enhanced internal profitability and productivity, alongside reduced negative environmental impacts externally. Furthermore, this model implementation supports corporate sustainability development.

According to stakeholder theory, corporations bear responsibility not only for owner welfare but also for considering the interests of other parties including governments, communities, private sectors, and other stakeholders who play vital roles in corporate continuity despite not being directly involved. To ensure welfare for various related parties, companies must monitor each production process stage through to completion while adhering to applicable rules and principles.

From a legitimacy theory perspective, MFCA implementation relates to corporate alignment with prevailing social norms and boundaries. Consequently, companies need to understand and fulfill stakeholder expectations to maintain positive community relationships during operational execution.

Empirical evidence regarding this relationship shows divergent findings, with some studies demonstrating that material flow cost accounting significantly influences corporate sustainability, while other research indicates that material flow cost accounting does not affect corporate sustainability.

H2: Material Flow Cost Accounting significantly influences Corporate Sustainability.

2.7.3 The Moderating Effect of Good Corporate Governance on the Relationship between Green Accounting and Corporate Sustainability

Good Corporate Governance (GCG) plays a vital role in strengthening the relationship between green accounting and corporate sustainability. Based on stakeholder theory, GCG implementation ensures that environmental reporting generated through green accounting is managed transparently, accurately, and in accordance with stakeholder expectations. GCG principles such as accountability and transparency ensure that information regarding corporate environmental impacts remains accessible to various interested parties, including communities, governments, and investors. Through GCG, green accounting transcends mere reporting functionality to become a mechanism for building stakeholder trust, which is essential for supporting corporate operational sustainability.

From a legitimacy theory perspective, GCG helps corporations strengthen their social legitimacy by ensuring environmental reporting complies with widely accepted standards and norms. When green accounting implementation occurs within a robust GCG framework, companies can demonstrate their commitment to social and environmental responsibility more credibly. This approach helps organizations obtain necessary social support for maintaining business sustainability. Thus, GCG functions as a moderating variable that ensures green accounting not only provides relevant information but also maximizes its impact in strengthening corporate-stakeholder relationships while ensuring long-term operational continuity.

H3: Good Corporate Governance significantly moderates the relationship between Green Accounting and Corporate Sustainability.

2.7.4 The Moderating Effect of Good Corporate Governance on the Relationship between Material Flow Cost Accounting and Corporate Sustainability

Good Corporate Governance (GCG) serves as a key element that strengthens the relationship between Material Flow Cost Accounting (MFCA) and corporate sustainability. According to stakeholder theory, GCG principles including transparency, accountability, and responsibility ensure that information generated through MFCA implementation is properly managed and openly communicated to stakeholders. MFCA, which focuses on material flow efficiency and waste management, becomes more effective with GCG implementation because it can better fulfill stakeholder information needs regarding corporate resource management and environmental impacts. Through GCG, companies can enhance stakeholder trust in their sustainability practices, thereby supporting social legitimacy and corporate operations.

From a legitimacy theory standpoint, GCG strengthens corporate positioning in obtaining social support by ensuring that MFCA implementation aligns with prevailing ethical standards and social norms. GCG helps companies communicate MFCA benefits in improving operational efficiency while reducing environmental impacts in a more credible and organized manner. This creates positive perceptions of the corporation as a socially and environmentally responsible entity. Consequently, GCG acts as a moderating variable that ensures MFCA implementation not only enhances internal efficiency but also significantly contributes to long-term corporate sustainability through improved social legitimacy.

H4: Good Corporate Governance significantly moderates the relationship between Material Flow Cost Accounting and Corporate Sustainability

2.8 Conceptual Framework

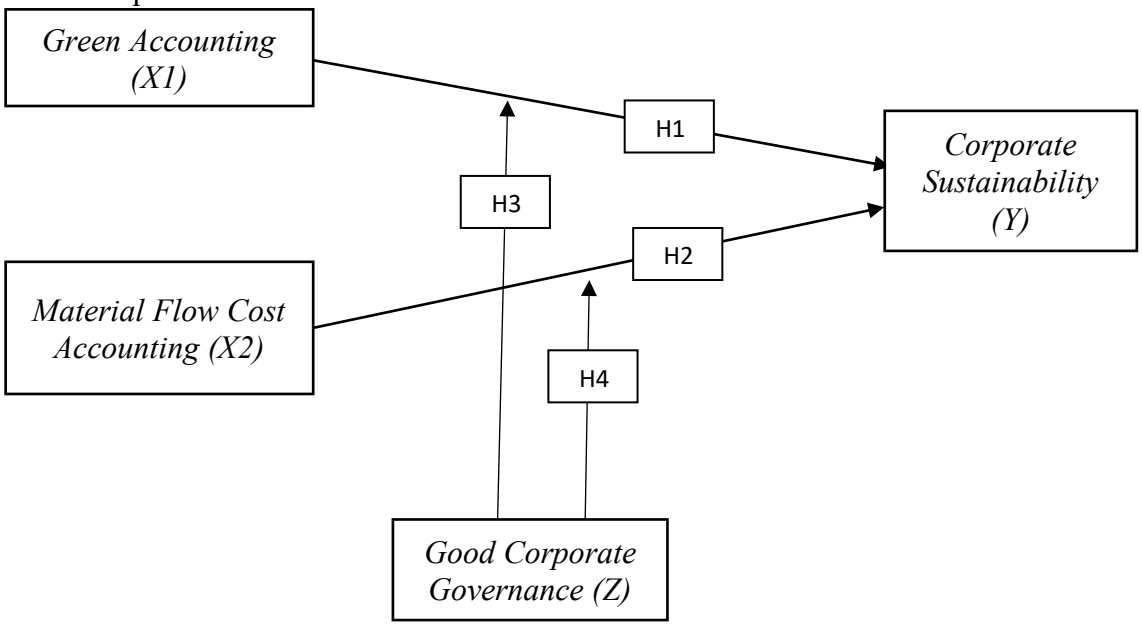

Figure 2. Conceptual Framework

3. Methods

3.1 Research Design

This study employs a quantitative research method with a panel data approach, utilizing secondary data from company financial reports and sustainability reports to examine the relationships between green accounting, material flow cost accounting, corporate sustainability, and good corporate governance.

3.2 Population and Sample

Table 1. Population and Sampling Criteria

Aspect	Description
Population	43 textile and garment companies listed on Indonesia Stock Exchange (23), Malaysia Stock Exchange (17), and Singapore Exchange (3)
Time Frame	2021-2023 (3-year period)
Sampling Method	Purposive sampling (non-probability)
Sampling Criteria	1. Continuously listed during 2021-2023 2. No delisting during research period 3. Complete annual and sustainability reports available

3.3 Data Collection Procedure

Data collected from official company websites and stock exchange portals (Indonesia Stock Exchange, Malaysia Stock Exchange, Singapore Exchange), focusing on annual reports and sustainability reports for 2021-2023 period.

3.4 Operational Definition of Variables

Table 2. Variable Definitions and Measurements

Variable	Type	Definition	Measurement	Scale
Corporate Sustainability	Dependent	Company's ability to maintain long-term viability and profitability	ROA = Net Profit / Total Assets	Ratio
Green Accounting	Independent	Integrated accounting process reporting financial, social and environmental information	Environmental disclosure quality index (34 items across 12 fields)	Ratio
Material Flow Cost Accounting	Independent	Environmental management accounting method focusing on material efficiency	Three dimensions: Production costs, Finished goods inventory, Raw material costs	Nominal
Good Corporate Governance	Moderating	Principles and practices ensuring responsible, transparent corporate management	Total number of board of directors	Nominal

3.5 Data Analysis Techniques

Table 3. Data Analysis Methods and Procedures

Analysis Type	Method/Test	Purpose	Decision Criteria
Descriptive Statistics	Central tendency and dispersion measures	Understand data patterns and distributions	Mean, SD, Min, Max, Skewness, Kurtosis
Panel Data Regression	Common Effect, Fixed Effect, Random Effect models	Analyze variable relationships across time and entities	Chow Test, Hausman Test, Lagrange Multiplier
Classical Assumption Tests			
Normality	Jarque-Bera Test	Assess normal distribution of residuals	p-value ≥ 0.05 (normal)
Multicollinearity	VIF & Correlation analysis	Detect high correlation among independent variables	VIF < 10 (no multicollinearity)
Heteroscedasticity	Breusch-Pagan & White Tests	Check constant variance of residuals	p-value ≥ 0.05 (homoscedastic)
Autocorrelation	Breusch-Godfrey LM Test	Detect correlation among residuals	p-value ≥ 0.05 (no autocorrelation)
Hypothesis Testing			
Simultaneous	F-Test	Test all independent variables simultaneously	p-value < 0.05 (significant)

Analysis Type	Method/Test	Purpose	Decision Criteria
Partial	t-Test	Test each independent variable individually	p-value < 0.05 (significant)
Moderation	MRA with interaction terms	Test GCG moderating effect	Significant interaction terms (p < 0.05)
Model Fit	R-squared	Measure explanatory power of model	0-1 (higher value = better fit)

3.5.1 Moderated Regression Analysis Model

The research employs Moderated Regression Analysis (MRA) with the following complete model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 Z + \beta_6 X_1 Z + \beta_7 X_2 Z + \beta_8 X_3 Z + \beta_9 X_4 Z + \varepsilon$$

Where:

Y : Corporate Sustainability (ROA)
X_1 : Green Accounting
X_2 : MFCA_Production Costs
X_3 : MFCA_Production Output
X_4 : MFCA_Main Production Flow
Z : Good Corporate Governance
X_1Z to X_4Z : Interaction terms for moderation testing
ε : Error term

4. Results and Discussion

4.1 Descriptive Statistical Analysis

Table 4. Descriptive Statistics Results

Statistic	Sustainability	GAC	MFCA_Production Cost	MFCA_Production Output	MFCA_Production Flow
Mean	0.008743	0.627179	7.958639	6.976836	6.970387
Median	0.028396	0.638889	7.992202	6.977512	7.043549
Maximum	0.317408	0.972222	9.174923	8.849824	8.631607
Minimum	-0.876150	0.250000	6.042936	3.580697	4.515185
Std. Dev.	0.131573	0.218038	0.706860	0.859385	0.897839
Probability	0.000000	0.038810	0.124373	0.000003	0.006618
Observations	102	102	102	102	102

Source: Processed by researchers with E-Views 12.0, 2025

Table 4 presents descriptive statistical analysis results with a sample of 34 companies during the 2021-2023 observation period using purposive sampling technique. The 102 observations resulted from applying sampling criteria to 43 companies over three years. The analysis reveals several key findings about variable distributions:

Corporate sustainability shows a mean value of 0.008743 with standard deviation of 0.131573, indicating relatively low average sustainability performance close to zero, suggesting most companies have positive but low sustainability performance with considerable variation among firms. The minimum value of -0.876150 occurred at PT Sri Rejeki Isman, Tbk in 2021, indicating negative sustainability performance, while the

maximum value of 0.317408 was achieved by ES Ceramic Technology Berhad in 2022, demonstrating good sustainability performance.

Green Accounting variable has a mean of 0.627179, indicating that overall implementation level in sample companies reaches approximately 62.71% of the measurement scale used, with standard deviation of 0.218038 showing moderate variation among companies. The minimum value of 0.25 was obtained by three companies, reflecting very low green accounting implementation compared to other sample companies, while the maximum value of 0.972222 was achieved by PT Trisula Textile Industries, Tbk throughout 2021-2023, showing nearly perfect implementation according to used indicators.

4.2 Panel Data Regression Analysis

Table 5. Panel Data Model Selection Results

Test Type	Statistic	Degrees of Freedom	Probability	Decision
Chow Test				
Cross-section F	6.799340	(33,64)	0.0000	Fixed Effect Model
Cross-section Chi-square	153.549764	33	0.0000	Fixed Effect Model
Hausman Test				
Cross-section random	9.858550	4	0.0429	Fixed Effect Model
Final Model Selection				Fixed Effect Model

Source: Processed by researchers with E-Views 12.0, 2025

Table 5 presents the results of panel data model selection tests. Both Chow Test and Hausman Test consistently indicate that the Fixed Effect Model (FEM) is the most appropriate for this research data.

The Chow Test results show probability values of 0.0000 for both Cross-section F and Cross-section Chi-square statistics, which are significantly smaller than the 0.05 significance level. This indicates substantial differences among cross-section units (companies), rejecting the Common Effect Model in favor of Fixed Effect Model.

Furthermore, the Hausman Test yields a probability value of 0.0429, which is below the 0.05 significance threshold. This confirms the superiority of Fixed Effect Model over Random Effect Model, suggesting significant correlation between individual company effects and the independent variables in the model.

Based on these comprehensive test results, the Fixed Effect Model was selected as the most appropriate estimation method for this panel data analysis, as it effectively accounts for individual company-specific characteristics that may influence the relationship between environmental accounting practices and corporate sustainability.

4.3 Classical Assumption Tests

Table 6. Classical Assumption Test Results

Test Type	Variable/Statistic	Value	Threshold	Conclusion
Multicollinearity Test	SUSTAINABILITY - GAC	-0.24547	< 0.8	No multicollinearity
	SUSTAINABILITY - MFCA_COST	-0.019558	< 0.8	No multicollinearity

Test Type	Variable/Statistic	Value	Threshold	Conclusion
	SUSTAINABILITY - MFCA_OUTPUT	-0.09298	< 0.8	No multicollinearity
	SUSTAINABILITY - MFCA_FLOW	-0.04663	< 0.8	No multicollinearity
	GAC - MFCA_COST	-0.27850	< 0.8	No multicollinearity
	GAC - MFCA_OUTPUT	-0.29629	< 0.8	No multicollinearity
	GAC - MFCA_FLOW	-0.30129	< 0.8	No multicollinearity
	MFCA_COST - MFCA_OUTPUT	0.57739	< 0.8	No multicollinearity
	MFCA_COST - MFCA_FLOW	0.73313	< 0.8	No multicollinearity
	MFCA_OUTPUT - MFCA_FLOW	0.66639	< 0.8	No multicollinearity
Highest Correlation	MFCA_COST - MFCA_FLOW	0.73313	< 0.8	Assumption satisfied
Heteroscedasticity Test (Glejser)	C	0.8493	> 0.05	No heteroscedasticity
	GAC	0.5995	> 0.05	No heteroscedasticity
	MFCA_COST	0.8934	> 0.05	No heteroscedasticity
	MFCA_OUTPUT	0.3457	> 0.05	No heteroscedasticity
	MFCA_FLOW	0.9097	> 0.05	No heteroscedasticity
All Variables	All probability values	> 0.05	-	Assumption satisfied

Source: Processed by researchers with E-Views 12.0, 2025

Table 6 presents the results of classical assumption tests for the regression model. The multicollinearity test reveals that no variable pairs exhibit correlation values exceeding the 0.8 threshold, with the highest correlation of 0.73313 observed between MFCA Production Cost and MFCA Production Flow. This indicates the absence of multicollinearity issues in the regression model.

Furthermore, the Glejser test for heteroscedasticity demonstrates that all probability values significantly exceed the 0.05 significance level, confirming the homoscedasticity assumption. The results show that the variance of residuals remains constant across observations, with probability values ranging from 0.3457 to 0.9097 for all independent variables.

Both tests collectively confirm that the regression model satisfies the essential classical assumptions, ensuring the reliability and validity of the subsequent statistical inferences and hypothesis testing.

4.4 Hypothesis Testing Results

Table 7. Hypothesis Testing Summary

Hypothesis	Relationship	Coefficient	p-value	Result
H1	GAC → Sustainability	-0.058471	0.6014	Not Supported
H2a	MFCA_Cost → Sustainability	-0.112638	0.1739	Not Supported
H2b	MFCA_Output → Sustainability	0.007886	0.8698	Not Supported
H2c	MFCA_Flow → Sustainability	-0.127290	0.0398	Supported

Source: Processed by researchers, 2025

Table 7 presents the comprehensive results of hypothesis testing for the direct relationships between environmental accounting practices and corporate sustainability. The analysis reveals that only one out of the four hypothesized relationships is statistically supported.

The results indicate that Green Accounting (GAC) demonstrates a negative but statistically insignificant relationship with corporate sustainability (coefficient = -0.058471, p-value = 0.6014). Consequently, H1 is not supported, suggesting that the implementation of green accounting practices in the sampled companies does not significantly influence their sustainability performance.

Regarding Material Flow Cost Accounting components, MFCA Production Cost shows a negative and insignificant effect (coefficient = -0.112638, p-value = 0.1739), leading to the rejection of H2a. Similarly, MFCA Production Output exhibits a positive but insignificant relationship (coefficient = 0.007886, p-value = 0.8698), resulting in H2b not being supported.

However, MFCA Production Flow demonstrates a statistically significant negative relationship with corporate sustainability (coefficient = -0.127290, p-value = 0.0398), which supports H2c. This significant finding indicates that improvements in production flow efficiency through MFCA implementation are associated with decreased corporate sustainability performance in the short term, possibly due to initial implementation costs, operational disruptions during transition periods, or other contextual factors specific to the textile and garment industry in emerging markets.

The overall pattern suggests limited effectiveness of environmental accounting practices in enhancing corporate sustainability within the research context, with only the production flow dimension of MFCA showing significant - albeit negative - impact.

4.5 Moderated Regression Analysis (MRA)

Table 8. MRA Results with Fixed Effect Model

Variable / Analysis	Coefficient	Std. Error	t-Statistic	Prob.
C	0.989427	0.724271	1.366100	0.1770
GAC	-0.433586	0.337146	-1.286049	0.2034
MFCA_COST	-0.116819	0.118827	-0.983101	0.3295
MFCA_OUTPUT	-0.159838	0.074614	-2.142205	0.0362
MFCA_FLOW	0.181143	0.154406	1.173162	0.2454
GCG_GAC	0.058173	0.055199	1.053885	0.2962
GCG_MFCA_COST	0.005891	0.016143	0.364913	0.7165
GCG_MFCA_OUTPUT	0.048910	0.017699	2.763460	0.0076
GCG_MFCA_FLOW	-0.058678	0.026051	-2.252453	0.0280
R-squared	0.823813			
Adjusted R-squared	0.703418			
F-statistic	6.842597			
Prob(F-statistic)	0.000000			

Source: Processed by researchers with E-Views 12.0, 2025

Table 8 shows the MRA results examining Good Corporate Governance's moderating role. The analysis reveals that GCG significantly moderates the relationship between MFCA Production Output and corporate sustainability (p-value = 0.0076 < 0.05) with positive coefficient, and between MFCA Production Flow and sustainability (p-value = 0.0280 < 0.05) with negative coefficient. However, GCG does not significantly moderate the relationships involving Green Accounting and MFCA Production Cost.

4.6 Discussion

4.6.1 The Influence of Green Accounting on Corporate Sustainability

The findings indicate that Green Accounting does not significantly influence corporate sustainability (p-value = 0.6014 > 0.05). This suggests that despite moderate to high implementation levels (mean = 0.627179), Green Accounting practices in sample companies may be more symbolic or formalistic rather than strategically integrated into business operations to drive substantial sustainability improvements.

From stakeholder theory perspective, this indicates insufficient balance among various stakeholder interests regarding environmental concerns. From legitimacy theory standpoint, companies may implement Green Accounting primarily for social legitimacy and regulatory compliance rather than genuine sustainability commitment. These findings align with previous research by Hindriani et al. (2024) and Rachmawati & Karim (2021), suggesting that Green Accounting implementation often remains superficial without substantial impact on corporate sustainability.

4.6.2 The Influence of Material Flow Cost Accounting on Corporate Sustainability

The results show mixed effects among MFCA components. MFCA Production Flow demonstrates significant negative influence on sustainability (p-value = 0.0398), suggesting potential short-term trade-offs where efficiency improvements in material flows may require substantial investments that initially pressure sustainability performance. This finding supports Santoso & Handoko's (2025) research indicating that MFCA implementation often focuses more on administrative recording than generating real efficiency gains.

MFCA Production Cost and Production Output show insignificant effects, indicating that while companies implement these practices relatively well, they may not be effectively integrated into comprehensive sustainability strategies. This aligns with Rachmawati & Karim's (2021) findings that MFCA effectiveness is often limited by inefficient material and energy usage and inadequate waste management.

4.6.3 The Moderating Role of Good Corporate Governance

The MRA results reveal that GCG's moderating effect varies across different relationships. GCG significantly strengthens the relationship between MFCA Production Output and sustainability, indicating that better governance enhances accountability and transparency in production output management. However, GCG weakens the relationship between MFCA Production Flow and sustainability, suggesting that complex decision-making processes in larger board structures may reduce flexibility in production flow management.

The non-significant moderating effects on Green Accounting and MFCA Production Cost relationships indicate that current governance mechanisms may not be sufficiently addressing environmental accounting integration into corporate sustainability strategies. This contrasts with Singgih's (2022) emphasis on leadership's crucial role in improving governance quality to support corporate sustainability.

These findings highlight the nuanced role of corporate governance in environmental management, where its effectiveness depends on specific implementation aspects and organizational contexts. Companies need to develop more targeted governance approaches that address different dimensions of environmental accounting practices to enhance their sustainability impacts.

5. Conclusion

This study examines the influence of green accounting and material flow cost accounting (MFCA) on corporate sustainability with good corporate governance (GCG) as a moderating variable in textile and garment manufacturing companies listed on the Indonesia Stock Exchange, Malaysia Stock Exchange, and Singapore Exchange for the 2021-2023 period. Based on the research findings, the following conclusions can be drawn:

1) The empirical evidence demonstrates that Green Accounting does not significantly influence corporate sustainability. This indicates that the implementation of green accounting in the sample companies has not been sufficiently strategic or comprehensive to substantially drive sustainability performance. The findings suggest that green accounting practices remain largely administrative or symbolic in nature, rather than being integrated as core components of sustainability strategies that effectively address stakeholder interests.
2) Material Flow Cost Accounting (MFCA) exhibits varying effects across its different components. MFCA measured through production costs and production output shows no significant influence on corporate sustainability, indicating that cost management and production output management have not yet contributed substantially to corporate sustainability strategies. Conversely, MFCA in production flow demonstrates a significant effect on corporate sustainability. This finding highlights the crucial importance of efficiency in managing core material flows - from raw material usage, energy consumption, to waste management - in enhancing sustainability performance. Effective production flow management not only reduces waste and environmental costs but also strengthens transparency and legitimacy in the eyes of stakeholders, consistent with stakeholder and legitimacy theories.
3) The research reveals that Good Corporate Governance (GCG) does not moderate the relationship between Green Accounting and corporate sustainability. This suggests that board size, as a proxy for GCG, has not been effective in strengthening the implementation of Green Accounting to promote sustainability. Thus, the governance role in this study has not successfully accommodated stakeholder interests or enhanced corporate legitimacy through transparent and accountable environmental management practices.
4) The moderating role of Good Corporate Governance (GCG) in the relationship between Material Flow Cost Accounting (MFCA) and corporate sustainability shows diverse results across different MFCA indicators. For MFCA production costs, GCG does not significantly moderate the relationship with corporate sustainability, indicating that board presence and sound governance mechanisms have not effectively strengthened environmentally efficient production cost management as part of sustainability strategy. However, for MFCA production output, GCG significantly strengthens the relationship with corporate sustainability, demonstrating that board oversight enhances accountability, transparency, and effectiveness in MFCA implementation. Surprisingly, for MFCA production flow, GCG weakens its influence on corporate sustainability, potentially due to decision-making complexity or coordination inefficiencies in companies with larger governance structures, thereby limiting the optimal implementation of MFCA in raw material flow management for sustainability contributions.

The study provides valuable insights for companies, regulators, and stakeholders in enhancing the effectiveness of environmental accounting practices and corporate

governance mechanisms to achieve sustainable development goals in the textile and garment manufacturing sector.

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