

THE EFFECT OF GREEN ACCOUNTING AND MATERIAL FLOW COST ACCOUNTING ON SUSTAINABLE DEVELOPMENT WITH PROFITABILITY AS A MODERATING FACTOR

Afni Nadia Rahmasari¹, Poppy Dian Indira Kusuma^{2*}

¹²Faculty of Economics and Business, Universitas Jenderal Soedirman, Indonesia

*Email corresponding author: poppy.kusuma@unsoed.ac.id

Abstract

This study examines the effect of green accounting and material flow cost accounting on sustainable development, with profitability serving as a moderating factor, in mining sector companies listed on the Indonesia Stock Exchange during the 2022–2024 period. The study is motivated by the phenomenon of high environmental degradation caused by mining exploitation activities, which directly threatens long-term ecosystem sustainability. This study aims to: (1) analyze the effect of green accounting on sustainable development; (2) analyze the effect of material flow cost accounting on sustainable development; (3) analyze the moderating effect of profitability on the relationship between green accounting and sustainable development; and (4) analyze the moderating effect of profitability on the relationship between material flow cost accounting and sustainable development. Based on the results of the research and data analysis using Partial Least Squares–Structural Equation Modeling (PLS-SEM), the findings indicate that: (1) green accounting has a positive and significant effect on sustainable development; (2) material flow cost accounting has a positive and significant effect on sustainable development; (3) profitability does not strengthen the effect of Green Accounting on sustainable development; and (4) profitability does not strengthen the effect of Material Flow Cost Accounting on sustainable development.

Keywords: Green Accounting, Material Flow Cost Accounting, Profitability, Sustainable Development

INTRODUCTION

Sustainable development has become a crucial global agenda in responding to environmental crises and climate change. However, achieving these sustainability targets often conflicts with the massive scale of extractive industrial activities. The mining sector accounted for 24% of total global anthropogenic greenhouse gas emissions in 2022 (Intergovernmental Panel on Climate Change, 2023). A paradox emerges as the transition toward green energy drives a surge in demand for mineral resources, such as nickel for electric vehicle batteries, which in practice frequently sacrifices environmental and social stability in extraction regions.

In Indonesia, the mining sector plays a dual role as both a major pillar of the economy and a significant source of ecological pressure. According to a report by the Ministry of Energy and Mineral Resources (ESDM) (2024), the sector exceeded its non-tax state revenue (PNBP) target, generating IDR 269.57 trillion, equivalent to 115.11% of the target, with the mineral and coal subsector serving as the largest contributor. The success of downstream industrialization has positioned Indonesia as the world's largest nickel producer. However, the expansion of smelters and mining activities, particularly in eastern Indonesia, has led to increased fossil fuel consumption and carbon emissions, thereby threatening the achievement of the Sustainable Development Goals (SDGs).

The complexity of the environmental impacts of the mining sector is clearly illustrated by the case of ecosystem degradation in the waters of Raja Ampat, West Papua. Mineral exploration

activities in the area are suspected of triggering heavy metal sediment contamination, threatening coral reefs and the survival of marine organisms (Prihatini & Jatmiko, 2025). Quantitatively, this urgency is reinforced by data from Statistics Indonesia (BPS) (2024), which recorded a surge in the national volume of Hazardous and Toxic Waste (B3) to 116.12 million tons in 2023, with the mining sector being one of the main contributors. Greenhouse gas emissions from the energy and mining subsectors also reached 185.6 million tons of CO₂ equivalent, accounting for approximately 18% of total national emissions.

The phenomenon of environmental degradation indicates weaknesses in corporate sustainability accounting and management practices. Referring to legitimacy theory and stakeholder theory, companies are required to align their operations with social norms and environmental expectations in order to maintain public support. One effort that can be undertaken is the implementation of green accounting and material flow cost accounting.

Green accounting serves to integrate environmental costs into conventional financial reporting for strengthening governance transparency (Schaltegger & Burritt, 2000). Meanwhile, material flow cost accounting serves as an important internal management instrument for accurately mapping material flows, rationalizing expenditures, and managing industrial waste more effectively (Loen, 2018). The synergy between these two instruments is expected to enhance resource productivity while supporting the achievement of sustainable development.

Although, in theory, green accounting and material flow cost accounting support sustainable development, various previous empirical studies have shown inconsistent results. Several studies found that green accounting and material flow cost accounting have a positive and significant effect on sustainable development (Anugrah et al., 2024; Putri et al., 2024), while other studies concluded that these instruments do not have a significant effect (Malika & Trisnawati, 2025; Nurkholisah & Nurcholisah, 2025).

This inconsistency opens the opportunity to introduce a new variable that is believed to strengthen the relationship. Based on the slack resource theory, the level of profitability is projected to serve as a moderating factor. Companies with high profitability are assumed to possess sufficient financial resource flexibility (slack) to invest in environmentally friendly technologies and sophisticated managerial accounting systems (Carreira et al., 2025). Therefore, this study aims to empirically examine the effect of green accounting and material flow cost accounting on sustainable development, with profitability positioned as a moderating variable in mining sector companies listed on the Indonesia Stock Exchange during the 2022–2024 period.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Underlying Theories

Stakeholder theory, introduced by Freeman (1984), states that the survival and success of a business entity do not solely depend on shareholders, but are also greatly influenced by its ability to maintain positive relationships with all stakeholders, including employees, consumers, governments, and the broader community. Amid increasing global awareness of ecological issues, the public increasingly demands that companies prioritize social and environmental responsibilities. Ignoring these demands in pursuit of profit alone may damage corporate reputation and erode the social support necessary for smooth operations (Abdullah & Amiruddin, 2020). These expectations are closely related to the growing stakeholder awareness regarding the importance of sustainable development due to environmental problems that directly affect society (Raras & Nyoman, 2022). In line with this perspective, legitimacy theory proposed by Dowling & Pfeffer (1975) argues that companies do not possess an inherent right to exploit natural resources, as their operational legitimacy is essentially granted by society. Therefore, companies are required to continuously align their activities with prevailing social norms and environmental values. A legitimacy gap may arise when business practices fail to meet public expectations (Grahovar, 2011), potentially threatening corporate continuity. To maintain legitimacy, companies must emphasize transparency regarding

their environmental contributions and demonstrate that their operations are conducted responsibly and lawfully. Consequently, fulfilling the social contract through tangible positive impacts on society and the environment becomes essential for ensuring long-term business sustainability.

Furthermore, slack resource theory, initially developed by Cyert & March (1963) and refined by Bourgeois (1981), explains that organizations possessing excess financial resources or resource buffers have greater flexibility to respond to internal and external pressures. In the context of social and environmental accounting, the quality of a company's sustainability commitment is strongly influenced by the availability of financial resources (Waddock & Graves, 1997). Strong financial performance generates excess capacity that enables management to allocate strategic investments toward environmental protection, governance improvements, and long-term socially beneficial operations (Carreira et al., 2025). Thus, financially capable companies are more likely to strengthen sustainability-oriented initiatives beyond merely achieving minimum operational requirements. Based on these perspectives, this study employs stakeholder theory, legitimacy theory, and slack resource theory as the underlying theoretical foundations to explain the relationship between corporate environmental practices, profitability, and sustainable development.

Green Accounting dan Sustainable Development

Green accounting is an integrated accounting system that incorporates economic, social, and environmental dimensions as a representation of the concept of sustainable development (Yasrawan & Werastuti, 2022). The primary objective of its implementation is to control and improve the efficiency of environmental management by periodically evaluating company operational activities from the perspectives of costs, benefits, and their impacts on society (Call et al., 2013). Through the presentation of comprehensive and relevant accounting information, the implementation of green accounting is expected to preserve environmental sustainability, encourage corporate compliance with regulations, and facilitate stakeholders in assessing the company's performance and sustainability prospects (Lako, 2018).

The concept of sustainable development, introduced by the *World Commission on Environmental and Development* (WCED) (1987), refers to efforts to meet present needs without compromising the ability of future generations to meet their own needs. The fundamental understanding of this concept is based on the synergy of three main principles: economic, environmental, and social welfare. In practice, an entity's efforts to achieve economic prosperity through productive activities must be aligned with environmental preservation efforts to prevent the degradation of natural resource capacity (Bansal, 2005). In addition, the social principle demands fair access to opportunities and resources in order to improve the quality of life for society as a whole (Gladwin et al., 1995). Therefore, companies pursuing profit maximization are required to maintain a balanced approach toward ecosystems and communities affected by their operations (Sheehy & Farneti, 2021). Ultimately, the integration of these three principles is not merely a form of responsibility, but also an essential strategy for companies to sustain their business continuity in the future.

Grounded in stakeholder and legitimacy theories, business entities are required to align their operational activities with societal expectations and prevailing norms in order to maintain survival and public legitimacy (Freeman, 1984; Dowling & Pfeffer, 1975; Deantari et al., 2019). As a form of proactive response to these demands, the implementation of Green Accounting (GA) facilitates companies in identifying, measuring, and transparently reporting environmental costs. Logically, such transparency and efficiency in environmental cost management will fulfill stakeholders' information expectations, while also serving as a foundation for management to balance profit achievement with ecological responsibility in an integrated manner. This theoretical argument is consistently supported by various previous empirical findings, which demonstrate that the quality of GA implementation has a positive and significant effect on the achievement of sustainable development (Santoso & Handoko, 2025; Nurkholisoh & Nurcholisah, 2025; Kakarika & Yanti, 2025;

Kurnianingtyas & Trisnawati, 2024; Anugrah et al., 2024; Lestari et al., 2023; Lingling & Farida, 2023). Therefore, the better a company evaluates and reports its environmental accounting, the higher the level of business sustainability it can achieve.

H1: Green accounting has a positive effect on sustainable development.

Material Flow Cost Accounting dan Sustainable Development

Material flow cost accounting is a management instrument designed to trace and quantify material flows within the production process, both physically and monetarily (ISO 14051, 2011). By comprehensively integrating the calculation of material costs, energy, operational systems, and waste management, material flow cost accounting provides an in-depth understanding of the environmental and economic implications of every manufacturing activity undertaken by an entity (Loen, 2018). The implementation of material flow cost accounting functions to optimize internal productivity and mitigate negative impacts on the surrounding ecosystem, while simultaneously reducing operational costs through the minimization of resource waste (Ardina et al., 2020).

Grounded in stakeholder theory and legitimacy theory, the achievement of sustainable development requires companies to align their operations with social norms and stakeholders' expectations regarding environmental responsibility (Freeman, 1984; Dowling & Pfeffer, 1975). The implementation of material flow cost accounting, proxied through production costs, enables entities to transparently present the allocation of material processing and waste management costs with precision (Selpiyanti & Fakhroni, 2020). Logically, the magnitude of disclosed production cost allocations indicates management's genuine commitment not to reduce costs by neglecting ecological feasibility standards, but rather to regard them as a form of environmental investment to ensure that extraction processes are conducted safely. This logical argument is strongly supported by previous empirical findings, which consistently prove that material flow cost accounting has a positive effect on the achievement of sustainable development (Putri et al., 2024; Fazmi et al., 2024; Trisnarningsih et al., 2024; Anugrah et al., 2024; May et al., 2023; Juliani et al., 2025; Handayani & Sari, 2025; Felinsia et al., 2025). Therefore, the more comprehensive and transparent the allocation of production costs through the material flow cost accounting instrument, the more aligned the company's operations are with ecological balance, which constitutes a primary pillar of sustainability.

H2: Material flow cost accounting has a positive effect on sustainable development.

The Role of Profitability in Strengthening the Relationship Between Green Accounting and Sustainable Development

Profitability is reflected in a company's ability to generate net operating profit through the optimal utilization of its various resources effectively and efficiently (Sari et al., 2023). An adequate level of profitability not only functions as a crucial indicator in evaluating internal management capabilities, but also serves as a key determining factor for investors in making investment decisions (Niandari & Handayani, 2023; Widodo et al., 2021).

Based on the theory of stakeholder and legitimacy (Freeman, 1984; Dowling & Pfeffer, 1975), business entities have a fundamental obligation to report their environmental performance through green accounting in order to gain social acceptance that supports sustainable development, regardless of their financial condition (O'Donovan, 2002). Nevertheless, the availability of excess financial resources, reflected in high levels of profitability, can provide management with the flexibility to undertake long-term strategic investments (Bourgeois, 1981). Companies with optimal profitability possess greater financial capacity to elevate green accounting practices from merely fulfilling administrative reporting standards into large-scale, real environmental preservation programs. This strong financial synergy will ultimately strengthen the company's commitment to achieving a balance between economic growth and ecological sustainability. This argument is consistent with the findings of Muniroh et al. (2023) and Gresya & Surianti (2024), which empirically prove that the availability of financial support derived from

profitability is capable of strengthening the positive effect of green accounting implementation on the achievement of sustainable development.

H3: Profitability strengthens the effect of green accounting on sustainable development.

The Role of Probability in Strengthening the Relationship Between Material Flow Cost Accounting and Sustainable Development

Based on stakeholder (Freeman, 1984) and legitimacy theories (Dowling & Pfeffer, 1975), transparency regarding the operational impacts reflected through material flow cost accounting constitutes a fundamental responsibility that companies must fulfill in order to maintain social legitimacy, regardless of their level of profitability (O'Donovan, 2002). Nevertheless, the availability of excess financial resources, such as high profitability levels, becomes a determining factor in the quality of follow-up actions arising from such operational commitments (Bourgeois, 1981). Strong capital capacity provides a buffer for management to consistently bear and disclose high production cost allocations as a manifestation of responsible operations without disrupting the company's financial stability (Carreira et al., 2025). Without adequate profits, business entities are vulnerable to taking shortcuts by reducing production costs and neglecting environmental feasibility standards. Conversely, the presence of profitability as a moderating variable enables companies to absorb high operational costs in order to ensure that material extraction processes are conducted safely and with minimal emissions. This financial synergy ensures that the commitment to transparent production cost allocation can be continuously maintained to balance economic and ecological aspects, which in turn further strengthens the achievement of sustainable development.

H4: Profitability strengthens the effect of material flow cost accounting on sustainable development.

RESEARCH METHODS

This study employs a quantitative approach to examine the relationship between green accounting and material flow cost accounting on sustainable development, with profitability serving as a moderating variable. The research population consists of 53 mining sector companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period. Secondary data were collected using a documentation technique by obtaining official annual reports from the IDX website (www.idx.co.id) and the respective companies' websites. Based on the purposive sampling method, with criteria requiring companies to be consecutively listed and consistently publish annual reports throughout the observation period, a final sample of 47 companies was obtained, resulting in a total of 141 observation data points. Data were analyzed using the Partial Least Squares-Structural Equation Modeling (PLS-SEM) method.

Sustainable development as the dependent variable is measured using the approach proposed by Marota (2017), which refers to the indicators developed by Azapagic (2003) and is consistent with the study by Kurnianingtyas & Trisnawati (2024). The indicators used are as follows:

$$SD = Economic + Environmental + Social + Technology$$

Where,

Economic	: Net profit after tax, sales, and investment
Environmental	: Occupational health and safety costs, utility costs
Social	: Salary and benefits expenses, CSR expenditures
Technology	: Research and development expenditures

The measurement uses the natural logarithm (ln) of the total sustainable development (SD) value.

Green accounting as the independent variable is assessed using content analysis, similar to the studies conducted by Lingling & Farida (2023), Juliani et al. (2025), and Adnyana et al. (2024), based on the research of Al-Tuwaijri et al. (2004). The dimensions and indicators of green accounting are listed in Table 1, while the scoring system to measure green accounting using content analysis is displayed in Table 2.

Table 1. Dimensions and Indicators of Green Accounting

No	Dimension	Indicator
1	Pollution prevention	Efforts to prevent or control water and air pollution
2	Environmental protection	Energy-saving programs (water, electricity, and fuel) and efforts to reduce the impacts of global warming
3	Resource recycling	Efforts to reduce waste and improve the efficiency of resources/raw materials used, including the implementation of recycling practices
4	Environmental restoration	Actions to restore or rehabilitate the environment (soil, water, and air pollution)
5	Management	Actions to restore or rehabilitate the environment (soil, water, and air pollution)
6	Social activities	Implementation of CSR programs or community social activities
7	Research & development	Environmental research and development activities, including environment-themed training programs

Source: Moorthy & Yacob (2013)

Table 2. Scoring Criteria

Score	Criteria
0	Mining companies that do not disclose Green Accounting (GA) indicators in their annual reports
1	Mining companies that only disclose GA indicators in the form of figures or images in their annual reports
2	Mining companies that disclose GA indicators through narrative explanations in their annual reports
3	Mining companies that disclose GA indicators in the form of narrative explanations supported by figures or images in their annual reports

Source: Al-Tuwaijri et al. (2004).

Material flow cost accounting as the independent variable is proxied using the natural logarithm (ln) of the company's total production costs, as applied in the study by Putri et al. (2024), which was adopted from the formulation proposed by Marota (2017). Furthermore, profitability as the moderating variable is measured using the return on assets (RoA) ratio, as applied in the studies conducted by Gresya & Surianti (2024) and Muniroh et al. (2023), with the following formula:

$$RoA = \frac{\text{Income after tax}}{\text{Total asset}}$$

RESULTS AND DISCUSSION

RESULTS

This study uses mining sector companies listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period as the population, consisting of 53 companies. Through the sample selection process using the purposive sampling method, 47 companies were determined to meet the criteria. Thus, the total number of observations in this study amounted to 141 observation data points. The details of the sample selection process are presented in Table 3.

Table 1. Sample Selection

No	Criteria	Number of Company
1	Mining companies consecutively listed on the Indonesia Stock Exchange (IDX) during the 2022–2024 period	53
2	Mining companies that did not publish annual reports during the 2022–2024 period	(6)
Final Company Sample		47
Total Observation (47 companies X 3 years)		141

Source: Data processed from the Indonesia Stock Exchange (IDX), 2026.

Descriptive Statistic

Based on the results of the descriptive statistical analysis in Table 4, the green accounting (GA) shows an average value of 1.760, indicating that most mining companies have made efforts to conduct environmental disclosure. Furthermore, the material flow cost accounting (MFCA) recorded an average value of 28.319, reflecting the average allocation of production costs incurred by entities to manage their operations. For the profitability (PR), the average value obtained was 0.108 or 10.8%. This means that during the 2022–2024 period, mining companies on average were able to generate net profits amounting to 10.8% of the utilization of their total assets, although fluctuations were evident from the negative minimum value achieved (-0.616). Lastly, the average score of 29.492 for the sustainable development (SD) variable projects the average level of allocation and achievement of sustainability activities carried out by the sample companies.

Table 2. Descriptive Statistic

Variable	Maximum	Minimum	Mean	Standard Deviation
GA	2,571	0,857	1,760	0,424
MFCA	32,812	17,948	28,319	2,478
PR	1,283	-0,616	0,108	0,192
SD	33,061	24,178	29,492	2,134

Source: SmartPLS data processing results, 2026

Hypothesis Testing Results

Based on the analysis result using SmartPLS, the model scheme for this study is presented in Figure 1.

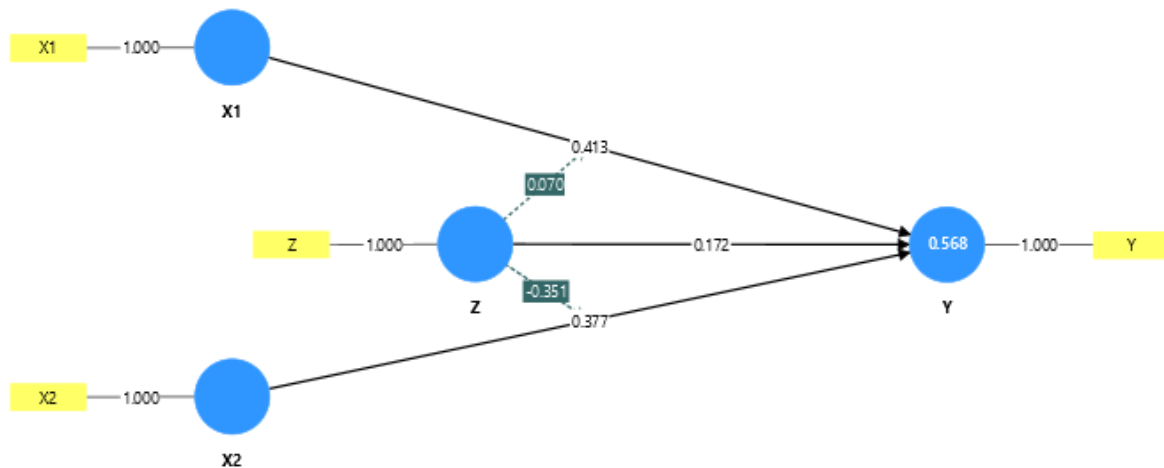


Figure 1. SmartPLS Program Model Scheme

Outer Model

The evaluation of the outer model, which includes convergent validity and internal consistency reliability testing, was not conducted in this study. This is because all observed variables were measured using single-item constructs. Based on the principles of Partial Least Squares (PLS) analysis, in constructs with a single indicator, the indicator directly represents the construct, resulting in an outer loading value that is automatically equal to 1.0. Therefore, testing outer model parameters such as Average Variance Extracted (AVE), composite reliability, and Cronbach's alpha becomes irrelevant and unnecessary. Consequently, the data analysis stage could proceed directly to the evaluation of the structural model (inner model).

Inner Model

Hypothesis testing was conducted using the bootstrapping calculation method in the SmartPLS 4 application. The results of the path coefficient testing are presented in Table 5. The Original Sample value is used to determine the direction of the relationship, where a positive value is required as a condition for hypothesis acceptance because the entire hypothesis framework in this study assumes a positive influence or strengthening effect. Furthermore, the P-value is used to test the significance of the effect. A hypothesis is considered accepted if it has a P-value below 0.05 and a positive Original Sample value.

Based on Table 5, the testing results indicate that H1 and H2 are accepted because they have P-values < 0.05 and positive Original Sample values. In contrast, H3 is rejected because its P-value exceeds the 0.05 significance level. Interestingly, for H4, although the P-value meets the required criterion (< 0.05), the Original Sample value shows a negative figure (-0.351). This demonstrates that profitability actually weakens the effect of material flow cost accounting on sustainable development; therefore, H4 is also rejected.

To measure the extent to which the independent variables and their moderating effect explain the dependent variable, this study employs the Adjusted R-square test. The test results show that the Adjusted R-square value for sustainable development (SD) is 0.552. This indicates that the variables of green accounting, material flow cost accounting, and profitability influence and explain 55.2% of the variance in SD. Meanwhile, the remaining 44.8% is influenced by other factors outside the scope of this study.

Table 3. Hypothesis Testing Results

Hypothesis	Original Sample	P-Value	Decision	Adjusted R-Square
H1	0,413	0,000	Accepted	0,552
H2	0,377	0,005	Accepted	
H3	0,070	0,241	Rejected	
H4	-0,351	0,040	Rejected	

Source: SmartPLS data processing results, 2026.

DISCUSSION

The Effect of Green Accounting on Sustainable Development

The results of testing the first hypothesis prove that green accounting has a positive effect on sustainable development. These findings empirically validate stakeholder theory (Freeman, 1984) and legitimacy theory (Dowling & Pfeffer, 1975), which emphasize that corporate operations must go beyond the interests of capital owners by also considering environmental welfare and complying with social norms in order to obtain public legitimacy. The transparency of environmental accounting data provides a vital control mechanism for management to align economic objectives with ecological responsibility, thereby creating a balanced integration between the economic, social, and environmental pillars to ensure long-term business sustainability. Empirically, these findings are consistent with various previous studies (Lingling & Farida, 2023; Santoso & Handoko, 2025; Adnyana et al., 2024; Anugrah et al., 2024; Nurkholisoh & Nurcholisah, 2025). Therefore, it can be concluded that the better an entity can identify and report its environmental costs, the higher the level of long-term business sustainability that can be achieved.

The Effect of Material Flow Cost Accounting on Sustainable Development

The results of testing the second hypothesis prove that material flow cost accounting has a positive effect on sustainable development. These findings are consistent with stakeholder theory (Freeman, 1984) and legitimacy theory (Dowling & Pfeffer, 1975), in which the high allocation of production costs disclosed transparently reflects the entity's level of environmental accountability in the eyes of the public. The use of production costs as a proxy for material flow cost accounting is not merely a form of administrative financial recording, but rather a real indicator of operational commitment. The magnitude of these expenditures indicates that management does not reduce costs by neglecting ecological feasibility standards. On the contrary, it demonstrates that the company invests adequate operational funds to ensure that the production cycle operates safely and with minimal emissions. Empirically, this argument is strongly supported by various previous studies (Putri et al., 2024; Fazmi et al., 2024; May et al., 2023; Anugrah et al., 2024; Trisnaningsih et al., 2024; Damayanti & Yanti, 2023). Therefore, it can be concluded that a high and transparent allocation of production costs has a direct impact on responsible operations, the minimization of negative operational impacts, and the successful achievement of long-term sustainable development goals.

The Role of Profitability in Strengthening the Effect of Green Accounting and Material Flow Cost Accounting on Sustainable Development

The results of testing the third and fourth hypotheses indicate that profitability is unable to moderate the influence of either green accounting or material flow cost accounting on sustainable development. The rejection of this hypotheses reinforces the relevance of stakeholder theory (Freeman, 1984) and legitimacy theory (Dowling & Pfeffer, 1975), suggesting that mining sector companies face constant external pressure to comply with environmental reporting standards (in the context of this study is implementing green accounting) and maintain high transparency in

production cost allocation (material flow cost accounting) as a form of absolute accountability to preserve their social license to operate, regardless of fluctuations in annual profits.

These findings provide a new perspective on the assumptions of slack resource theory, in which environmental management costs are no longer financed from the company's residual excess financial resources, but have instead become fixed operational budget items that are mandatory and subject to strict regulations. Empirically, these findings are consistent with the study by Pesak (2024), which emphasizes that fluctuations in corporate profits do not necessarily strengthen the implementation of environmental preservation practices, as such practices are often driven by regulatory compliance rather than merely depending on the availability of funds. The inability of profitability to function as a moderating variable occurs because the commitment to bearing representative production costs (in this case is applying material flow cost accounting) and reporting environmental responsibility through green accounting constitutes a fundamental operational necessity for corporate survival and the avoidance of sanctions; therefore, their implementation is not influenced by the company's annual profit level.

CONCLUSION

The results of hypothesis testing prove that the implementation of green accounting and material flow cost accounting is significantly capable of enhancing the achievement of sustainable development in mining sector companies. The high level of environmental disclosure transparency and production cost allocation represents a concrete manifestation of the company's commitment to ensuring operations that are aligned with ecological feasibility. In contrast, profitability is proven to be unable to moderate the influence of either green accounting or material flow cost accounting on sustainable development. This finding implies that the fulfillment of environmental reporting and production cost allocation (material flow cost accounting) must continue to be implemented consistently as a standard operational practice to maintain social legitimacy, regardless of the level of profit earned. Theoretically, these findings strengthen stakeholder theory and legitimacy theory, while also emphasizing that environmental practices constitute an absolute operational obligation that does not merely depend on the availability of excess financial resources. Practically, these results may serve as a basis for the government to enforce stricter standardization of environmental reporting, as well as guide investors in assessing corporate sustainability prospects not solely based on the magnitude of profits generated.

BIBLIOGRAPHY

- Abdullah, M. W., & Amiruddin, H. (2020). Efek Green Accounting terhadap Material Flow Cost Accounting dalam Meningkatkan Keberlangsungan Perusahaan. *Ekuitas (Jurnal Ekonomi Dan Keuangan)*, 4(2), 166–186. <https://doi.org/10.24034/j25485024.y2020.v4.i2.4145>.
- Adnyana, I. W. P., Adiputra, I. M. P., & Musmini, L. S. (2024). Pengaruh Green Accounting, Profitabilitas dan Corporate Social Responsibility terhadap Sustainable Development Goals dengan Ukuran Perusahaan sebagai Variabel Moderasi: Studi pada Perusahaan Manufaktur yang Terdaftar di BEI. *Ekuitas: Jurnal Pendidikan Ekonomi*, 12(2), 288–301. <https://doi.org/10.23887/ekuitas.v12i2.86997>
- Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. *Accounting, Organizations and Society*, 29(5–6), 447–471. [https://doi.org/10.1016/S0361-3682\(03\)00032-1](https://doi.org/10.1016/S0361-3682(03)00032-1)
- Anugrah, Y. S., Maemunah, M., & Lukita, C. (2024). Pengaruh Penerapan Green Accounting , Environmental Disclosure , dan Material Flow Cost Accounting Terhadap Sustainable

- Development Goals : Studi Kasus pada Perusahaan Manufaktur yang Terdaftar di BEI. *Jurnal Kajian Ekonomi & Bisnis Islam*, 5(11), 4620–4634. <https://doi.org/1047467/elmal.v5i11.4298>
- Ardina, A. K., Damayanti, N., Anggraini, S. M., Rachman, M. R., & Lastiati, A. (2020). Implementasi Material Flow Cost Accounting pada Industri UMKM (Studi Kasus Konveksi Rumahan 4 Putri). *E-Proceeding: National Conference on Accounting & Fraud Auditing*, 2(1), 1–16.
- Azapagic, A. (2003). Systems Approach to Corporate Sustainability: A General Management Framework. *Process Safety and Environmental Protection: Transactions of the Institution of Chemical Engineers*, 81(5), 303–316. <https://doi.org/10.1205/095758203770224342>
- Badan Pusat Statistik (BPS). (2024). *Statistik lingkungan hidup Indonesia 2024*. <https://www.bps.go.id/publication/2024/02/28/statistik-lingkungan-hidup-indonesia2024.html>
- Bansal, P. (2005). Evolving sustainably: A longitudinal study of corporate sustainable development. *Strategic Management Journal*, 26(3), 197–218. <https://doi.org/10.1002/smj.441>
- Bourgeois, L. J. (1981). On The Measurement of Organizational Slack. *Academy of Management Review*, 6(1), 29–39. <https://doi.org/10.5465/amr.1981.4285922>
- Call, D. A. N., Papers, F. O. R., Ketintang, K., & Ketintang, J. (2013). *Green Accounting, Mengapa dan Bagaimana?* 978–979.
- Carreira, F., Silva, A., Cepêda, C., Carreira, F., Silva, A., & Cepêda, C. (2025). *Does Profitability Support Sustainability ? Examining the Influence of Financial Performance and ESG Controversies on ESG Ratings Does Profitability Support Sustainability ? Examining the Influence of Financial Performance and ESG Controversies on ESG Ratings*. 0–16. <https://doi.org/10.20944/preprints202506.1265.v1>
- Cyert, R. M., & March, J. G. (1963). *A behavioral theory of the firm*. Prentice-Hall.
- Damayanti, R. S., & Yanti, H. B. (2023). Pengaruh Implementasi Green Accounting Dan Material Flow Cost Accounting Terhadap Sustainable Development. *Jurnal Ekonomi Trisakti*, 3(1), 1257–1266. <https://doi.org/10.25105/jet.v3i1.16014>
- Deantari, S. A. O., Pinasti, M., & Herwiyanti, E. (2019). Faktor-Faktor Yang Mempengaruhi Pengungkapan Emisi Gas Rumah Kaca Dari Perspektif Akuntansi Hijau. *Journal Ekonomi Syariah*, 7(1), 88–111.
- Dowling, J., & Pfeffer, J. (1975). Organizational Legitimacy: Social Values and Organizational Behavior. *Source: The Pacific Sociological Review*, 18(1), 122–136.
- Fazmi, N., Hilmi, & Mardiaton, R. (2024). Analisis Implementasi Green Accounting Dan Material Flow Cost Accounting Terhadap Sustainable Development (Studi Kasus Pada PT. Pupuk Iskandar Muda Aceh Utara Periode 2018-2022). *Jurnal Akuntansi Malikussaleh*, 3(1), 121–134.
- Felinsia, M., Kiuk, L., Angi, Y. F., & Kiak, N. T. (2025). *Pengaruh Implementasi Green Accounting , Material Flow Cost Accounting dan Environmental Performance terhadap Sustainable Development*.
- Freeman, R. (1984). *Strategic Management: A Stakeholder Approach*. Cambridge University Press.

- Gladwin, T. N., Kennelly, J. J., & Krause, T.-S. (1995). Shifting Paradigms for Sustainable Development: Implications for Management Theory and Research. *The Academy of Management Review*, 20(4), 874–907. <https://doi.org/0.2307/258959>
- Grahoar, M. (2011). *The use of Corporate Responsibility Reports for Managing Legitimacy*. Gothenburg University Publications Electronic Archive.
- Gresya, J., & Surianti, M. (2024). Pengaruh Penerapan Green Accounting , Kinerja Lingkungan dan Profitabilitas terhadap Sustainable Development Goals. *JAKP: Jurnal Akuntansi, Keuangan Dan Perpajakan*, 7(1), 66–77.
- Handayani, N., & Sari, S. P. (2025). Mewujudkan Sustainable Development Goals : Implementasi Pengelolaan Lingkungan pada Perusahaan Pertambangan di Indonesia. *Transekonomika: Akuntansi, Bisnis Dan Keuangan*, 5(2), 491–501.
- Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report*. IPCC. <https://www.ipcc.ch/report/ar6/syr/>
- ISO 14051. (2011). *Environmental management — Material flow cost accounting — General framework*. International Organization for Standardisation. <https://www.iso.org/obp/ui/en/#iso:std:iso:14051:ed-1:v1:en>
- Juliani, D., Lasmini, L., & Puspitasari, M. (2025). Pengaruh Implementasi Green Accounting, Material Flow Cost Accounting, dan Environmental Performance terhadap Sustainable Development. *Jurnal Bisnis Dan Akuntansi*, 15(1), 70–76.
- Kakarika, & Yanti, H. B. (2025). Pengaruh Akuntansi Hijau, Kinerja Lingkungan, Akuntansi Biaya Aliran Material Terhadap Pembangunan Berkelanjutan. *Jurnal Ekonomi Trisakti*, 5(1), 461–472. <https://doi.org/10.25105/jet.v5i1.22387>
- Kementerian Energi dan Sumber Daya Mineral (ESDM). (2024). *Laporan kinerja Kementerian ESDM Tahun 2024*. <https://www.esdm.go.id/id/publikasi/laporan-kinerja>
- Kurnianingtyas, I., & Trisnawati, L. P. P. (2024). Pengaruh Green Accounting, Material Flow Cost Accounting, dan Environmental Performance terhadap Sustainable Development. *Jurnal Penelitian Ekonomi Akuntansi (JENSI)*, 8(8), 302–317.
- Lako, A. (2018). Conceptual Framework of Green Accounting. *Journal of Accounting*, 60–66.
- Lestari, N. L. P. R. W., Juniariani, N. M. R., & Kurniawati, N. P. A. T. (2023). Corporate Social Responsibility and Green Accounting in Achieving Sustainable Development. *International Journal of Multidisciplinary Research and Publications*, 6(6), 77–81.
- Lingling, S. A., & Farida. (2023). Pengaruh Green Accounting, Environmental Performance, Material Flow Cost Accounting (MFCA) Dan Environmental Disclosure Terhadap Sustainable Development Goals (Sdgs). *Kajian Bisnis Sekolah Tinggi Ilmu Ekonomi Widya Wiwaha*, 31(2), 54–67. <https://doi.org/10.32477/jkb.v31i2.711>
- Loen, M. (2018). Penerapan Green Accounting Dan Material Flow Cost Accounting (Mfca) Terhadap Sustainable Development. *Jurnal Akuntansi Dan Bisnis Krisnadwipayana*, 5(1), 1–14. <https://doi.org/10.35137/jabk.v5i1.182>

- Malika, N., & Trisnawati, R. (2025). The Impact Of Green Accounting, Material Flow Cost Accounting, Corporate Social Responsibility, Environmental Disclosure, And Environmental Performance On Sustainable Development Pengaruh Penerapan Green Accounting, Material Flow Cost Accounting, Corporat. *Management Studies and Entrepreneurship Journal*, 6(5), 124–138.
- Marota, R. (2017). Green Concepts and Material Flow Cost Accounting Application for Company Sustainability. *Indonesian Journal of Business and Entrepreneurship*, 3(1). <https://doi.org/10.17358/ijbe.3.1.43>.
- May, S. P., Zamzam, I., Syahdan, R., & Zainuddin. (2023). Pengaruh Implementasi Green Accounting, Material Flow Cost Accounting dan Environmental Performance Terhadap Sustainable Development. *Owner: Riset & Jurnal Akuntansi*, 7(3), 2506–2517. <https://doi.org/10.33395/owner.v7i3.1586>
- Moorthy, K., & Yacob, P. (2013). Green Accounting : Cost Measures. *Open Journal of Accounting*, 2, 4–7. <https://doi.org/10.4236/ojacct.2013.21002>
- Muniroh, Nursasi, E., & Triani. (2023). Pengaruh Penerapan Green Accounting Dan Kinerja Lingkungan Terhadap Sustainable Development Dengan Profitabilitas Sebagai Variabel Moderasi (Pada Perusahaan Sektor Industri Dasar Dan Kimia Yang Terdaftar Di Bursa Efek Indonesia. *Journal Akses STIA Malang*, 5(2), 28–39.
- Niandari, N., & Handayani, H. (2023). Green accounting, Kinerja Lingkungan, Dan Profitabilitas. *Jurnal Akuntansi Bisnis*, 16(1), 83–96. <https://doi.org/10.30813/jab.v16i1.3875>
- Nurkholisoh, E., & Nurcholisah, K. (2025). Pengaruh Penerapan Green Accounting dan Material Flow Cost Accounting terhadap Sustainable Development. *Bandung Cobference Series Accountancy*, 5(1), 343–352. <https://doi.org/10.29313/bcsa.v5i1.16563>
- O'Donovan, G. (2002). Environmental disclosures in the annual report. *Accounting, Auditing & Accountability Journal*, 15(3), 344–371. <https://doi.org/10.1108/09513570210435870>
- Pesak, P. (2024). Profitability as Moderation on The Influence of Green Accounting on Sustainability Development. *Jurnal Riset Akuntansi Dan Keuangan*, 12(1), 25–36. <https://doi.org/10.17509/jrak.v12i1.63101>
- Prihatini, Z., & Jatmiko, B. P. (2025). *KLH Dalami Kerusakan Lingkungan akibat Aktivitas Tambang di Raja Ampat*. Kompas Lestari. <https://lestari.kompas.com/read/2025/06/09/094536086/klh-dalami-kerusakan-lingkungan-akibat-aktivitas-tambang-di-raja-ampat>
- Putri, R. A., Lasmini, L., & Septiawati, R. (2024). Pengaruh Environmental Performance dan Material Flow Cost Accounting Terhadap Sustainable Development: pada Perusahaan Sektor Industri Dasar dan Kimia yang Terdaftar di Bursa Efek Indonesia Tahun 2020-2022. *Al-Kharaj: Jurnal Ekonomi, Keuangan & Bisnis Syariah*, 6(9), 6658–6675. <https://doi.org/10.47467/alkharaj.v6i9.2775>
- Raras, C., & Nyoman, D. (2022). Pengaruh Penerapan Green Accounting dan Material Flow Cost Accounting terhadap Corporate Sustainability (Studi Empiris Pada Perusahaan Tekstil dan Garmen yang Terdaftar di Bursa Efek Indonesia). *Jurnal Ilmiah Mahasiswa Akuntansi*, 13(4), 1141–1152. <https://doi.org/10.23887/jimat.v14i03.64688>

- Santoso, M. A. S., & Handoko, J. (2025). Pengaruh Implementasi Green Accounting dan MFCA terhadap Sustainable Development. *Jurnal Akuntansi*, 12(1), 1–23.
- Sari, T. R., Primasari, D., & Farida, Y. N. (2023). The effect of profitability , company size , leverage , liquidity , and free cash flow on dividend policy. *International Journal of Economy and Business*, 2(1), 22–34.
- Schaltegger, S., & Burritt, R. (2000). *Contemporary Environmental Accounting* (1st ed.). Routledge. <https://doi.org/10.4324/9781351282529>
- Selpiyanti, & Fakhroni, Z. (2020). Pengaruh Implementasi Green Accounting Dan Material Flow Cost Accounting Terhadap Sustainable Development. *Jurnal ASET (Akuntansi Riset)*, 12(1), 109–116. <https://doi.org/10.17509/jaset.v12i1.23281>
- Sheehy, B., & Farneti, F. (2021). Corporate Social Responsibility , Sustainability , Sustainable Development and Corporate Sustainability : What Is the Difference , and Does It Matter ? *Sustainability*, 13(11), 1–17. <https://doi.org/10.3390/su13115965>
- Trisnaningsih, S., Hendrawan, B. M., & Hendra, F. H. (2024). Application of Green Accounting and Material Flow Cost Accounting Towards Sustainable Development. *International Journal of Religion*, 5(11), 2814–2819. <https://doi.org/10.61707/xzqe8a24>
- Waddock, S. A., & Graves, S. B. (1997). The Corporate Social Performance - Financial Performance Link. *Strategic Management Journal*, 18(4), 303–319.
- Widodo, F. P. T., Praptapa, A., Suparlinah, I., & Setyorini, C. T. (2021). The effect of company size , institutional ownership , profitability and leverage on dividends payout ratio. *Journal of Contemporary Accounting*, 3(2), 77–87. <https://doi.org/10.20885/jca.vol3.iss2.art3>
- World Commission on Environmental and Development (WCED). (1987). *Our Common Future*. Oxford University Press.
- Yasrawan, K. T., & Werastuti, D. N. S. (2022). Bagaimana Peran Dan Penerapan Akuntansi Hijau Di Indonesia? *Jurnal Akuntansi Kontemporer*, 14(3), 151–161. <https://doi.org/10.33508/jako.v14i3.3514>