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Sustainable development: through the implementation of green accounting and material flow cost accounting

Irna Triannur Lubis[1], Selvi Aristantya[2]
[1,2] Accounting Study Program, Universitas Battuta, Medan, Indonesia

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ABSTRACT

The background of this research is based on the importance of public awareness of environmental preservation. Currently, companies are required to carry out environmentally friendly business. Application of Green Accounting and Material Flow Cost Accounting to Sustainable Development, which includes four main aspects: economic, environmental, social and technological. Great attention to the imbalance between these aspects is the main focus of various parties. Currently, people will tend to use products from companies that implement green industry. Problems: An increase in the earth's average temperature can cause climate changes that are difficult to predict and extreme. The aim of the research is to analyze the effect of implementing green accounting, environmental performance and material flow cost accounting on the sustainable development of manufacturing companies on the Indonesian Stock Exchange. The population used in this research are companies listed on the Indonesia Stock Exchange 2021-2023. The sampling technique in this research used purposive sampling, so that a sample of 33 companies was obtained. The data used in this research is secondary data originating from the company's annual report. The analytical method used is multiple linear regression. It is hoped that the research results will be availableThe Effect of Implementing Green Accounting, Environmental Performance andMaterial Flow Cost Accounting for Sustainable Development of Manufacturing Companies on the Indonesian Stock Exchange.

Corresponding Author:

Irna Triannur Lubis,
Accounting Study Program,
Universitas Battuta,
Jalan Sekip, simpang Jalan Sikambing, Sei Putih Timur No. 1, Medan, Sumatera Utara.
Email: irnatriannurlubis@gmail.com

1. INTRODUCTION

Corporate sustainability is a concept that adopts a long-term business orientation to meet the needs of current and future stakeholders by considering aspects of economic growth, environmental protection and social justice (Rahman & Nguyen-Viet, 2023).

In line with this concept, (Rahmaniati & Ekawati, 2024) argues that public awareness of environmental issues encourages companies to carry out environmental management in the business world. This program was launched during the period 2000

to 2015. Furthermore, from 2016 to 2030, the UN again launched a follow-up program, namely Sustainable Development Goals (SDGs) (Novi Andari & Fitria, 2023). One of the Sustainable Development Goals (SDGs) programs is on the issue of climate change. and global warming. The issue of climate change is point 13 in the Sustainable Development Goals (SDGs) (Sri Werastuti, 2020).

Global warming and climate change have become the most challenging environmental problems that must be faced by various countries, including Indonesia. Public concern for the problems caused by climate change has led to the emergence of environmental regulations. Green Accounting appears as an element that contributes to improving the company's economy without ignoring the environmental conditions around the company (ENDIANA et al., 2020; Lubis et al., 2020).

Revealed that ignoring stakeholder interests can tarnish the company's image in the eyes of the public, which will have a negative impact on the company's financial performance. Company financial performance is one of the dimensions used to measure corporate sustainability (Aristantya, 2023; Senadheera et al., 2022). In connection with this, companies need a tool that can support the company's commitment to the environment and social, namely green accounting. Apart from that, companies also need a tool to manage waste so that it has a good impact on the company and the environment, namely material flow cost accounting. Therefore, it is important to examine the effect of implementing green accounting and material flow cost accounting on corporate sustainability (Abdullah & Amiruddin, 2020; Jeanice & Kim, 2023; Susanti et al., 2023).

Along with developments over time, public awareness of environmental preservation is now required for companies to be able to carry out environmentally friendly business. Currently, people will tend to use products from companies that implement green industry . The impact of minimal environmental damage will improve environmental performance. Conversely, the greater the impact of environmental damage resulting from business activities, the worse the company's performance (Abdullah & Amiruddin, 2020; Susanti et al., 2023)

The implementation of environmentally friendly industrial practices, such as eco-efficiency and green accounting, has become the main focus in company accounting practices (Abdullah & Amiruddin, 2020). Green accounting includes the integration of costs for environmental preservation in company expenses. Increasing public awareness of environmental preservation makes the application of green accounting attractive to consumers .This concept emphasizes the efficiency and effectiveness of sustainable use of resources in the production process, which is in line with the aim of maintaining environmental functions and providing social benefits (Sri Werastuti, 2020).

Research shows that the impact of environmental damage can affect company performance; the greater the impact, the worse the performance (Selpiyanti & Fakhroni, 2020). Adoption of environmentally friendly business practices not only increases company value and stakeholder satisfaction, but also protects the future of our planet. By implementing this practice, a business can embrace the green economy paradigm in sustainable development, which aims to meet the needs of the current generation without harming future generations(Abdullah & Amiruddin, 2020).

According to (Sri Werastuti, 2020; Wiredu et al., 2023) sustainable development focuses on how companies can continue to make improvements in the direction of human welfare now and in the future. This means that the company will always carry out development activities with the aim of improving the economy or improving the welfare of the community around the company for a long period of time.

According to (DAROMES et al., 2024; Pattiasina et al., 2022)Green Accounting is the identification, prioritization, qualification and integration of environmental costs incurred by a company in a business decision. Green Accounting management uses

environmental costs incurred by the company and company performance data to help companies make business decisions. The company does this by collecting various data on production costs, waste processing, inventory and environmental performance (Gonzalez & Peña-Vinces, 2023; Kokubu et al., 2023; Marota, 2017). In other words, Green Accounting management is a combined approach that provides data transition from financial accounting data to cost accounting data which aims to reduce environmental impacts and risks that must be faced, increase the company's material efficiency, and reduce the costs of protecting the environment around the company (Sulistiyani & Fachriyah, 2019).

Material flow cost accounting is a management instrument that can increase the use of materials effectively and efficiently so as to reduce production waste (DAROMES et al., 2024; Ulupui et al., 2020). Material flow cost accounting is a tool to reduce costs by reducing waste which can ultimately lead to increased business productivity. The use of Material Flow Cost Accounting (MFCA) aims to reduce excessive energy use by identifying and reducing waste in the production process. This waste causes material loss and increased waste in the production process. Through MFCA, companies can change their manufacturing processes to be more efficient by monitoring the inputs used, the number of final products produced, and the volume of waste produced. Information resulting from MFCA is important for management to evaluate the environmental impact of the production process, improve performance in accordance with company goals, reduce waste, and take appropriate steps to control the environmental impact. Thus, MFCA not only helps in operational efficiency but also in fulfilling corporate social and environmental responsibilities.

2. RESEARCH METHOD

This type of research uses quantitative methods which aim to provide an overview of the company's financial performance. Quantitative research according to (Sugiyono, 2018) is a research method that is based on positivistic (concrete data), research data in the form of numbers that will be measured using statistics as a calculation test tool, related to the problem being studied to produce a conclusion. This research uses secondary data, namely data obtained, processed and presented by other parties or indirectly from the first source (company) in finished form in the form of publications. The data collection method used is the documentation method, namely data collection that is not aimed directly at the research subject, but rather through documents. The sample is a part or number and characteristics of the population (Sugiyono, 2015). The sampling method used in this research was purposive sampling. The criteria for this research sample are: Companies listed on the Indonesia Stock Exchange (BEI) in 2021-2023; Companies that have published annual reports for 2021-2023 consecutively; Companies that have participated in the Performance Rating Assessment Program (PROPER) by the Ministry of Environment and Forestry during 2021-2023. Next, process the data will be done using SPSS application, with classic assumption tests to determine the suitability of the data so that it can proceed to hypothesis testing.

Sustainable Development, The sustainability of a company can be seen from how much profit it generates. An increase in profits shows that the company has greater opportunities to continue developing in the future. This concept is explained in research by (Marota, 2017) who states that Sustainable Development can be measured using the following formula: Sustainable Development = Economic + Social + Environmental + Technological

In this context: The economic dimension in the annual report can be seen from investment, net profit and income; The social dimension in the annual report includes Corporate Social Responsibility costs, salary costs and severance pay costs; The

environmental dimension is reflected in utility costs (such as electricity costs and water costs) and Health, Safety and Security (K3) costs; The technological dimension is seen from Research and Development costs which include costs for quality research and development. By paying attention to these dimensions, companies can understand their contribution to Sustainable Development and manage their resources sustainably.

Green Accounting, According to (Indriastuti & Mutamimah, 2023) green accounting is a contemporary concept in the field of accounting that supports the environmental movement in business entities by identifying, measuring, assessing and disclosing costs related to company activities that affect the environment. This definition shows that green accounting is a part of accounting that focuses on disclosing costs related to company activities that have an impact on the environment (Oktadifa & Widajantie, 2023). (Ulupui et al., 2020)identifies the following dimensions and indicators of environmental accounting disclosure:

Table 1. Dimensions and Indicators of Green Accounting

No	Dimensions	Indicator
1	Contribution of the natural environment, energy, human resources (employees) and society.	1. Implementation of an environmental management system. 2. Energy efficiency efforts, 3. Efforts to reduce emissions, Implementation of Reduce, Reuse, 4. Recycle B3 and non-B3 waste, 5. Water conservation and reducing the burden of water pollution, 6. biodiversity protection, 7. Community development program.
2	Positive economic, social and ecological impacts and negative impact of the company's business activities on the environment nature, energy, employees, and society.	1. Positive impact and company business activities, 2. Negative impact on the company.
3	The company's contribution to solving ecological problems.	1. Water pollution control, 2. air pollution control, 3. B3 waste management 4. controlling sea water pollution, 5. Potential land damage

Material Flow Cost Accounting, Material flow cost accounting is a management tool designed to evaluate the cost of losses resulting from the production of materials, so that companies can make decisions that help in managing their waste. This material flow cost accounting measurement refers to research conducted by (Marota, 2017), the results of which can be presented as follows:

Table 2. Material flow measurements

Variable	Dimensions	Size	Scale
MFCA	Production cost Area Planted Production result	Monetary Units Unit Area Monetary Units	Intervals

3. RESULTS AND DISCUSSIONS

Based on the results of the classical assumption test, multiple regression analysis was carried out in this research. Multiple linear regression analysis is important for

evaluating regression coefficients and their significance, which is necessary for testing hypotheses. The results of multiple linear regression analysis using SPSS version 22 can be seen in the following table:

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Table 3. t test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.382	3.386		-2.476	.017
	Green Accounting	.543	.122	.511	4.455	.000
	Material Flow Cost Accounting	7.293	1.659	.504	4.396	.000

a. Dependent Variable:Sustainable Development

Source: SPSS processed data, 2024.

Based on the table above, it can be seen that the multiple linear regression equation is as follows:

$$SD = \alpha + \beta 1GA + \beta 2KL + € \quad (1)$$

$$SD = 8.382 + 0.543\ GA + 7.293\ MFCA + € \quad (2)$$

Information :
Y = Sustainable Development
α = Constant
β1-2 = Regression Coefficient
X1 = Green Accounting
X2 = Material Flow Cost Accounting
€ = Interference Error (*Error*)

From the results of this equation, the following results can be seen:

The constant (α) of 8.382 shows that if*Green Accounting*(GA) and Material Flow Cost Accounting (MFCA) are assumed to be 0 or have not changed, so Sustainable Development (SD) has increased by 8.382. The Green Accounting (GA) coefficient is 0.543 for every one unit increase in the Green Accounting (GA) variable which increases by 0.543 with the assumption that the other variables remain equal to zero. This means stating that Green Accounting (GA) has a positive effect and can increase SD by 54.3%.

The Material Flow Cost Accounting (MFCA) coefficient is 7.293, indicating that every one unit increase in the Green Accounting (GA) variable increases by 7.293 with the assumption that the other variables remain equal to zero.

The results of the coefficient of determination test can be seen in the table as follows:

Table 4. Coefficient of Determination

Model Summary b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.639a	,409	,384	1.37427

a. Predictors: (Constant), Green Accounting, Material Flow Cost Accounting

b. Dependent Variable: Sustainable Development

Source: SPSS processed data, 2024.

From the table of R Square test results, it shows that the adjusted R Square values for the Green Accounting variables andMaterial Flow Cost Accountingis 0.384 or 38.4% can be explained by the independent variables in the model, while the remaining 61.6% is explained by other variables.

3.1 Discussion

a. The Influence of Green Accounting on Sustainable Development

Based on the legitimacy theory of companies that care about the environment in which they operate so that they can be accepted by society and continue to develop in the future (DAROMES et al., 2024; Loen, 2018; Wiredu et al., 2023), implementing Green Accounting is considered a contribution to Sustainable Development to maintain the company's reputation. This research reveals that Green Accounting has a positive impact on corporate sustainability, in accordance with the findings of (Sri Werastuti, 2020) which highlights the aim of Green Accounting to improve the company's image while meeting the demands of environmental responsibility, gaining investor support, and inspiring consumers to choose green products.

Implementing Green Accounting not only improves the company's public image, but also increases competitiveness with other companies that do not prioritize environmental cost transparency. This means companies that implement Green Accounting tend to attract consumer interest for their green products and gain investor trust to support company capital. Therefore, the greater the costs invested in implementing Green Accounting, the higher the level of corporate sustainability that can be achieved.

The main hypothesis of this research states that Green Accounting has an effect on Sustainable Development, a result that is consistent with previous research by (Indriastuti & Mutamimah, 2023; Oktadifa & Widajantie, 2023; Susanti et al., 2023)which shows the positive impact of Green Accounting on sustainable development.

b. The Influence of Material Flow Cost Accounting on Corporate Sustainability

This research shows that material flow cost accounting has a positive impact on corporate sustainability. As stated by (Marota, 2017),this approach can increase company profits and productivity and reduce negative impacts on the environment, which in turn contributes to the development of company sustainability. By implementing material flow cost accounting, companies can improve their corporate sustainability.

Stakeholder theory also emphasizes that companies must provide benefits to stakeholders and prevent negative environmental impacts from their production activities. The application of material flow cost accounting in the management of production activities helps companies to meet these demands, not only focusing on achieving profits but also on reducing waste. Transparent information about the stages of production that produce waste allows managers to make better decisions to reduce waste, increase the efficiency of manufacturing processes, and generate sustainable competitive advantages (Wiredu et al., 2023).

The research results of (Loen, 2018; Mukwarami & van der Poll, 2024; Wiredu et al., 2023) consistently support that material flow cost accounting plays an important role in improving sustainable development and company sustainability with resource efficiency as the main reinforcement.

4. CONCLUSION

The application of green accounting in companies shows a positive and significant relationship in improving sustainable development. Companies that implement and report costs related to environmental conservation have been proven to be able to

increase sustainable development. Apart from that, material flow cost accounting has also been proven to have a positive effect on sustainable development. Companies that are committed to optimizing production costs with the aim of achieving high profitability are able to improve the welfare of stakeholders while minimizing expenditure costs, which ultimately also increases sustainable development.

However, this study has several limitations. First, the research is only limited to manufacturing companies listed on the Indonesian Stock Exchange. Second, the variables used in this research are still incomplete. Future research could consider the use of moderating or intervention variables. In addition, the measurement of green accounting variables is still subjective, indicating the need for other, more objective, measurement approaches in future research.

The research was conducted for the purpose of obtaining evidence regarding the influence of green accounting, material flow cost accounting, on Sustainable Development. The research results reveal that the application of green accounting can trigger increased Sustainable Development, which means that the better a company's environmental disclosure, the more sustainable development it can increase. The existence of environmental performance by a company can contribute to increasing Sustainable Development. It is also hoped that this research can be used as a basis for companies to pay attention to environmental disclosure and environmental performance as something that is useful in improving Sustainable Development.

REFERENCES

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

Aristantya, S. (2023). Enrichment : Journal of Management Analysis of preparation of financial statements based on. *Enrichment: Journal of Management*, *12*(6).

DAROMES, F. E., Ono, Y., & Kampo, K. (2024). Green Accounting, Material Flow Cost, And Environmental Performance as Predictors of Corporate Sustainability. *Indonesian Journal of Accounting and Governance*, *7*(2), 49–83. https://doi.org/10.36766/ijag.v7i2.398

ENDIANA, I. D. M., DICRIYANI, N. L. G. M., ADIYADNYA, M. S. P., & PUTRA, I. P. M. J. S. (2020). The Effect of Green Accounting on Corporate Sustainability and Financial Performance. *Journal of Asian Finance, Economics and Business*, *7*(12), 731–738. https://doi.org/10.13106/jafeb.2020.vol7.no12.731

Gonzalez, C. C., & Peña-Vinces, J. (2023). A framework for a green accounting system-exploratory study in a developing country context, Colombia. *Environment, Development and Sustainability*, *25*(9), 9517–9541. https://doi.org/10.1007/s10668-022-02445-w

Indriastuti, M., & Mutamimah, M. (2023). Green Accounting and Sustainable Performance of Micro, Small, and Medium Enterprises: The Role of Financial Performance as Mediation. *The Indonesian Journal of Accounting Research*, *26*(02), 249–272. https://doi.org/10.33312/ijar.691

Jeanice, J., & Kim, S. S. (2023). Pengaruh Penerapan ESG Terhadap Nilai Perusahaan di Indonesia. *Owner*, *7*(2), 1646–1653. https://doi.org/10.33395/owner.v7i2.1338

Kokubu, K., Kitada, H., Nishitani, K., & Shinohara, A. (2023). How material flow cost accounting contributes to the SDGs through improving management decision-making. *Journal of Material Cycles and Waste Management*, *25*(5), 2783–2793. https://doi.org/10.1007/s10163-023-01696-7

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

Lubis, I. T., Ningsi, E. H., Aristantya, S., Rizki, I. H., & Kaur, M. (2020). Pengaruh Firm Size, Likuiditas, dan Kepemilikan Manajerial Terhadap Dividen Payout Ratio pada Perusahaan Perbankan yang Terdaftar di Bursa Efek Indonesia (BEI). *Jurnal Ilmiah Simantik*, *4*(2), 232–241.

Marota, R. (2017). Green Concepts and Material Flow Cost Accounting Application for Company Sustainability. *Indonesian Journal of Business and Entrepreneurship*, *3*(1), 43–51. https://doi.org/10.17358/ijbe.3.1.43

Mukwarami, S., & van der Poll, H. M. (2024). Critical environmental management accounting practices influencing service delivery of growing cities in a developing economy: a review and conceptual framework. *Environment Systems and Decisions*, *Hossain 2018*. https://doi.org/10.1007/s10669-023-09960-9

Novi Andari, R., & Fitria, R. (2023). Village Funds Policy and its Impact on Improvement and Autonomy Status of Villages in Indonesia. *KnE Social Sciences*, *2023*(1), 1–30. https://doi.org/10.18502/kss.v8i11.13537

Oktadifa, R. M., & Widajantie, T. D. (2023). Pengaruh Penerapan Green Accounting, Material Flow Cost Accounting, dan Environmental Performance terhadap Profitabilitas Perusahaan. *Al-Kharaj : Jurnal Ekonomi, Keuangan & Bisnis Syariah*, *6*(3), 2896–2909. https://doi.org/10.47467/alkharaj.v6i3.4743

Pattiasina, V., Papua, U. Y., Wati, I., Papua, U. Y., Noch, M. Y., & Papua, U. Y. (2022). *Pengaruh Pengetahuan Perpajakan, Pelayanan Pajak, Sanksi Perpajakan, Dan Sosialisasi Perpajakan Terhadap Kepatuhan Wajib Pajak*. *December*.

Rahman, S. ur, & Nguyen-Viet, B. (2023). Towards sustainable development: Coupling green marketing strategies and consumer perceptions in addressing greenwashing. *Business Strategy and the Environment*, *32*(4), 2420–2433. https://doi.org/10.1002/bse.3256

Rahmaniati, N. P. G., & Ekawati, E. (2024). The role of Indonesian regulators on the effectiveness of ESG implementation in improving firms' non-financial performance. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2023.2293302

Selpiyanti, S., & 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

Senadheera, S. S., Gregory, R., Rinklebe, J., Farrukh, M., Rhee, J. H., & Ok, Y. S. (2022). The development of research on environmental, social, and governance (ESG): A bibliometric analysis. *Sustainable Environment*, *8*(1). https://doi.org/10.1080/27658511.2022.2125869

Sri Werastuti, D. N. (2020). Sustainability Balanced Scorecard and Management Communication in Evaluating A Company's Performance. *Jurnal Ilmiah Akuntansi Dan Bisnis*, *16*(1), 45. https://doi.org/10.24843/jiab.2021.v16.i01.p03

Sugiyono. (2018). Sugiyono Metode Penelitian Kuantitatif Kualitatif. *Metode Penelitian Kuantitatif Kualitatif*.

Sulistiyani, M., & Fachriyah, N. (2019). Pengaruh Penghargaan Finansial, Pengakuan Profesional, Lingkungan Kerja, PertimbanganPasar Kerja, Dan Personalitas TerhadapPemilihan Karir Mahasiswa Akuntansi SebagaiAkuntan Publik(Studi Empiris Pada Mahasiswa S1 AkuntansiKota Malang). *Jurnal Ilmiah Mahasiswa FEB*, *7*(2), 1–19.

Susanti, I. D., Hertati, L., & Putri, A. U. (2023). the Effect of Green Accounting and Environmental Performance on Company Profitability. *Cashflow : Current Advanced Research on Sharia Finance and Economic Worldwide*, *2*(2), 320–331. https://doi.org/10.55047/cashflow.v2i2.552

Ulupui, I. G. K. A., Murdayanti, Y., Marini, A. C., Purwohedi, U., Mardi, & Yanto, H. (2020). Green accounting, material flow cost accounting and environmental performance. *Accounting*, *6*(5), 743–752. https://doi.org/10.5267/j.ac.2020.6.009

Wiredu, I., Osei Agyemang, A., & Agbadzidah, S. Y. (2023). Does green accounting influences ecological sustainability? Evidence from a developing economy. *Cogent Business and Management*, *10*(2). https://doi.org/10.1080/23311975.2023.2240559