E-ISSN: 2580-1236 P-ISSN: 1693-8224
JKB
JURNAL KEUANGAN DAN BISNIS

JURNAL KEUANGAN DAN BISNIS

Volume 23, Number 2, October 2025

GREEN ACCOUNTING, MATERIAL FLOW COST ACCOUNTING, ECO-EFFICIENCY, AND CORPORATE SOCIAL RESPONSIBILITY ON SUSTAINABLE DEVELOPMENT GOALS DISCLOSURE

Nur Amalina Widya Pangestika[1]
(nuramalinawp@gmail.com)
Dien Noviany Rahmatika[2]
(diennovi@upstegal.ac.id)
Budi Susetyo[3]
(budisetyoups@gmail.com)

[123] Faculty of Economics and Business, Universitas Pancasakti Tegal, Indonesia

Abstract

Purpose: This study examines whether green accounting, material flow cost accounting (MFCA), and eco-efficiency influence Sustainable Development Goals (SDGs) disclosure, and tests corporate social responsibility (CSR) as a moderating variable in these relationships
Design/Methodology/Approach: A quantitative design is employed using a purposive sample of 27 mining subsector companies listed on the Indonesia Stock Exchange (IDX) over 2020–2024 (135 firm-year observations), with moderated regression analysis (MRA) applied to annual and sustainability report data.
Findings: Green accounting and eco-efficiency exhibit significant negative effects on SDGs disclosure, while MFCA shows no effect; CSR strengthens the effects of green accounting and eco-efficiency but does not moderate the MFCA–SDGs link.
Practical Implications: Green accounting should be positioned as a strategic stakeholder communication device rather than mere compliance with programmatic ratings; MFCA needs to be integrated with resource-efficiency governance and environmental cost allocation; and eco-efficiency should be embedded in holistic sustainability strategies aligned with GRI-based SDGs mapping and strengthened CSR policies.
Originality/Value: By focusing on high-impact mining firms, the study clarifies mixed evidence on whether environmental management instruments (green accounting, MFCA, eco-efficiency) translate into broader SDGs disclosure, and identifies CSR's boundary-spanning role as a governance mechanism in emerging markets.

Keywords: Green Accounting; Material Flow Cost Accounting; Eco-Efficiency; SDGs Disclosure; Corporate Social Responsibility

© [Nur Amalina Widya Pangestika]. Published in Jurnal Keuangan dan Bisnis (JKB). Published by LPPM, Universitas Katolik Musi Charitas. This article is published under the Creative Commons Attribution-NonCommercial 4.0 (CC BY-NC 4.0) licence. Anyone may reproduce, distribute, translate, and create derivative works of this article, subject to full attribution to the original publication and authors. The full terms of this licence may be seen at http://creativecommons.org/licences/by/4.0/legalcode

INTRODUCTION

Companies are established to achieve profitability while fulfilling stakeholder expectations that drive business development. Traditionally, many firms considered supplying demanded products and creating employment opportunities as sufficient contributions to society. However, growing public awareness reveals that such contributions are no longer deemed adequate in addressing broader social and environmental responsibilities (Safitri & Saifudin, 2019). This shift emerged alongside the increasing recognition of environmental impacts caused by corporate activities. Consequently, the concept of sustainable development arose as a response to these negative externalities, emphasizing a strategic balance among social, environmental, and economic dimensions.

This balance is embodied in the Sustainable Development Goals (SDGs), which represent a global framework to mitigate the adverse consequences of industrialization while maximizing each nation's potential and resources to enhance the quality of life for both present and future generations (Irhamsyah, 2019). The primary challenge in achieving SDGs lies in integrating social and environmental considerations within economic growth models. In response, various international financial institutions have introduced cooperative programs to accelerate sustainable development implementation. Since the issuance of Presidential Regulation No. 59/2017, Indonesia has reinforced its commitment to the SDGs as a United Nations member state, embedding sustainability principles into national development planning (Arifianti & Widianingsih, 2022).

A closer examination of Indonesia's SDGs performance reveals fluctuating progress influenced by both domestic and global factors.

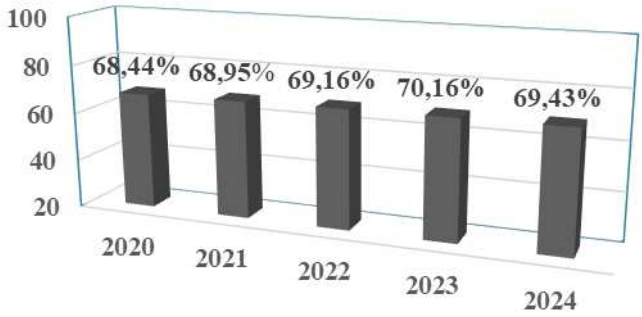

Figure 1. SDGs Index Scores in Indonesia

Source: dashboards.sdgindex.org/rankings, processed data (2025)

Figure 1 illustrates a decline in Indonesia's SDGs achievement rate in 2024, with a score of 69.4 on a 100-point scale, compared to 70.16 in 2023. Consequently, Indonesia's ranking dropped from 75th out of 166 countries to 78th out of 167. The persistent challenge of deforestation remains a major contributor to lower performances in SDG 13 (Climate Action) and SDG 15 (Life on Land). Despite ongoing efforts, issues such as illegal logging, land conversion for plantations, and rapid infrastructure expansion continue to exacerbate deforestation. According to Global Forest Watch (2024), Indonesia loses hundreds of

thousands of hectares of forest each year, resulting in increased carbon emissions, ecosystem degradation, and biodiversity loss factors that intensify the climate crisis and hinder progress toward sustainable development targets.

Several factors are believed to influence SDGs disclosure, one of which is green accounting. Green accounting enables firms to build competitive advantage by fostering positive stakeholder perceptions and enhancing customer loyalty while promoting long-term environmental responsibility over short-term profit orientation (Purnamawati et al., 2018). This approach extends beyond financial gain by incorporating social and ecological costs into business decision-making (Hamidi, 2019).

To evaluate environmental performance more effectively, many companies have implemented Material Flow Cost Accounting (MFCA). This method enhances internal productivity and profitability while simultaneously reducing external environmental impacts, thereby reinforcing corporate sustainability commitments (Loen, 2018). However, Rahmatika et al. (2023) emphasize that MFCA's effectiveness largely depends on a company's readiness to adopt environmentally friendly technologies and the existence of supporting regulations promoting resource efficiency. Without these enabling factors, MFCA's potential to minimize waste and improve production efficiency remains limited.

In parallel, eco-efficiency plays a vital role in achieving sustainability by reducing environmental burdens without compromising productivity. Defined as "creating more value with less environmental impact" (WBCSD, 2000), eco-efficiency underscores the need for efficient resource utilization and emission reduction in economic processes. To yield significant results, environmental management systems must be integrated into broader corporate strategies. Moreover, Corporate Social Responsibility (CSR) programs should move beyond philanthropic initiatives and adopt strategic, goal-oriented frameworks to accelerate SDG progress. For effective transparency, CSR disclosures should align with internationally recognized sustainability standards such as the Global Reporting Initiative (GRI) (Adnyana et al., 2024).

This study addresses a research gap identified in prior literature—a lack of comprehensive examination of CSR's moderating role in the relationship between green accounting, MFCA, and eco-efficiency with SDGs disclosure. By focusing on Indonesia's mining subsector, which faces elevated environmental risks that may impede SDG achievement, this study aims to offer a holistic perspective on the drivers and barriers of sustainability implementation. The results are expected to provide empirical insight and policy implications that support Indonesia's efforts toward achieving inclusive and impactful sustainable development.

LITERATURE REVIEW

Theoretical Foundations

Stakeholder theory, initially introduced by the Stanford Research Institute in 1963 and further developed by Freeman et al. (2021), asserts that business success depends not solely on profit generation but on creating value for all stakeholders. This approach highlights corporate responsibility toward investors, employees, customers, communities, and the environment. By

addressing stakeholder expectations, organizations enhance long-term sustainability and social credibility (Purnamawati et al., 2018).

Complementing this, legitimacy theory proposed by Dowling and Pfeffer (1975) posits that corporate survival relies on maintaining congruence between organizational actions and societal norms (Anjasari & Andriati, 2016). When companies fail to meet societal expectations, legitimacy erodes, negatively affecting reputation and stakeholder trust. Both theories collectively justify why firms engage in sustainability and SDGs disclosure to maintain legitimacy, respond to stakeholder pressure, and secure long-term value creation (Wati et al., 2024; Wiguna et al., 2023).

Sustainable Development Goals (SDGs) as a Global Framework

The Sustainable Development Goals (SDGs), adopted by the United Nations, represent a universal agenda to balance social welfare, economic progress, and environmental preservation (Irhamsyah, 2019). The SDGs emphasize meeting current needs without compromising future generations' capacity to meet theirs (Damayanti & Yanti, 2023).

Farida (2022) classifies SDG information into four interdependent dimensions economic, social, environmental, and technological each forming a foundation for assessing sustainable development. As noted by Arifianti and Widianingsih (2022), corporate disclosure of SDG-related activities enhances financial transparency and demonstrates commitment to global sustainability efforts. Therefore, SDGs disclosure serves as both a communication mechanism to stakeholders and a strategic reporting tool for measuring corporate contributions to national and global sustainability priorities (Apriliyani & Novita, 2019).

Environmental Accounting Practices and SDGs Disclosure

Green accounting integrates environmental and financial data to evaluate ecological impacts alongside profitability (Hamidi, 2019). The approach enhances compliance with sustainability frameworks such as POJK 51/2017 and the Global Reporting Initiative (GRI), aligning with SDG 16 and SDG 17 (Loen, 2019). Multiple studies confirm its positive relationship with sustainability performance. Selpiyanti and Fakhroni (2020) as well as Hindriani et al. (2024) find that green accounting significantly improves SDG disclosure and environmental accountability. Lestari and Alim (2021) demonstrate that transparent environmental cost reporting supports long-term corporate growth, while Arum and Farida (2023) emphasize its role in enhancing environmental indicators within the SDG framework.

Dura and Suharsono (2022) identify green accounting as a tangible reflection of corporate environmental responsibility, whereas Abdullah and Amiruddin (2020) and Rachmawati and Karim (2021) highlight its ability to enhance operational efficiency when integrated with MFCA practices. Overall, green accounting functions not merely as a financial mechanism but as a strategic management tool for sustainable value creation (Adnyana et al., 2024).

H1: Green Accounting positively influences Sustainable Development Goals (SDGs) disclosure.

Material Flow Cost Accounting (MFCA) is an environmental management tool that traces physical material flows to identify inefficiencies, waste, and emissions (Loen, 2018). Its application enhances both cost savings and sustainability performance, supporting SDG 12 (Responsible Consumption and Production). May et al. (2023) confirm that MFCA improves production efficiency while reducing ecological impacts.

Abdullah and Amiruddin (2020) and Lestari and Alim (2021) reveal that MFCA promotes sustainable business performance by optimizing resource use and improving transparency. Similarly, Kokubu and Kitada (2015) argue that MFCA enhances decision-making efficiency, while Kokubu et al. (2023) show that it directly contributes to SDG achievement by improving managerial awareness of waste reduction and energy optimization.

Selpiyanti and Fakhroni (2020), Rahmatika et al. (2023), and Hindriani et al. (2024) further validate that MFCA strengthens corporate legitimacy through environmentally responsible reporting. Thus, MFCA operationalizes stakeholder and legitimacy theories by combining cost efficiency, sustainability transparency, and accountability to society.

H2: Material Flow Cost Accounting positively influences Sustainable Development Goals (SDGs) disclosure.

Eco-efficiency refers to "creating more value with less environmental impact" (WBCSD, 2000). It represents a balance between economic productivity and ecological responsibility. Research by Wang et al. (2022) and Sun et al. (2024) highlights eco-efficiency's contribution to reducing emissions and resource consumption, strengthening SDG implementation.

Vargas et al. (2024) demonstrate that eco-efficiency drives sustainable resource management and competitiveness, while Yang et al. (2024) show its applicability in industrial sustainability transitions in developing economies. Basuki (2015) emphasizes eco-efficiency as an essential element of sustainability strategy, encompassing waste reduction and CSR alignment.

Recent studies by Lukia and Lestari (2024) and Jamil and Rasheed (2024) confirm that eco-efficiency supports the triple bottom line economic, social, and environmental performance strengthening the foundation for SDGs disclosure.

H3: Eco-Efficiency positively influences Sustainable Development Goals (SDGs) disclosure.

Corporate Social Responsibility (CSR) as a Moderating Variable

CSR provides a strategic platform to amplify the impact of green accounting on SDG disclosures. Green accounting identifies environmental costs, while CSR communicates these initiatives to stakeholders transparently (Nabila & Arinta, 2021). Dhar et al. (2022) demonstrate that CSR integration enhances stakeholder trust and corporate accountability. Mohammadi and Saeidi (2022) confirm that CSR disclosures reduce investor uncertainty, while Wiguna et al. (2023) and Wati et al. (2024) show that CSR strengthens the alignment between green accounting and SDG outcomes. Therefore, CSR serves as a catalyst that connects environmental accounting data to societal impact, reinforcing sustainability transparency and stakeholder legitimacy (Adnyana et al., 2024).

H4: Corporate Social Responsibility strengthens the positive relationship between Green Accounting and SDGs Disclosure

Integrating MFCA within CSR policies reflects the company's commitment to balancing efficiency with ethical responsibility (Lestari & Alim, 2021; Farida, 2022). CSR motivates the adoption of MFCA by emphasizing environmental and social impacts beyond financial gains (Kokubu & Kitada, 2015). Kokubu et al. (2023) provide empirical evidence that CSR integration enhances MFCA's effectiveness in achieving sustainability targets. Through CSR, firms gain legitimacy and strengthen stakeholder support for resource optimization initiatives. Thus, CSR and MFCA work synergistically: CSR drives sustainability culture, while MFCA provides measurable operational results.

H5: Corporate Social Responsibility strengthens the positive relationship between Material Flow Cost Accounting and SDGs Disclosure.

Eco-efficiency focuses on minimizing waste, energy, and material consumption, but its effectiveness increases when aligned with CSR values (Niu et al., 2024). CSR ensures that eco-efficiency initiatives extend beyond internal cost savings to deliver social and environmental benefits. Astuti et al. (2024) highlight CSR's role in enhancing corporate environmental awareness and encouraging the adoption of eco-efficient processes. Alfy et al. (2020) identify CSR as a mechanism that embeds eco-efficiency into long-term business strategies, particularly through carbon emission reduction and sustainable innovation. Adnyana et al. (2024) further emphasize that CSR must evolve into a strategic tool for advancing SDG progress. The combined implementation of CSR and eco-efficiency thus accelerates sustainability transformation and strengthens corporate competitiveness in global markets.

H6: Corporate Social Responsibility strengthens the positive relationship between Eco-Efficiency and SDGs Disclosure.

Conceptual Framework

This study proposes a conceptual model that integrates environmental accounting practices green accounting, Material Flow Cost Accounting (MFCA), and eco-efficiency as the primary determinants influencing the level of Sustainable Development Goals (SDGs) disclosure. These three practices collectively represent a company's internal mechanism for embedding sustainability into operational and financial processes. Green accounting ensures the integration of environmental costs into financial reporting, MFCA identifies material inefficiencies and promotes resource optimization, while eco-efficiency focuses on achieving higher productivity with lower environmental impact. Together, they reflect an organizational effort to balance profitability, transparency, and ecological responsibility in line with sustainable development principles.

The model further positions Corporate Social Responsibility (CSR) as a moderating variable that strengthens the relationship between environmental accounting practices and SDGs disclosure. CSR provides a social and ethical dimension that enhances the translation of sustainability actions into transparent reporting, aligning corporate performance with

stakeholder expectations and social legitimacy. In this framework, the synergy between environmental management systems and CSR is expected to improve the quality and credibility of SDGs disclosure, thereby reinforcing the firm's contribution to sustainable value creation and the achievement of global sustainability objectives.

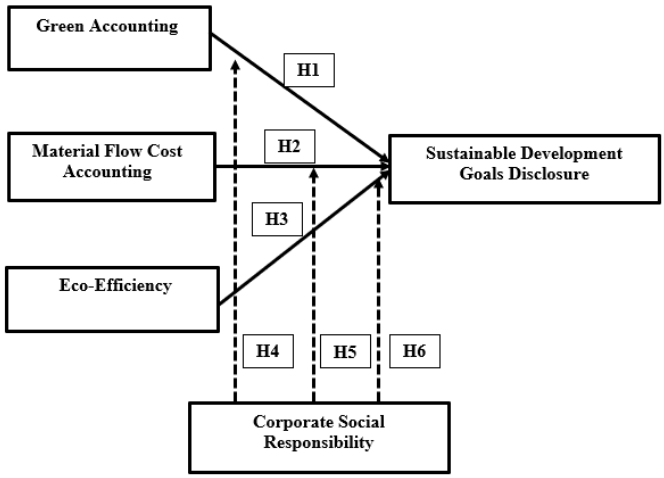

Figure 2. Conceptual Framework
Source: Processed Data (2025)

RESEARCH METHODS

Research Design and Approach

This study adopts a quantitative explanatory research design aimed at empirically examining the influence of *Green Accounting*, *Material Flow Cost Accounting (MFCA)*, and *Eco-Efficiency* on *Sustainable Development Goals (SDGs) Disclosure*, with *Corporate Social Responsibility (CSR)* as a moderating variable. The quantitative approach enables the establishment of measurable causal relationships among variables through statistical analysis, ensuring objectivity and replicability. This design is aligned with prior empirical studies emphasizing quantitative evaluation of sustainability accounting practices (Loen, 2019; Rahmatika et al., 2023; Wati et al., 2024).

Population and Sampling Technique

The population of this research consists of 64 mining subsector companies listed on the Indonesia Stock Exchange (IDX) during the period 2020–2024. This sector was chosen because it has a high level of environmental exposure and plays a critical role in Indonesia's sustainable development performance. The sampling process applied a purposive sampling technique, selecting companies that met specific inclusion criteria. The selected companies were required to remain continuously listed on the IDX throughout the observation period, to have published both annual and sustainability reports consistently, and to provide complete and verifiable financial, environmental, and CSR information. After applying these criteria, 27 companies qualified as the research sample, resulting in 135 firm-year observations (27 companies over five years). This sample size is considered adequate to ensure statistical reliability and analytical robustness in panel data regression analysis.

Data and Sources

The study uses secondary data derived from publicly available annual reports and sustainability reports, accessed through company websites and the official IDX database. Data triangulation was conducted by cross-verifying with external sources, including the Global Reporting Initiative (GRI) database, to ensure accuracy and consistency. Each variable was operationalized based on established theoretical and empirical frameworks, ensuring construct validity and analytical reliability.

Operational Definition of Variables

All variables were defined and measured based on relevant literature and reporting standards, as summarized below.

Table 1. Operational Definition and Measurement of Variables

Variable	Definition & Indicators	Measurement	Sources
SDGs Disclosure (Y)	Extent of company disclosure related to SDG indicators across economic, social, environmental, and governance dimensions.	SDGs Disclosure Index (0–1) based on GRI & SDG Compass indicators.	Arifianti & Widianingsih (2022); Damayanti & Yanti (2023)
Green Accounting (X_1)	Integration of environmental costs and impacts into financial reporting to reflect sustainability commitment.	Green Accounting Index using POJK 51/2017 and GRI 305–306 disclosure items.	Selpiyanti & Fakhroni (2020); Loen (2019)
MFCA (X_2)	Accounting system that traces material flow and cost efficiency to reduce waste and improve productivity.	MFCA Implementation Score based on waste identification, cost efficiency, and recycling.	Kokubu & Kitada (2015); May et al. (2023)
Eco-Efficiency (X_3)	Company's ability to maximize productivity with minimal environmental impact through efficient use of resources.	Ratio-based indicators (energy intensity, emission reduction, waste minimization).	WBCSD (2000); Wang et al. (2022)
CSR (Z)	Corporate responsibility integrating social, environmental, and ethical considerations into operations.	CSR Disclosure Index covering environment, community, employee, and product dimensions.	Nabila & Arinta (2021); Dhar et al. (2022); Wati et al. (2024)

Source: Compiled from various sources (2025)

Data Analysis Procedure

Data analysis in this study was conducted using SPSS version 22.0 and Microsoft Excel to examine both the direct and moderating effects among variables. The analytical process began with a descriptive statistical analysis that summarized the data distribution and provided

an overview of central tendency, including the mean, minimum, maximum, and standard deviation of each variable. This stage aimed to understand the general characteristics of the dataset before proceeding to inferential testing.

To ensure that the regression model met the assumptions of classical linear analysis, a series of classical assumption tests were performed. The Kolmogorov–Smirnov test was used to examine the normality of residuals, while Variance Inflation Factor (VIF) and tolerance values were analyzed to detect any potential multicollinearity among predictor variables. The Durbin–Watson test was applied to identify the presence of autocorrelation in the residuals, and the Glejser test was used to confirm the absence of heteroscedasticity, ensuring homogeneity of variance across the dataset. All assumptions were verified before conducting the main regression analysis to guarantee that the model results were statistically valid and reliable.

The study employed Moderated Regression Analysis (MRA) to test the hypothesized relationships among variables and to evaluate the moderating role of Corporate Social Responsibility (CSR). The regression equation used in this study was formulated as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 Z + \beta_5 (X_1 Z) + \beta_6 (X_2 Z) + \beta_7 (X_3 Z) + \varepsilon$$

Where Yrepresents SDGs disclosure, X_1, X_2, and X_3represent green accounting, Material Flow Cost Accounting (MFCA), and eco-efficiency, respectively, while Zdenotes CSR as the moderating variable. This analytical technique allowed the identification of both the direct influence of each independent variable and the interaction effects between CSR and the independent variables.

Model evaluation was carried out through several diagnostic tests. The coefficient of determination (R^2) was used to assess the explanatory power of the model, the F-test determined the overall goodness-of-fit, and the t-test measured the individual significance of each predictor. The interpretation of the moderating effects was further supported by examining the interaction terms and plotting them to visualize whether CSR strengthened or weakened the relationships between the independent and dependent variables.

To ensure the accuracy and robustness of findings, construct validity was established by aligning all variable measurements with recognized frameworks, including the Global Reporting Initiative (GRI) Standards, POJK 51/2017, and the SDG Compass Guidelines. Reliability was maintained by applying consistent coding procedures during content analysis and validating the results through independent cross-checking by two researchers. As the data were obtained from publicly accessible company reports, all research procedures complied with ethical standards of academic research. The analysis was conducted with rigor, transparency, and integrity to ensure that the conclusions drawn reflect objective and evidence-based insights into corporate sustainability performance.

RESULT

The empirical findings of this study were obtained through several analytical procedures, including descriptive analysis, classical assumption testing, and moderated regression analysis. All stages were performed using SPSS version 22.0 and Microsoft Excel to ensure analytical accuracy and consistency. The following sections present the results in a

sequential and interpretive manner to provide a comprehensive understanding of the data analysis outcomes.

The first step was to conduct a descriptive statistical analysis to provide an overview of the characteristics of each variable observed in this study. The results of the descriptive analysis are summarized in the following table.

Table 2. Descriptive Statistical Analysis

Variable	N	Minimum	Maximum	Mean	Std. Deviation
SDGs Disclosure	135	0.06	1.00	0.71	0.20
Green Accounting	135	3.00	5.00	3.76	0.75
Material Flow Cost Accounting	135	0.08	9.37	0.91	0.77
Eco-Efficiency	135	0.00	1.00	0.94	0.22
Corporate Social Responsibility	135	0.17	0.82	0.59	0.20

Source: Processed Data (2025)

The results in Table 2 indicate that all variables exhibit mean values greater than their respective standard deviations, suggesting that the data are of good quality and relatively stable. SDGs disclosure shows a mean of 0.71, reflecting that mining companies in Indonesia generally provide a moderate to high level of sustainability reporting. Meanwhile, green accounting and eco-efficiency display moderate variability, indicating that environmental initiatives are unevenly implemented across the sampled firms.

Before proceeding to regression analysis, a series of classical assumption tests were conducted to ensure the reliability and validity of the regression model. The results of these diagnostic tests are presented in the following table.

Table 3. Classical Assumption Tests Summary

Test Type	Method	Decision Rule	Result	Conclusion
Normality	Kolmogorov–Smirnov	Sig. > 0.05	0.200	Data are normally distributed
Multicollinearity	VIF < 10 and Tolerance > 0.1	VIF (1.003–1.375)	No multicollinearity detected	
Autocorrelation	dL < DW < 4–dU	DW = 1.272	No autocorrelation present	
Heteroscedasticity	Sig. > 0.05	All > 0.05	No heteroscedasticity	

Source: Processed Data (2025)

All diagnostic test results presented in Table 3 meet the required criteria, confirming that the dataset fulfills the classical assumptions of normality, independence, and homoscedasticity. Therefore, the regression model can be considered statistically appropriate for further analysis.

Following the verification of model assumptions, a moderated regression analysis (MRA) was conducted to examine both the direct and moderating effects of green accounting, Material Flow Cost Accounting (MFCA), and eco-efficiency on the disclosure of Sustainable Development Goals (SDGs), with Corporate Social Responsibility (CSR) serving as the moderating variable. The results of the MRA are summarized below.

Table 4. Moderated Regression Analysis

Variable	B	Std. Error	Beta	t	Sig.	Decision
(Constant)	0.634	0.024	—	26.784	0.000	—
Green Accounting	-0.027	0.011	-0.158	-2.534	0.012	Significant (–)
Material Flow Cost Accounting	-0.028	0.021	-0.172	-1.381	0.170	Not significant
Eco-Efficiency	-0.167	0.022	-0.292	-7.566	0.000	Significant (–)
Green Accounting × Corporate Social Responsibility	0.118	0.014	0.941	8.561	0.000	Significant (+)
Material Flow Cost Accounting × Corporate Social Responsibility	0.013	0.027	0.062	0.469	0.640	Not significant
Eco-Efficiency × Corporate Social Responsibility	0.118	0.045	0.212	2.636	0.009	Significant (+)

Source: Processed Data (2025)

The regression results show that green accounting and eco-efficiency have significant negative effects on SDGs disclosure, while MFCA does not exhibit a significant influence. However, CSR significantly moderates the relationships between green accounting and eco-efficiency with SDGs disclosure, suggesting that companies with stronger CSR engagement are better able to translate environmental and efficiency initiatives into improved sustainability reporting performance.

The explanatory power and overall fit of the model were then evaluated using the coefficient of determination and F-test, as shown below.

Table 5. Model Summary and Feasibility Test

Model	R	R Square	Adjusted R Square	F	Sig.
Regression	0.968	0.937	0.934	8.428	0.000

Source: Processed Data (2025)

As shown in Table 5, the coefficient of determination ($R^2 = 0.937$) indicates that 93.7% of the variation in SDGs disclosure is explained by the variables of green accounting, MFCA,

eco-efficiency, and CSR, including their interaction effects. The F-test result (Sig. = 0.000) confirms that the model is statistically significant and suitable for explaining the relationship among the variables.

To further interpret the findings, hypothesis testing was carried out to assess the direction and strength of each relationship, as summarized in the following table.

Table 6. Summary of Hypothesis Testing

Hypothesis	Relationship Tested	Result	Conclusion
H1	Green Accounting → SDGs Disclosure	Sig. 0.012	Significant (negative)
H2	MFCA → SDGs Disclosure	Sig. 0.170	Not significant
H3	Eco-Efficiency → SDGs Disclosure	Sig. 0.000	Significant (negative)
H4	Green Accounting × CSR → SDGs Disclosure	Sig. 0.000	Supported
H5	MFCA × CSR → SDGs Disclosure	Sig. 0.640	Not supported
H6	Eco-Efficiency × CSR → SDGs Disclosure	Sig. 0.009	Supported

Source: Processed Data (2025)

The hypothesis testing results reveal that green accounting and eco-efficiency independently exert negative effects on SDGs disclosure, indicating potential resource constraints or implementation inefficiencies in environmental accounting practices. However, the significant moderating effect of CSR demonstrates its strategic role in enhancing sustainability transparency. Specifically, CSR transforms eco-efficiency and green accounting practices from internal management tools into externally visible commitments that strengthen corporate legitimacy and stakeholder trust.

Overall, the regression results and hypothesis testing indicate that CSR plays a critical role in linking environmental performance with transparent sustainability disclosure, underscoring its importance in achieving the Sustainable Development Goals within environmentally sensitive industries such as mining.

DISCUSSION

The findings of this study provide important insights into how environmental accounting mechanisms, efficiency practices, and social responsibility interact to influence the disclosure of Sustainable Development Goals (SDGs) among mining companies in Indonesia. Overall, the results suggest that while some sustainability-oriented practices may not immediately translate into greater disclosure, the moderating role of Corporate Social

Responsibility (CSR) serves as a critical bridge connecting internal environmental management with external sustainability communication.

The negative effect of green accounting on SDGs disclosure indicates that environmental cost recognition and ecological reporting are still perceived as compliance-driven rather than value-creating initiatives. Companies may face increased costs and operational complexity when adopting green accounting, especially in environmentally sensitive sectors such as mining. This finding contrasts with Loen (2019) and Dura and Suharsono (2022), who reported a positive relationship between green accounting and sustainability disclosure, but aligns with Hamidi (2019), who argued that the early stages of green accounting implementation often lead to disclosure constraints due to limited expertise and cost burdens. From the perspective of legitimacy theory (Dowling & Pfeffer, 1975), this suggests that mining firms are still struggling to align their environmental accounting practices with societal expectations. Their disclosure decisions appear to be strategic attempts to maintain legitimacy while minimizing reputational and financial risks.

The non-significant relationship between Material Flow Cost Accounting (MFCA) and SDGs disclosure further reinforces this interpretation. Although MFCA theoretically enhances production efficiency and environmental performance (Loen, 2018; Kokubu & Kitada, 2015), its operational benefits may not be immediately reflected in external sustainability reporting. The lack of significant association implies that MFCA adoption in the mining industry remains primarily an internal management tool rather than a communication instrument. This result aligns with the findings of May et al. (2023), who observed that the impact of MFCA depends heavily on organizational commitment, resource availability, and top management support. In other words, the system's effectiveness is contingent upon how deeply it is integrated into corporate sustainability strategies.

In contrast, the negative but significant effect of eco-efficiency on SDGs disclosure reveals a nuanced dynamic. Eco-efficiency aims to achieve "more with less," optimizing resource use while reducing environmental impact (WBCSD, 2000). However, in developing contexts such as Indonesia, firms that prioritize operational efficiency may reduce voluntary disclosures if such transparency exposes inefficiencies or inconsistencies in environmental performance. This finding is consistent with the argument of Wang et al. (2022) and Yang et al. (2024), who highlight that eco-efficiency outcomes often precede full disclosure, especially when firms are still consolidating internal sustainability metrics. Under stakeholder theory (Freeman et al., 2021), this situation reflects a pragmatic approach where companies prioritize internal efficiency to satisfy key stakeholders (e.g., investors, regulators) before engaging in broader public transparency.

The moderating role of Corporate Social Responsibility (CSR) offers an important counterbalance to these negative trends. CSR significantly strengthens the influence of green accounting and eco-efficiency on SDGs disclosure, implying that socially responsible firms are more capable of transforming internal environmental performance into credible sustainability narratives. This finding supports the studies of Mohammadi and Saeidi (2022), Dhar et al. (2022), and Wati et al. (2024), who emphasize that CSR acts as an integrative mechanism aligning economic, social, and environmental objectives. In the context of the mining sector, CSR initiatives such as community development, environmental restoration, and transparent

sustainability reporting serve as legitimacy-enhancing tools that bridge the gap between internal performance improvements and external disclosure obligations.

Interestingly, CSR does not moderate the relationship between MFCA and SDGs disclosure. This suggests that while CSR can amplify the communicative dimension of accounting and efficiency practices, it may not yet be capable of institutionalizing technical management tools like MFCA within sustainability reporting frameworks. As noted by Kokubu et al. (2023), MFCA's success depends on operational integration rather than symbolic social engagement. Therefore, CSR's moderating role may be more influential in relational and narrative aspects of disclosure rather than in process-based efficiency mechanisms.

Overall, these findings provide empirical support for the combined application of stakeholder theory and legitimacy theory in explaining corporate sustainability behavior. Mining companies appear to use disclosure strategically to manage legitimacy and stakeholder perceptions rather than as a direct reflection of internal sustainability performance. CSR emerges as a key legitimizing force that transforms compliance-oriented practices into broader accountability efforts. The high explanatory power of the model ($R^2 = 0.937$) also underscores that the interaction among these variables is not coincidental but rather systemic, reflecting an evolving paradigm of corporate sustainability in emerging economies.

From a practical standpoint, the results emphasize the need for companies to move beyond symbolic CSR and compliance-based reporting. Integrating CSR into operational frameworks such as green accounting and eco-efficiency can help firms not only improve transparency but also achieve genuine progress toward the SDGs. Regulators and policymakers are encouraged to provide stronger incentives and standardized reporting frameworks that promote substantive, rather than declarative, sustainability disclosure. Finally, continuous capacity-building programs for environmental accounting and sustainability reporting professionals are essential to ensure that sustainability efforts in high-impact industries like mining can meaningfully contribute to national and global development goals.

CONCLUSIONS AND RECOMMENDATIONS

This study investigated the influence of green accounting, Material Flow Cost Accounting (MFCA), and eco-efficiency on the disclosure of Sustainable Development Goals (SDGs), with Corporate Social Responsibility (CSR) as a moderating variable, using data from 27 mining companies listed on the Indonesia Stock Exchange between 2020 and 2024. The empirical results provide several key conclusions.

First, both green accounting and eco-efficiency were found to have a significant negative effect on SDGs disclosure. This outcome suggests that while these practices enhance internal environmental management, they may initially impose higher operational and reporting costs, leading to conservative disclosure behaviors. In other words, mining companies appear to prioritize internal process improvement over public transparency when adopting environmental accounting and efficiency initiatives.

Second, MFCA does not have a significant influence on SDGs disclosure, indicating that this management tool remains primarily operational and has yet to evolve into a formalized disclosure mechanism. The limited integration of MFCA into sustainability reporting frameworks may explain this weak relationship.

Third, CSR plays a pivotal moderating role in strengthening the positive influence of green accounting and eco-efficiency on SDGs disclosure. This demonstrates that CSR acts as a bridge between internal performance and external accountability, enabling companies to communicate sustainability achievements more effectively and build stakeholder trust. However, CSR does not moderate the relationship between MFCA and SDGs disclosure, implying that social responsibility initiatives alone are insufficient to institutionalize efficiency-based management systems within reporting structures.

Collectively, these findings reinforce the complementary perspectives of stakeholder theory and legitimacy theory. Mining companies disclose sustainability information not only to comply with regulations but also to maintain legitimacy and fulfill stakeholder expectations. CSR emerges as a legitimizing mechanism that strengthens the link between environmental management efforts and public accountability, while highlighting the evolving maturity of sustainability practices in Indonesia's high-impact sectors.

The results of this study provide several important recommendations for strengthening sustainability disclosure practices among mining companies in Indonesia. The integration of Corporate Social Responsibility (CSR) into environmental and operational strategies should be prioritized as a central pillar of corporate sustainability. Rather than being treated as a peripheral activity or public relations instrument, CSR must be embedded within the implementation of green accounting and eco-efficiency to ensure that environmental performance is directly translated into measurable contributions to the Sustainable Development Goals (SDGs). Strengthening this integration will not only enhance transparency but also reinforce corporate legitimacy and stakeholder trust.

Regulatory authorities such as the Financial Services Authority (OJK) and the Ministry of Environment and Forestry are encouraged to enhance the effectiveness of existing policies, particularly POJK 51/2017, by providing clearer reporting frameworks and consistent enforcement mechanisms. Establishing standardized disclosure indicators aligned with the Global Reporting Initiative (GRI) Standards and the SDG Compass Guidelines will help companies reduce ambiguity in sustainability reporting and improve comparability across sectors. Additionally, offering fiscal or reputational incentives for companies that demonstrate exemplary sustainability disclosure can further motivate corporate participation in sustainable development efforts.

Capacity building in the field of environmental accounting and sustainability management is also urgently needed. Continuous professional development programs and inter-institutional collaborations between universities, industry associations, and government agencies should be implemented to increase technical competence and awareness regarding the strategic value of sustainability disclosure. Empowering corporate managers and accountants with a deeper understanding of green accounting, Material Flow Cost Accounting (MFCA), and eco-efficiency will help transform sustainability reporting from a compliance obligation into a strategic management tool.

Furthermore, companies should begin leveraging digital technologies to improve the quality, accuracy, and accessibility of sustainability information. The use of integrated reporting systems, sustainability dashboards, and data analytics platforms can streamline data collection and verification processes, thereby improving transparency and reducing the cost of sustainability reporting. These technologies can also facilitate real-time monitoring of

environmental performance, enabling companies to make more responsive and data-driven sustainability decisions.

Finally, future research is encouraged to expand the analytical framework by incorporating additional variables such as environmental innovation, governance mechanisms, and firm size to obtain a more comprehensive understanding of the determinants of SDGs disclosure. Longitudinal and cross-sectoral studies could also provide valuable insights into how sustainability disclosure evolves over time and across industries, particularly in emerging economies where institutional frameworks are still developing.

Through these recommendations, it is expected that the mining industry and other environmentally intensive sectors in Indonesia can transition toward a more transparent, accountable, and sustainable corporate culture—one that not only complies with regulatory requirements but also contributes substantively to global sustainability objectives.

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

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

Alfy, A. El, Palaschuk, N., El-Bassiouny, D., Wilson, J., & Weber, O. (2020). Scoping The Evolution Of Corporate Social Responsibility (CSR) Research In The Sustainable Development Goals (SDGs) Era. *Sustainability (Switzerland)*, *12*(14), 1–21. Https://Doi.Org/10.3390/Su12145544

Anjasari, S. P., & Andriati, H. N. (2016). Pengaruh Tata Kelola Perusahaan Dan Kinerja Lingkungan Terhadap Nilai Perusahaan. *Jurnal Akuntansi Dan Keuangan Daerah*, *11*(2), 52–59. Https://Doi.Org/10.52062/Jakd.V11i2.63

Apriliyani, W., & Novita, N. (2019). Implementation Of Csr Programs Toward Achievement Of The Sdgs Target. *Accounting Research Journal Of Sutaatmadja (Accruals)*, *3*(1), 13–31. Https://Doi.Org/10.35310/Accruals.V3i1.37

Arifianti, N. P., & Widianingsih, L. P. (2022). Kualitas Pengungkapan Sustainable Development Goals (Sdgs) Dan Kinerja Keuangan. *Akuntansi Dewantara*, *6*(3), 68–78. Https://Doi.Org/10.30738/Ad.V6i3.12463

Arum, L. S., & 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), 1–14. Https://Doi.Org/10.32477/Jkb.V31i2.711

Astuti, T., Magdalena, M., Mandagie, Y. R., & Irawan, T. (2024). A Relationship Assessment Between Environmental Practices, Corporate Value, And Csr In Sustainability Context. *Jurnal Economia*, *20*(3), 466–487. Https://Doi.Org/10.21831/Economia.V20i1.71341

Basuki, B. (2015). Eco-Efficiency And Sustainable Development As Efforts To Produce Environmentally Friendly Product: An Exploratory Case Study. *Issues In Social And Environmental Accounting*, *9*(3), 199–218. Http://Dx.Doi.Org/10.22164/Isea.V9i3.105

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

Dhar, B. K., Sarkar, S. M., & Ayittey, F. K. (2022). Impact Of Social Responsibility Disclosure Between Implementation Of Green Accounting And Sustainable Development: A Study On Heavily Polluting Companies In Bangladesh. *Corporate Social Responsibility And Environmental Management*, *29*(1), 71–78. Https://Doi.Org/10.1002/Csr.2174

Dura, J., & Suharsono, R. S. (2022). Application Green Accounting To Sustainable Development Improve Financial Performance Study In Green Industry. *Jurnal Akuntansi*, *26*(2), 192–212. Https://Doi.Org/10.24912/Ja.V26i2.893

Farida, A. L. (2022). Pengujian Kinerja Keuangan: Sustainable Development Goals Sebagai Intervening Di Bursa Efek Indonesia. *Fair Value: Jurnal Ilmiah Akuntansi Dan Keuangan*, *4*(10), 4790–4796. Https://Doi.Org/10.32670/Fairvalue.V4i10.1650

Freeman, R. E., Dmytriyev, S. D., & Phillips, R. A. (2021). Stakeholder Theory And The Resource-Based View Of The Firm. *Journal Of Management*, *47*(7), 1757–1770. Https://Doi.Org/10.1177/0149206321993576

Global Forest Watch. (2024). *Discover He World's Forests Through Data*. Https://Www.Globalforestwatch.Org/

Hamidi, H. (2019). Analisis Penerapan Green Accounting Terhadap Kinerja Keuangan Perusahaan. *Equilibiria*, *6*(2), 23–36. Https://Doi.Org/10.4324/9781315561103-15

Hindriani, R., Siregar, D. K., Idayu, R., & Husni, M. (2024). Penerapan Green Accounting Dan Material Flow Cost Accounting Terhadap Sustainable Development. *Jurnal Revenur Jurnal Akuntansi*, *4*(2), 845–854. Https://Doi.Org/10.46306/Rev.V4i2.365

Irhamsyah, F. (2019). Sustainable Development Goals (Sdgs) Dan Dampaknya Bagi Ketahanan Nasional. *Jurnal Lemhannas Ri*, *7*(2), 45–54. Https://Doi.Org/10.55960/Jlri.V7i2.71

Jamil, M. N., & Rasheed, A. (2024). Dynamic Effect Of External Finance In Achieving Eco-Efficiency And Sustainable Development Goals. *Journal Of Economic Impact*, *6*(2), 115–124. Https://Doi.Org/10.52223/Econimpact.2024.6201

Kokubu, K., & Kitada, H. (2015). Material Flow Cost Accounting And Existing Management Perspectives. *Journal Of Cleaner Production*, *108*, 1279–1288. Https://Doi.Org/Https://Doi.Org/10.1016/J.Jclepro.2014.08.037

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

Lestari, W., & Alim, M. (2021). Pengaruh Green Accounting, Material Flow Cost Accounting (Mfca) Terhadap Sustainable Development. *Jurnal Digital Akuntansi (Judika)*, *2*(2), 59–67. Http://Ojs.Itb-Ad.Ac.Id/Index.Php/Judika/Article/View/1952%0a

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

Loen, M. (2019). Pengaruh Penerapan Green Accounting Dan Material Flow Cost Accounting (Mfca) Terhadap Sustainable Development Dengan Resource Efficiency Sebagai Pemoderasi. *Jurnal Akuntansi Dan Bisnis Krisnadwipayana*, *6*(3), 14–25. Https://Doi.Org/10.35137/Jabk.V6i3.327

Lukia, F. L., & Lestari, D. I. (2024). The Influence Of Eco-Efficiency And Implementation Of Green Accounting On Achievement Of Sustainable Development (Case Study Of Consumer Goods Industrial Sector Companies Listed On The Indonesian Stock Exchange Period 2018-2022). *Costing: Journal Of Economic, Business And Accounting*, *7*(4). Https://Doi.Org/Https://Doi.Org/10.31539/Costing.V7i4.9128

May, S. P., Zamzam, I., Syahdan, R., & Zainuddin, Z. (2023). Pengaruh Implementasi Green Accounting, Material Flow Cost Accounting Dan Environmental Performance Terhadap Sustainable Development. *Owner*, *7*(3), 2506–2517. Https://Doi.Org/10.33395/Owner.V7i3.1586

Mohammadi, S., & Saeidi, H. (2022). Corporate Social Responsibility And Financial Accounting Concepts: Evidence From An Emerging Market. *Sustainability Accounting, Management And Policy Journal*, *13*(3), 740–764. Https://Doi.Org/10.1108/Sampj-10-2019-0364

Nabila, R., & Arinta, Y. N. (2021). Green Accounting For Sustainable Development: Case Study Of Indonesia Manufacturing Sector. *Akuntansi Dewantara*, *5*(1). Https://Doi.Org/10.26460/Ad.V5i1.9147

Niu, Z., Yan, C., & Tan, F. (2024). Green Innovation And Eco-Efficiency: Interaction Between Society And Environment Of Sustainable Development Demonstration Belt In China. *Environmental Technology And Innovation*, *34*. Https://Doi.Org/10.1016/J.Eti.2024.103620

Purnamawati, I. G. A., Yuniarta, G. A., & Diatmika, I. P. G. (2018). Green Accounting: A Management Strategy And Corporate Social Responsibility Implementation. *International Journal Of Community Service Learning*, *2*(2), 149–156. Https://Doi.Org/10.23887/Ijcsl.V2i2.14198

Rachmawati, W., & Karim, A. (2021). Pengaruh Green Accounting Terhadap Mfca Dalam Meningkatkan Keberlangsungan Usaha Serta Resource Efficiency Sebagai Variabel Moderating (Studi Kasus Pada Perusahaan Peraih Penghargaan Industri Hijau Yang Listing Di Jii). *Jurnal Ilmiah Manajemen Ubhara*, *3*(1), 33. Https://Doi.Org/10.31599/Jmu.V3i1.811

Rahmatika, D. N., Muttaqin, I., Firmansyah, F., & Rofiqoh, H. A. (2023). Assessing The Influence Of Green Accounting, Material Flow Cost Accounting, And Firm Size On Company Sustainability Performance. *Journal Of Economics, Finance And Management Studies*, *06*(11), 5555–5562. Https://Doi.Org/10.47191/Jefms/V6-I11-32

Safitri, M., & Saifudin, S. (2019). Implikasi Karakteristik Perusahaan Dan Good Corporate Governance Terhadap Pengungkapan Sustainability Report. *Jurnal Bingkai Ekonomi*, *4*(1), 13–25.

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

Sun, R., Ye, X., Li, Q., & Scott, N. (2024). Assessing The Eco-Efficiency Of Cruise Tourism At The National Level: Determinants, Challenges, And Opportunities For Sustainable Development. *Ecological Indicators*, *160*(March). Https://Doi.Org/10.1016/J.Ecolind.2024.111768

Vargas, S. L., Pensado-Leglise, M. Del R., Rosano-Peña, C., & Marques-Serrano, A. L. (2024). Socio-Eco-Efficiency In Agroforestry Production Systems: A Systematic Review. *Sustainability (Switzerland)*, *16*(19), 1–22. Https://Doi.Org/10.3390/Su16198589

Wang, G., Shi, R., Mi, L., & Hu, J. (2022). Agricultural Eco-Efficiency: Challenges And Progress. *Sustainability (Switzerland)*, *14*(3). Https://Doi.Org/10.3390/Su14031051

Wati, Y., Chandra, T., Irman, M., & Rahman, S. (2024). Green Accounting, Corporate Governance, Sustainable Development: The Moderating Effect Of Corporate Social Responsibility. *The Indonesian Journal Of Accounting Research*, *27*(2), 213–242. Https://Doi.Org/10.33312/Ijar.786

Wiguna, M., Hardi, H., Hariyani, E., & Safitri, D. (2023). Implementasi Green Accounting Dan Internal Corporate Governance Strength, Terhadap Sustainable Development: Csr Sebagai Variabel Moderasi. *Jurnal Akuntansi Keuangan Dan Bisnis*, *16*(2), 383–391.

Https://Doi.Org/10.35143/Jakb.V16i2.5931

World Business Council For Sustainable Development (WBCSD). (2000). Eco-Efficiency Learning Module. In *Five Winds International*. Https://Www.Wbcsd.Org/Projects/Education/Resources/Eco-Efficiency-Learning-Module

Yang, L., Chen, S., Chiu, Y., Chang, T., & Wang, Y. (2024). Reassessment Of Industrial Eco-Efficiency In China Under The Sustainable Development Goals: A Meta Two-Stage Parallel Entropy Dynamic Ddf-Dea Model. *Journal Of Cleaner Production*, *447*. Https://Doi.Org/10.1016/J.Jclepro.2024.141275