JURNAL RISET AKUNTANSI TERPADU
Vol.17 No.1, 2024
Hal. 74-89

Material Flow Cost Accounting to Enhance Sustainable Development: A Green Accounting Perspective

Yusup Maulana
Faculty of Economics and Business, Universitas Kuningan
yspmln.12@gmail.com
Dendi Purnama
Faculty of Economics and Business, Universitas Kuningan
dendi.purnama@uniku.ac.id
Teti Rahmawati
Faculty of Economics and Business, Universitas Kuningan
teti.rahmawati@uniku.ac.id

Abstract

This study examined the impact of material flow cost accounting, corporate social responsibility, and green accounting on sustainable development. The contribution of this research includes (1) adding literature and insight into the impact of the application of material flow cost accounting, corporate social responsibility, and green accounting perspective on sustainability development, (2) contributing ideas for the government to establish policies or regulations to formulate sustainable development plans in the company in the form of mandates by applicable laws and regulations and related laws, (3) Provide input for companies in determining policies related to the implementation of green accounting, material flow cost accounting in supporting sustainable development. The research method uses descriptive and verification methods. The population in this study is coal companies listed on the Indonesia Stock Exchange for the 2016-2020 period, with a total of 26 companies. The final sample obtained as many as 100 observations from 2016-2020. The results found that material flow cost accounting, corporate social responsibility, and green accounting significantly positively affect sustainable development. The implications of this research can create far-reaching positive impacts, helping companies make decisions to prepare for sustainable development.

Keywords: Green Accounting, Material Flow Cost Accounting, Corporate Social Responsibility, Sustainable Development

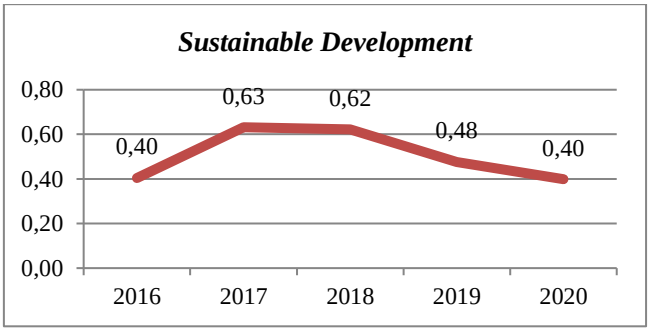
INTRODUCTION

Environmental issues have become important in the international world. Massive human growth and over-exploitation of natural resources lead to persistent disasters such as climate crises. Humans' massive exploitation of natural resources is the cause of ecosystem imbalance. This situation impacts the occurrence of natural disasters in various parts of the world. Environmental quality that has declined over time has increased the attention of the world community that environmental protection aspects are a shared responsibility that cannot be separated from aspects of economic, technological, social, and environmental development. The sustainable development concept includes environmental, economic, and socio-political sustainability (Damayanti & Harti Budi MT, 2023; Gunaratne & Lee, 2020). The

concept of sustainable development indirectly changed the company's paradigm, especially in business activities that initially relied on profit-oriented, then switched to active participation in community welfare and environmental conservation (Frare et al., 2020).

The concept of the sustainable development paradigm is best understood as development ethics, or the moral commitment to how development should be planned and carried out to meet business objectives while considering significant social, technological, environmental, and economic factors. The corporate sustainability management system (CSMS) has five stages: policy development, Planning, Implementation, Communication, and Evaluation (Made et al., 2020). The five stages will be formulated to show indicators of sustainable development for the industry: economic, technological, social, and environmental. Sustainable development is generally an ongoing process to meet the needs of present and future generations (Mufti, 2021). Economic, ecological, social, and environmental indicators are important factors in a company (Loen, 2019).

In their business activities, companies must develop sustainable concepts and environmentally friendly industries that are integrated, comprehensive, and efficient. Referring to the principle of sustainable development, sustainability is important to ensure that the next generation has the resources to protect and meet human needs. Sustainable development is quite a complex concept. This is because sustainable development seeks to combine economic, social, technological, and environmental sides. We know so far that the application of development is only driven by mere economic interests. So, that ultimately leads to the free exploitation of nature. Sustainable development can only be achieved if commitment, realization efforts, and real collaboration are carried out by companies and other parties in economic, technological, social, and environmental aspects. Chart 1 below is the development of sustainable development in coal sub-sector mining companies listed on the Indonesia Stock Exchange from 2016 to 2020, presented as follows:



Source: Processed Secondary Data (2022)

Figure 1. Development of Sustainable Development of Coal Companies

As shown in Chart 1, sustainable development in coal sector mining companies has decreased in the last five years. This can be seen from the percentage value of sustainable development in 2018, which was 62%; in 2019, it decreased to 48%, and in 2020, it was 40%. This contradicts the published statement, (Gazzaway, 2021), which states that 62% of public companies believe that sustainability equals or is even more important than financial success. This was revealed through the results of the International Business Report (IBR) survey. Environmental, social, and governance aspects are competitive advantages for some medium-sized companies. Around 42% of business people emphasize the importance of sustainability because this strategy can increase efficiency and reduce costs, making it

profitable for a company. The report revealed that 79% of medium-sized businesses in Indonesia believe that sustainability is as important as financial success. It was also mentioned that 68% of business people in Indonesia, or the highest from all over the world, have begun to develop sustainability strategies for the company's business activities.

Factors affecting sustainable development according to Loen, (2019b) and Selpiyanti & Fakhroni, (2020). It involves applying environment-based accounting and material flow cost accounting as a management tool for efficient production processes and waste management. Green accounting is a supporting tool that companies can use in accounting. Corporate social responsibility is the company's effort to implement social responsibility programs to balance performance in the economic, social, and environmental fields.

Material Flow Cost Accounting is a management method that helps businesses treat their waste by assessing the cost of losses from the production of materials (Selpiyanti & Fakhroni, 2020). Material flow cost accounting provides the best waste information, allowing company managers to make the right waste management decisions and achieve company sustainability (Leanne & Burritt, 2017) . Accounting of material flow costs related to products and material losses. Research results Abdullah &; Amiruddin,(2020); Rachmawati &; Karim, (2021), concluded that material flow cost accounting positively affects business continuity. This shows that the amount of production costs, production area, and production results or values can increase business continuity. Meanwhile, research was conducted by (Mufti, 2021) The company was identified as experiencing material losses based on the production process analysis using material flow cost accounting.

An attempt has been made to link environmental protection and commercial interests through green accounting (Abdullah & Amiruddin, 2020). Green or environmental costs include all the most obvious costs for measuring uncertainty. Environmental costs are associated with the price of goods, services, systems, or infrastructure needed to support better management decision-making (Hamidi, 2019). Selpiyanti & Fakhroni, (2020) This statement states that, in general, companies that implement green accounting can contribute to improving sustainable development. Research results Marota, (2017) States that the concept of green accounting significantly affects the sustainability dimension. Meanwhile, research was conducted by Abdullah & Amiruddin,(2020) States that green accounting does not increase production costs in improving company sustainability.

Corporate decision-making linked to moral principles and adherence to laws and rulings is known as corporate social responsibility. Corporate social responsibility can achieve goals or results directly or indirectly on the company's income or finances. Therefore, if the company implements its corporate social responsibility program well, it will guarantee business sustainability(Kurnia et al., 2020). Corporate social responsibility through corporate social responsibility programs during the COVID-19 pandemic is very helpful socially and environmentally because it has an impact on strengthening sustainable development (Rahman et al., 2020). Corporate social responsibility arrangements are not firm in the Limited Liability Company Law, which ultimately causes implementation to be unoptimal. As is known, the regulation of corporate social responsibility in Article 1 number 3 junto Article 74 of the Limited Liability Company Law and Law Number 25 of 2007 concerning Capital Investment is unclear. So, implementing environmental social responsibility in the company has only been carried out voluntarily, not as an obligation.

So far, research using sustainable development variables has only been carried out using content analysis of sustainability reporting and company annual reports. However, it differs from the data used in this study because it uses annual report data in the form of

numbers with predetermined indicators and the novelty of the research conducted (Loen, 2019a; Selpiyanti & Fakhroni, 2020). There is a lack of empirical research examining how green accounting, MFCA, and CSR practices directly affect sustainable development indicators, such as environmental impact, social welfare, and economic efficiency. There is a potential gap between companies' awareness of these practices and their implementation and impact on sustainable development. Several studies have highlighted the role of environmental accounting in measuring and reporting the environmental impact of a company's activities. However, empirical research linking this practice to sustainable development remains relatively limited. Research has shown the benefits of MFCA in identifying and managing waste and the efficient use of materials. However, studying how MFCA contributes to sustainable development goals requires further exploration. Many studies have highlighted the importance of CSR in the context of sustainability. However, effective implementation of CSR and its impact on sustainable development can be complex and varied.

Research examining the effect of MFCA, CSR implementation, and green accounting on sustainable development can contribute to filling empirical gaps with clear evidence on how these practices can help or hinder progress toward sustainable development. Produce policy recommendations supported by empirical evidence to strengthen sustainability practices at the corporate and government levels. Provide practical guidance for companies in implementing green accounting, MFCA, and CSR effectively to support sustainable development. Thus, research that deepens these relationships will fill empirical knowledge gaps and provide valuable insights for practitioners, academics, and policymakers in promoting sustainable business practices.

This study aims to determine, analyze, and obtain empirical evidence to test the model of the effect of material flow cost accounting, corporate social responsibility, and green accounting on sustainable development. The contribution of this research includes (1) adding literature and insight into the impact of the application of green accounting concepts, material flow cost accounting, and corporate social responsibility on sustainability development, (2) contributing ideas for the government to establish policies or regulations to formulate sustainable development plans in the company in the form of mandates by applicable laws and regulations and related laws, (3) Provide input for companies in determining policies related to the implementation of green accounting, material flow cost accounting in supporting sustainable development.

THEORETICAL FRAMEWORK AND HYPOTHESIS

Stakeholder Theory

Stakeholder theory is one of the main theories widely used to underlie research on sustainable development. This theory was proposed by Freeman et al., (1984) Stakeholder theory defines stakeholders as groups significantly capable of influencing an organization's success and failure. It describes company managers' response to the existing business environment. Stakeholder theory holds that value is explicitly part of business activities (Finamore et al., 2021). In theory, stakeholders in a company are characterized as a set of relationships that are important functions among individuals or groups that influence or are affected by their business operations (Ascani et al., 2020). These various stakeholders provide resources, influence the business environment, benefit from the company, and influence its efficiency and impact. This can be related to sustainable development in the company, where

with the use of environmental costs in production operations and the use of management tools, in this case, material flow cost accounting, and the application of corporate social and environmental responsibility, the company will have a good relationship with internal and external parties so that the development and improvement of the company's sustainability can be achieved.

Legitimacy Theory

Legitimacy theory explains why companies report on their social and environmental performance (C. Deegan & Gordon, 1996). Reporting is a company's one-way communication channel with its stakeholders. Legitimacy issues drive sustainability, including environmental and social reporting. Legitimacy can encourage corporate social and environmental reporting so that a company can achieve sustainable development. (C. M. Deegan, 2019).

The effect of Material Flow Cost Accounting on sustainable development

Material flow cost accounting is an instrument of a management approach that aims specifically to manage the use of raw materials more effectively and can contribute to reducing waste, emissions, and non-products so that the manufacturing process can be more efficient and meet the targets set by the company. Material flow cost accounting can be used in all industries that use raw materials and energy. Key concepts of material flow cost accounting are based on inputs (materials, energy, water, and other inputs) and outputs (main products or by-products, waste, and emissions) determined in a quantity center. It calculates the material, energy, and system costs incurred for products and material losses (Rachmawati &; Karim, 2021). Material flow cost accounting provides the best waste information, enabling company managers to make informed waste management decisions and achieve company sustainability (Tajelawi &; Garbharran, 2015).

Material flow cost accounting about products and material losses is useful in improving the current accounting approach to two levels, namely the economic and environmental levels. This means more efficient use and management of material flow cost accounting. So, the opportunity to obtain high profits can be fulfilled through effective and efficient production activities to encourage the creation of sustainable development. The statement is supported by research Christ & Burritt, (2017); Marota (2017); Pratiwi & Kusumawardani (2023); Selpiyanti & Fakhroni (2020), states that material flow cost accounting, which is researched using elements of production costs, the area planted, and production results, has a positive and significant effect on increasing sustainable development.

H1: Material flow cost accounting Increase Sustainable Development

The Effect of Green Accounting Implementation on Sustainable Development

Green accounting is a concept the company applies in production activities, prioritizing the effectiveness and efficiency of sustainable use of resources. Because, in concept, green accounting has provided information or ways to minimize energy, control costs, and promote environmentally friendly products. This strategy can show the company's efficiency in various policies and management decisions. The application of the concept of green accounting also gives an overview of the effectiveness of company management. Green accounting is one of the variables used to show the company's sustainability level. Green accounting is a communication medium with the public to convey whether an organization is serious about improving its environmental performance. The purpose of environmental performance

improvement is to propose continuous improvement performance for environmental control (Ningsih &; Rachmawati, 2017).

The stakeholder theory approach is a response of company managers to the existing business environment. In its business activities, the company not only focuses on the owner's welfare but is also obliged to pay attention to the welfare of other parties, such as the community, non-governmental organizations, and other parties who contribute indirectly to the company. This statement is supported by several studies showing that implementing green accounting positively and significantly improves sustainable development (Abdullah & Amiruddin, 2020; Loen, 2019a; May et al., 2023; Ningsih & Rachmawati, 2017; Selpiyanti & Fakhroni, 2020). This means the more effectively green accounting is implemented, the more the company contributes to sustainable development.

H2: The implementation of green accounting Increase sustainable development

The Effect of Corporate Social Responsibility on Sustainable Development

Corporate social responsibility It is an effort planned by the company to carry out corporate social responsibility programs by applicable laws and regulations by prioritizing the achievement of a balance of performance in the economic, social, and environmental fields to support the achievement of various formulations of sustainable development goals. Corporate social responsibility is corporate decision-making associated with ethical values, fulfilling legal rules and decisions, and respecting humans, society, and the environment. Corporate social responsibility includes corporate governance. The company's concern for the environment, workplace conditions and standards for employees, company-community relations, and corporate social investment (Kurnia et al., 2020). Both statements align with legitimacy theory, which states that the actions of an entity must be appropriate or appropriate in some social construction, system of norms, values, and beliefs by identifying stakeholder expectations regarding the business activities carried out. The goal is to understand their expectations, accommodate them, and work to meet those expectations according to available resources. Stakeholder groups, in this case, are customers, shareholders/investors, employees, business partners, media, as well as the public and community.

The statement is in line with the research Disemadi &; Prananingtyas, (2020) This shows that implementing corporate social responsibility carries out the company's responsibility towards social and environmental aspects. The concept of corporate social responsibility in Indonesia has gained legal legitimacy and can be implemented by private and state-owned enterprises. Later, the study demonstrated that with sustainable development, regulation of corporate social responsibility is found in various laws and regulations, namely the 1945 Constitution, as well as in various other sectoral laws, specifically regulating private companies and State-Owned Enterprises. From research Humaira J &; Cupian, (2023); Kustinah, (2022) Social, economic, and environmental variables significantly influence community empowerment. Implementing the corporate social responsibility program will achieve various formulations of sustainable development goals.

H3: Implementasi Corporate social responsibility Increase sustainable development

RESEARCH METHOD

In this study, verification research approaches were employed. Companies in the coal subsector listed on the Indonesia Stock Exchange comprise the study's population. With 26

firm observations annually, the population of this study consists of coal subsector companies listed on the Indonesia Stock Exchange throughout 2016–2020. The study's sample consisted of 20 coal sub-sector mining businesses listed on the Indonesia Stock Exchange between 2016 and 2020, chosen based on certain sample selection criteria. Up to 100 businesses contributed to the final sample.

Table 1 Research sample

No.	Criteria	Number of Samples
1.	Coal sub-sector mining company listed on the Indonesia Stock Exchange in 2016-2020	26
2.	Coal sub-sector companies that do not have complete data for 2016-2020	(6)
	Number of samples	20
	Amount of data in five years (20 x 5)	100

Source: processed secondary data (2022)

The dependent variable in this study is sustainable development. Sustainable development, in general, is a continuous process to meet the needs of present and future generations (Lavrinenko et al., 2019). The independent variables in this study are green accounting, material flow cost accounting, and corporate social responsibility.

Data analysis in this study used a panel data regression analysis model. There are several approaches in panel data analysis, namely Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM. These tests must be carried out as a series of stages to get the best model for data analysis in this research. After the model selection, the data is tested with classical assumption tests to ensure the data is not biased. Analysis tools using the Eviews app. Panel data regression analysis was used in this study with the following regression equation:

$$SDVit = ß_o + ß_1\, MFCA_{it} + ß_2\, GA_{it} + ß_3\, CSR_{it} + \mu_{it}$$

SDV : sustainable development
GA : green accounting
MFCA : material flow cost accounting
CSR : Corporate social responsibility
$ß_o$: koefisien intersep
$ß_1$: koefisien slope untuk variabel implementasi material flow cost accounting
$ß_2$: koefisien slope untuk variabel green accounting
$ß_3$: koefisien slope untuk variabel corporate social responsibility
ɖ : koefisien dummy
µ : koefisien residu (variabel bebas lain di luar model)
I : cross-section
T : time series

Table 2. Operational Variables

No.	Variable	Indikacator
1.	**Sustainable development**	• Economic dimensions: sales, net income, and investment • Technology dimensions: provisioning costs, research and development costs. • Social dimensions: salary costs, allowance costs, and pension costs. • Environmental dimension: waste maintenance costs, occupational health and safety (K3) costs, and other equipment costs. (Marota, 2017)
2.	**Green accounting**	Analysis content: • Score 0 if the company does not disclose green accounting indicators on the annual report. • Score 1 if the company discloses green accounting indicators only with numbers or figures on the annual report. • Score 2 if the company discloses green accounting indicators only by narration on the annual report. • Score 3 if the company discloses green accounting indicators in the annual report as narratives supported by numbers or images. • • Score 4 if the company discloses complete green accounting indicators on the annual report $$\text{GA} = \frac{\text{Number of indicators disclosed}}{\text{Total Indicators}}$$ (Selpiyanti & Fakhroni, 2020)
3.	**Material flow cost accounting.**	$$\text{MFCA} = \frac{\text{Cost of using raw materials} + \text{Cost of using other materials}}{\text{Total cost of production}}$$ (Marota, 2017)
4.	**Corporate social responsibility**	Analysis content: • Score 0 if the company does not disclose corporate social responsibility indicator items in the annual report • Score 1 if the company discloses corporate social responsibility indicator items only with numbers or pictures in the annual report • Score 2 if the company discloses corporate social responsibility indicator items only with narration in the annual report • Score 3 if the company discloses complete corporate social responsibility indicator items in the annual report $$\text{CSRDI} = \frac{\Sigma \text{Xij}}{91}$$ (Global Report Initiative G4, 2013)

RESULT AND DISCUSSION

This study examines the effect of material flow cost accounting, corporate social responsibility, and green accounting on sustainable development. Table 3 below describes the descriptive statistics results.

Table 3 Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev
SDV	0.502400	0.450000	0.910000	0.090000	0.236511
MFCA	0.530700	0.520000	0.870000	0.240000	0.162140
GA	0.500700	0.540000	0.750000	0.100000	0.162321
SDV	0.695500	0.745000	0.980000	0.210000	0.200909

Source: output Eviews 9

Based on the table above regarding descriptive statistics of sustainable development, it can be explained that the average of sustainable development from 2016 to 2020 is 0.502400. The achievement of the total sustainable development target of 0.502400 resulted in 0.502400 total indicators of achieving the sustainable development target. The standard deviation of achieving sustainable development targets is 0.236511. This shows that the deviation from the average data value on achieving sustainable development targets is 0.236511. Green accounting has an average value of 0.500700. The total amount of green accounting of 0.500700 results in 0.500700 companies implementing green accounting. The standard deviation of the application of green accounting is 0.162321. This shows that the deviation from the average value of green accounting implementation is 0.162321. Material flow cost accounting has an average value of 0.530700. The cost of each material used is 0.530700 plus the cost of using other materials, or every 1 rupiah of production cost produces 0.530700 material flow costs. The standard deviation of material flow cost accounting is 0.162140. This shows that the deviation from the average value of the material flow cost accounting data is 0.162140. Corporate social responsibility has an average value of 0.695500. The total number of corporate social responsibility disclosures of 0.695500 results in 0.695500 total corporate social responsibility disclosure items. The standard deviation of corporate social responsibility disclosure is 0.200909. This shows that the deviation from the average corporate social responsibility disclosure data value is 0.200909.

The selected model follows the random effect model. Then, the results of estimation using the random effect model can be made by the following equation:

$$SDV_{it} = 0.424696 + 0.031291MFCA_{it} + 0.042968GA_{it} + 0.055889CSR_{it} + 0.082525_{ADRO} - 0.030690_{ARII} - 0.033200_{BRMS} - 0.079795_{BSSR} - 0.050570_{BUMI} - 0.049742_{BYAN} - 0.004743_{DEWA} + 0.018108_{DOID} + 0.064024_{GEMS} - 0.026454_{HRUM} - 0.002098_{INDY} - 0.014653_{ITMG} - 0.016780_{KKGI} - 0.039364_{MYOH} + 0.017288_{PKPK} - 0.011900_{PTBA} + 0.060879_{PTRO} + 0.040553_{SMMT} + 0.069339_{TOBA} - 0.007275_{UNTR} + \mu$$

The coefficient of implementation of green accounting (0.042968), material flow cost accounting (0.031291), and corporate social responsibility (0.055889) positively affect sustainable development with a constant value of 0.424696. The positive value of the independent variable regression coefficient shows that material flow cost accounting,

corporate social responsibility, and green accounting corporate social responsibility have a positive impact on sustainable development.

Table 4. Random Effect Model Panel Regression Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.424696	0.113673	3.736125	0.0003
MFCA?	0.031291	0.039136	2.799547	0.0425
GA?	0.042968	0.165542	2.259561	0.0358
CSR?	0.055889	0.133633	2.418230	0.0267

Source: output Eviews 9

The effect of material flow cost accounting on sustainable development.

Based on the table above, which tests the material variable flow cost accounting in sustainable development, it can be seen that the result of the calculated statistical value is 2.799547. Since the calculated value of 2.799547 > Table 1.98422, it can be concluded that H0 is rejected and Ha is accepted. The positive influence of material flow cost accounting on sustainable development shows that the more companies apply material flow cost accounting, the higher the company's contribution to realizing sustainable development in coal mining companies listed on the Indonesia Stock Exchange.

Material flow cost accounting is a management approach that aims to manage the efficient use of raw materials more effectively and can contribute to reducing waste, emissions, and non-products so that the manufacturing process can be more efficient and meet the targets set by the company. Stakeholder theory holds the view that value is explicitly part of business activities. Simply put, stakeholder theory is the response of company managers to the existing business environment. Material Flow Cost Accounting (MFCA) is a management tool that evaluates the environmental impact of a company's operations by analyzing the costs associated with the flow of materials through the production process. MFCA is an accounting method that focuses on material flows and the associated costs rather than just the cost of materials. This approach helps organizations to identify areas where materials can be improved and saved, reducing waste and environmental impact.

Material Flow Cost Accounting (MFCA) is a management tool developed to measure material, and energy flows in production processes, identify inefficiencies, and reduce waste. MFCA considers the costs associated with materials not converted into finished products, thereby driving resource efficiency and more sustainable business practices. MFCA assists companies in identifying waste points in the production process. The application of MFCA in various industries shows a significant reduction in production waste and more efficient use of resources. This waste reduction directly contributes to sustainable development by reducing the environmental burden. By mapping material flows in detail, MFCA allows companies to improve the efficiency of using raw materials. Companies implementing MFCA experience an increase in material efficiency of up to 30%, reducing costs and consuming natural resources.

MFCA focuses not only on reducing solid waste but also on reducing greenhouse gas emissions and other pollutants. MFCAs in the manufacturing sector can significantly reduce carbon emissions, support climate change mitigation efforts, and support sustainable development goals. MFCA implementation often spurs companies to develop more innovative and efficient production processes. Companies using MFCA tend to be more proactive in adopting eco-friendly technologies and innovative production processes that

reduce environmental impact and improve sustainability. MFCA provides more comprehensive and accurate data on hidden environmental costs in production. This allows management to make better decisions and supports long-term sustainability strategies. Information from MFCA assists managers in designing more effective strategies for resource management and environmental impact reduction.

Material Flow Cost Accounting (MFCA) significantly affects sustainable development. By identifying and reducing waste, improving resource efficiency, reducing emissions, driving innovation in production processes, and supporting sustainable managerial decisions, MFCA helps companies to operate more efficiently and environmentally friendly. Recent studies have shown that MFCAs provide economic benefits and support broader sustainable development goals. These results align with Tajelawi and Gabharran (2015), who stated that material flow cost accounting provides the best waste information to enable company managers to make the right waste management decisions to achieve company sustainability. This statement is supported by Chang et al (2015), Leanne & Burritt (2017), Marot (2017), and Fakhroni (2020) State that material flow cost accounting, studied using elements of production costs, planting area, and production results, positively and significantly improves sustainable development.

The Effect of Green Accounting on Sustainable Development

Based on the table above, testing green accounting variables on sustainable development produces a calculated statistical value of 2.259561. Since the result of count 2.259561 > table 1.98422, it can be concluded that H0 is rejected and Ha is accepted. Testing on the t-test shows that green accounting positively and significantly affects sustainable development. The positive influence of green accounting on sustainable development shows that the more companies apply the concept of green accounting, the higher the company's contribution to realizing sustainable development in coal mining companies listed on the Indonesia Stock Exchange.

Green accounting is a communication medium with the public to convey whether an organization is serious about improving its environmental performance. Green accounting, or environmental accounting, is an accounting approach that considers environmental costs and benefits in business activities and economic decisions. The aim is to provide more accurate information on the environmental impact of a company's operations, thus supporting more environmentally friendly and sustainable decisions. The implementation of green accounting encourages companies to disclose information related to the environmental impact of their activities transparently. This transparency allows stakeholders, including governments, investors, and the general public, to assess a company's environmental performance. Transparency in environmental reporting increases corporate accountability and motivates them to adopt more sustainable business practices.

In addition, through green accounting, efforts are to integrate environmental costs into financial statements. Companies are more driven to reduce negative impacts on the environment. Green accounting helps companies identify and reduce environmental costs, such as waste reduction and more efficient use of resources. This positively impacts sustainable development by reducing the burden on ecosystems and promoting resource efficiency. The information generated through green accounting provides a clearer picture of environmentally related risks and opportunities. Investors can make better decisions by considering the environmental aspects of their investment portfolios. Companies with good environmental practices tend to have better financial performance in the long run, thus

attracting more sustainable investments. Policymakers can use data obtained from the implementation of green accounting to formulate more effective regulations for environmental protection. Green accounting provides a powerful database for governments to design environmental policies that can push companies toward more sustainable business practices. Companies implementing green accounting can use opportunities to improve operational efficiency and encourage innovation. Reducing emissions and waste reduces environmental costs and can improve production efficiency. Strict environmental regulations can encourage innovation that reduces environmental impact and increases a company's competitiveness.

The implementation of green accounting has a significant influence on sustainable development. Green accounting is important in driving companies and economies towards sustainability by increasing transparency, reducing environmental impact, encouraging sustainable investment, supporting environmental policies, and increasing efficiency and innovation. Studies show that the integration of environmental aspects in accounting is not only beneficial for the environment but also supports long-term economic performance. This statement is supported by research Loen (2019a); Ningsih & Rachmawati, (2017); Selpiyanti & Fakhroni (2020), showed that applying green accounting positively and significantly improves sustainable development. Abdullah and Amiruddin (2020) showed that green accounting as a moderating variable improves company sustainability.

The effect of corporate social responsibility on sustainable development

Based on the table above examining the variables of corporate social responsibility towards sustainable development, it can be seen that the calculation results in the statistical value of 2.308422. Since the calculated value of 2.308422 > Table 1.98422, it can be concluded that H0 is rejected and Ha is accepted. This means that corporate social responsibility has a significant influence on sustainable development. The positive influence of corporate social responsibility on sustainable development shows that the more corporate social responsibility activity programs carried out and reported by the company in the annual report, the higher the company's contribution to realizing sustainable development in coal mining companies.

This is in line with legitimacy theory, which states that the actions of an entity must be appropriate or appropriate in some social construction, system of norms, values, and beliefs by identifying stakeholder expectations regarding the business activities carried out. The goal is to understand their expectations, accommodate them, and work to meet those expectations according to available resources. Stakeholder groups, in this case, are customers, shareholders/investors, employees, business partners, media, as well as the public and community. The concept of corporate social responsibility in Indonesia has gained legal legitimacy to be applied by both private and government-owned companies. Corporate Social Responsibility (CSR) is a company's commitment to contribute to sustainable economic development by working with employees, their families, local communities, and the wider community to improve the quality of life. CSR covers human rights, labor practices, the environment, and anti-corruption. CSR programs often focus on improving the welfare of local communities through various initiatives, such as education, health, and infrastructure development. Companies that are active in CSR programs can improve the quality of life of the surrounding community, which contributes directly to sustainable development by creating healthier and more educated communities.

CSR plays an important role in environmental management by adopting more environmentally friendly business practices. Companies implementing strong CSR policies tend to be more proactive in managing their environmental impacts, such as reducing carbon emissions, waste management, and conservation of natural resources. It directly supports the sustainable development goals. Through CSR activities, companies can build a good reputation and gain trust from the community and other stakeholders. Companies with a good CSR reputation tend to gain greater trust from consumers and investors, which supports long-term business sustainability. CSR implementation can encourage innovation in environmentally and socially friendly products and services. Companies that integrate CSR in their business strategies often find new opportunities for innovation that reduce environmental impact and create added value for the company and society. CSR helps companies identify and manage social and environmental risks affecting their operations. Companies with effective CSR programs can better cope with crises and uncertainties because they have strong relationships with stakeholders and operate more transparently and responsibly. Corporate Social Responsibility (CSR) has a significant influence on sustainable development. By improving people's quality of life, managing natural resources responsibly, increasing public reputation and trust, encouraging innovation, reducing risk, and increasing corporate resilience, CSR helps create a more sustainable business environment. Recent research shows that CSR benefits society and the environment and supports companies' sustainability and competitiveness in the long run.

This statement is in line with the research (Disemadi &; Prananingtyas, 2020). This shows that corporate responsibility towards social and environmental aspects is carried out by carrying out corporate social responsibility (Hillier et al., 2018; Martinez-Conesa et al., 2017; Porter & Kramer, 2019; Shayan et al., 2022; Wang et al., 2016)

CONCLUSIONS

Based on the results of research and discussion that the author has explained comprehensively in the previous chapter, the following conclusions can be drawn: The application of green accounting has a positive and significant effect on sustainable development. Thus, the higher the application of green accounting, the more it will pay full attention to the environment around the company and get positive perceptions from stakeholders towards the company, which in turn is followed by an increase in positive response and an increase in the efficiency of company profits. Cost accounting of material flows positively and significantly influences sustainability development. That is, the higher the company implements corporate social responsibility, the higher the level of sustainable development. Thus, the higher the company applies material flow cost accounting, the more the production efficiency of the company's business activities will increase. Corporate social responsibility has a positive and significant effect on sustainable development. Thus, the higher the corporate social responsibility, the more full attention to the environment around the company and a positive perception from stakeholders towards the company, which in turn is followed by an increase in positive response and an increase in the efficiency of the company's profits.

Limitations in this study include samples that are only used in coal subsector manufacturing companies. The researchers suggest that future studies expand the study sample and add years of observation. In addition, future research may add variables such as financial technology, green finance, and the digital economy.

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