

Impact of Sustainability Reporting on Firm Value with Audit Quality as Moderator: Coal Companies

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ABSTRACT

This study examines the impact of sustainability reporting on firm value in coal mining companies in Indonesia and investigates the moderating role of audit quality in this relationship. Rooted in agency theory, this study addresses the issue of information asymmetry between managers and shareholders, especially in environmentally sensitive industries. This study uses a quantitative approach using sustainability reporting as the independent variable, firm value as the dependent variable, and audit quality as the moderator variable. The study classifies sustainability reporting as non-experimental with time series and cross-sectional data classification. The research sample consists of 11 coal mining companies listed on the Indonesia Stock Exchange for the years 2020-2023. Using panel data from 2020-2023 and applying regression analysis, this study finds that sustainability reporting significantly increases firm value. In addition, audit quality strengthens this relationship, indicating that credible audits increase stakeholders' trust in disclosed Environmental, Social, and Governance information. These findings highlight that transparent reporting and reliable assurance mechanisms play an important role in improving firm valuation. This article contributes to the literature by emphasizing the interaction between non-financial disclosure and corporate monitoring in emerging markets.

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Keywords: Audit Credibility, Audit Quality, Coal Company, Firm Value, Sustainability Reporting.

ABSTRAK

Penelitian ini mengkaji dampak pelaporan keberlanjutan terhadap nilai perusahaan pada perusahaan pertambangan batu bara di Indonesia dan menginvestigasi peran moderasi kualitas audit dalam hubungan ini. Berakar pada teori keagenan, penelitian ini membahas masalah asimetri informasi antara manajer dan pemegang saham, terutam di industry yang sensitif terhadap lingkungan. Penelitian ini menggunakan pendekatan kuantitatif dengan menggunakan pelaporan keberlanjutan sebagai variabel independen, nilai perusahaan sebagai variabel dependen, dan kualitas audit sebagai variabel moderator. Penelitian tersebut mengklasifikasikan pelaporan keberlanjutan sebagai non-eksperimental dengan deret waktu dan klasifikasi data cross-sectional. Sampel penelitian terdiri dari 11 perusahaan tambang batubara yang tercatat di Bursa Efek Indonesia untuk tahun 2020-2023. Dengan menggunakan data panel dari tahun 2020-2023 dan menerapkan analisis regresi, penelitian ini menemukan bahwa pelaporan berkelanjutan secara signifikan meningkatkan nilai perusahaan. Selain itu, kualitas audit memperkuat hubungan ini, menunjukkan bahwa audit yang kredibel meningkatkan kepercayaan pemangku kepentingan terhadap informasi Lingkungan, Sosial dan Tata kelola yang diungkapkan. Temuan ini menyoroti bahwa pelaporan yang transparan dan mekanisme jaminan yang dapat diandalkan memainkan peran penting dalam meningkatkan penilaian perusahaan.

Kata kunci: Kredibilitas Audit, Kualitas Audit, Perusahaan Batubara, Nilai Perusahaan, Pelaporan Keberlanjutan

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INTRODUCTION

The Indonesian coal mining sector stands as a pivotal contributor to the nation's economy, yet it faces increasing scrutiny due to environmental concerns and sustainability challenges. In response, companies are adopting sustainability reporting practices to demonstrate their commitment to Environmental, Social, and Governance (ESG) criteria (Khatri & Kjærland, 2023). However, the mere publication of sustainability reports may not suffice, the credibility and reliability of these disclosures are paramount. Audit quality plays a crucial role in enhancing the trustworthiness of sustainability reports, thereby influencing their impact on firm value (Zahid et al., 2022).

The significance of sustainability reporting in the mining sector is underscored by increasing global and local emphasis on ESG factors (Fikru et al., 2024). In Indonesia, the coal mining industry, while economically vital, has been associated with environmental degradation and social issues. As stakeholders demand greater transparency, companies are compelled to disclose their sustainability efforts (Sulemana et al., 2025). However, without high-quality audits, these disclosures may lack credibility, potentially leading to greenwashing and eroding stakeholder trust (Sundarasan et al., 2024; Sneideriene & Legenzova, 2025). Therefore, understanding how sustainability reporting, when coupled with robust audit quality, affects firm value is crucial for investors, regulators, and corporate managers.

In the Indonesia context, recent research has started to investigate the connection between sustainability reporting firm value. For instance, Suhartini et al. (2024) found a significant positive impact of sustainability reporting on firm value among Indonesian mining companies. Similarly, Syakur and Khomsiyah (2025) observed that companies adhering to the Global Reporting Initiative (GRI) G4 standards and implementing green accounting practices experienced enhanced firm value. These findings align with global research indicating that transparent ESG disclosures can improve investor perceptions and firm valuation.

Furthermore, the role of audit quality as a moderating variable has been highlighted in recent literature. Suranta et al. (2025) demonstrated that high audit quality strengthens the positive relationship between ESG scores and firm value, suggesting that credible audits enhance the reliability of sustainability disclosures. Similarly, studies from Egypt and Nigeria have reported that robust audit practices increase investor confidence and firm valuation by reducing information asymmetry and agency costs (Ogoun & Perelayefa, 2020).

While existing research provides valuable insights, there is a paucity of studies examining the combined effect of sustainability reporting and audit quality on firm value within Indonesian coal mining sector. By examining the moderating effect of adding quality and empirically assessing the direct relationship between sustainability reporting and firm value, this study seeks to close this gap. By focusing on this specific industry and context, the study offers nuanced insights that can inform policy-making, corporate governance, and investment strategies in Indonesia's mining sector.

This study examines the effect of sustainability reporting on firm value in Indonesian coal mining companies, with audit quality as a moderating variable. As Environmental, Social, And Governance (ESG) issues gain greater importance in global capital markets, particularly in environmentally intensive sectors such as coal mining, sustainability reporting has become an essential tool for enhancing transparency and investor confidence. However, in emerging economies like Indonesia, the effectiveness of sustainability reporting in enhancing firm value remains underexplored, especially when audit assurance is not consistently present. Drawing on agency theory, this research hypothesizes reports on sustainability have a positive effect on firm value and that audit quality strengthens this relationship.

Using a quantitative approach, the study analyzes panel data from publicly listed Indonesian coal mining firms between 2020 and 2023. Sustainability reporting is measured using Global Reporting Initiative (GRI) Standards 2016, firm value is proxied

by Tobin's Q, and audit quality is assessed based on auditor type (Big Four vs. non-Big Four). The methodology includes panel regression and moderation analysis using interaction terms. The findings are expected to provide empirical evidence on the significance of sustainability reporting and audit quality in enhancing firm value, thereby contributing to the broader discourse on corporate sustainability and governance.

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

The Nexus Between Sustainability Reporting and Firm Value

This study applies agency theory (Jensen & Meckling, 1976) to examine how sustainability reporting and audit quality affect firm value. Sustainability reporting reduces agency problems by increasing transparency (Zhou et al., 2024; Mohammad & Wasiuzzaman, 2021; Primacintya & Kusuma, 2025). Audit quality enhances credibility, reinforcing the benefits of disclosure (El-Deeb et al., 2023; Zahid et al., 2024). Managers may act in self-interest, harming shareholders (Al-Shaer, 2020; Fajariwati et al., 2021; Ahmad et al., 2023). Transparent ESG disclosures lower agency costs (Li et al., 2018; Fuadah et al., 2022), but their effectiveness depends on audit quality (Shakhatreh et al., 2020; Qiao et al., 2023; Vaihekoski & Yahya, 2025).

Sustainability Reporting is the forms of corporate accountability in economic, environmental, and social aspects (Ramadana et al., 2023; Butar-Butar, et al., 2024; Itan et al., 2024; Juliana & Sembiring, 2025). Sustainability reporting, encompassing Environmental, Social, and Governance (ESG) disclosures, has garnered significant attention as companies seek to demonstrate their commitment to responsible practices (Chopra et al., 2024; Khamisu et al., 2024; Tamasiga et al., 2024). Meanwhile, the company value is the market value of common shares divided by the book value of total assets (Itan & Angellina, 2023; Regina et al., 2024; Itan et al., 2025; Nirwansyah et al., 2025). In the Indonesian coal mining sector, such disclosures are particularly crucial due to the industry's environmental impact and regulatory scrutiny.

Recent studies show mixed results on sustainability reporting's impact on firm value. Suhartini et al. (2024) and Suranta et al. (2025) found positive effects, while Cahyani and Suhartini (2023) reported no direct impact, suggesting other factors may be needed to enhance firm value.

H1: Sustainability reporting has positive effect on the firm value.

Sustainability Reporting, Firm Value, and Audit Quality

Audit quality is the auditor's expertise and independence in finding and disclosing material misstatements in financial statements (Butar-Butar et al., 2024). Audit quality serves as a critical mechanism to mitigate agency costs by reducing information asymmetry between management and stakeholders (Bawuah, 2024; Magri & Marchini, 2024; Manoel et al., 2025). In the context of sustainability reporting, high-quality audits can enhance the credibility of ESG disclosures, thereby influencing firm value.

Zahid et al. (2022) and El-Deeb et al. (2023) demonstrated that audit quality moderates the relationship between ESG scores and firm value, emphasizing the role of credible audits in enhancing the impact of sustainability reporting. Additionally, Alprijatna and Muhyarsyah (2023) examined the effect of good corporate governance and audit quality on the quality of financial statements in Indonesian mining companies, highlighting the importance of audit quality in ensuring accurate and reliable financial reporting (Nejad et al., 2024; Novatiani et al., 2024; Senan, 2024).

The findings described above are consistent with agency theory, which explains the relationship between principals (such as shareholders) and agents (such as company managers), where conflicting interests and information asymmetry often arise. According to agency theory, mechanisms like independent audits are essential to monitor managerial actions and ensure that they act in the best interest of shareholders (Nguyen et al., 2020; Al-Faryan, 2024). In this context, audit quality plays a pivotal role by providing assurance

that the information disclosed by management especially in sustainability reports is accurate, complete, and free from material misstatements.

H2: Audit quality moderates the influence of sustainability reporting on the firm value.

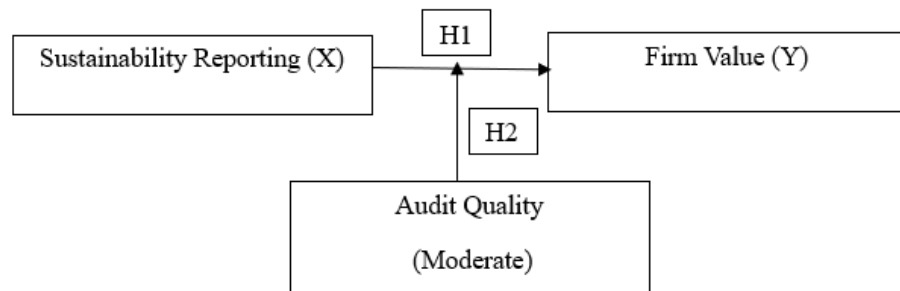


Figure 1. Research Framework

Figure 1 illustrates a framework that shows the relationship between variables in the study. Sustainability Reporting (X) acts as an independent variable that is considered to influence other variables, while Firm Value (Y) is a dependent variable that is influenced by Sustainability Reporting. In the middle, Audit Quality (Moderate) acts as a moderator variable that moderates the relationship between the two variables. This relationship is illustrated by two hypotheses: H1 shows the direct effect of Sustainability Reporting on Firm Value, indicated by the direct arrow, while H2 indicates that Audit Quality modifies or strengthens the relationship between Sustainability Reporting and Firm Value, indicated by the arrow passing through Audit Quality. Overall, this framework proposes that Sustainability Reporting has an effect on Firm Value, with the level of Audit Quality being able to influence the strength or direction of the effect.

RESEARCH METHOD

This study uses a quantitative approach using a non-experimental design with time series and cross-sectional data classification utilizing panel data. The research sample consists of 11 coal mining companies listed on the Indonesia Stock Exchange for the years 2020-2023. Due to the Covid-19 pandemic and the increasing use of coal to generate energy, this time frame was chosen. The data sources are the official website of the Indonesia Stock Exchange (idx.co.id) and the company's website. This study initially considered 89 coal mining companies with 356 observations, but after removing incomplete data of 78 companies (312 observations), only 11 companies remained with 44 observations used as the final data in the analysis. Sustainability reporting is measured using the Sustainability Report Disclosure Index (SRDI) as a proxy, which is 1 (one) if information is available while 0 (zero) if information is not available. There are 89 components in the economic, environmental, and social aspects, and the assessment is based on the 2016 GRI Standards. After completing the item assessment, the total items are disclosed and divided into all items to obtain each company's score. While the audit quality uses a dummy, which is 1 (one) if the company is audited by Big 4 and 0 (zero) otherwise.

Moderate Regression Analysis (MRA) uses 3 (three) types of variables and measurement tools in this study. Tobin's Q represents the value of the company; a measure used to determine the value of the company from an estimate the value in the market above each dollar invested. Sustainability reporting is a general description of the economic, social, and environmental practices of an organization. This study examines the effect of sustainability reporting (independent variable) on company value (dependent variable), with audit quality as a moderating variable, using panel data for enhanced accuracy. Data was processed using EViews version 13. To determine the appropriate regression model, three models were tested: Common Effect Model (CEM), Fixed Effect

Model (FEM), and Random Effect Model (REM). Model selection was based on three tests. First, the Chow Test compared CEM and FEM to check for individual effects; the result indicated FEM was not significantly better. Then, the Hausman Test compared FEM and REM; a non-significant result supported REM. Lastly, the Lagrange Multiplier (LM) Test compared REM and CEM, and results showed no strong reason to prefer REM. Based on these tests, the Common Effect Model (CEM) was chosen as the best fit, assuming uniformity across entities and time. This model was then used in the Moderated Regression Analysis (MRA), which examined the influence of independent variables, moderating variables, and their interaction on the dependent variable. The sample was selected using purposive sampling to ensure relevance to the research objectives. Therefore, the model developed is as follows:

$$\text{Firm value} = \alpha + \beta_1 \text{SRit} + \beta_2 \text{AQit} + \beta_3 \text{SRit} * \text{AQit} + \varepsilon_{it}$$

Information: α is constant; β_1 - β_3 are regression coefficient; SRit Sustainability Reporting; AQit is Audit Quality; SRit* AQit is interaction variable between sustainability reporting and audit quality; ε is error terms.

RESULTS

Table 1 presents descriptive statistics for three main variables: Firm Value, Sustainability Reporting, and Audit Quality from 44 observations. The mean of Firm Value is 0.914, with a median of 0.675, indicating that the distribution is slightly skewed to the right (skewness = 3.966), meaning that there are some companies with firm values much higher than the average. The high kurtosis (18.322) and the highly significant Jarque-Bera value ($p = 0.000$) indicate a heavy-tailed and non-normal distribution containing many extreme outliers. Sustainability Reporting (SRDI) shows a mean of 0.681 with a median of 0.683, negative skewness (-1.344), and kurtosis of 6.865, also non-normal (significant JB), indicating a distribution that is skewed to high values with a slightly narrowed spread around the mean. Meanwhile, Audit Quality, with an average value of 0.705 and a median of 1.0, shows many observations distributed at the maximum value (1), with a skewness of -0.897 and a kurtosis of 1.804, and a JB value = 8.518 ($p = 0.014$), indicating a slightly non-normal distribution, but approaching a bimodal distribution between Big 4 and non-audited companies. Overall, the JB results confirm that the normality assumption is not met, so further analysis should consider robust standard errors or data transformation.

Table 1. Descriptive Test Result

Analysis	Firm Value	Sustainability Reporting	Audit Quality
Mean	0.913762	0.681457	0.704545
Median	0.675433	0.682540	1.000000
Maximum	7.129860	1.000000	1.000000
Minimum	0.082570	0.000000	0.000000
Std. Dev	1.286474	0.174297	0.461522
Skewness	3.966002	-1.343950	-0.896644
Kurtosis	18.32181	6.864689	1.803970
Jarque-Bera	545.7366	40.62781	8.518342
Probability	0.000000	0.000000	0.014134
Sum	40.20553	29.98413	31.00000
Sum Sq. Dev	71.16562	1.306323	9.159091
Observation	44	44	44

This means that the descriptive analysis of the company's value shows a minimum value of 0.08257, where this value is the firm value of PT Bumi Resource (BUMI). Meanwhile, the maximum company value of 7.19286 is owned by PT ABM Investama (ABMM) in 2021. The minimum value of sustainability reporting is 0.000, implying no sustainability reports were published, which is very common in 2020 among companies. Meanwhile, the maximum value of sustainability reporting is 1,000 belonging to PT Indo

Tambangraya Megah (ITMG) in 2023. Audit quality reveals that the minimum value in this study is 0,000 which indicates that the report is not audited by Big 4. The maximum value for audit quality is 1,000, which means that the financial statements are audited by Big 4.

Table 2 represents the results of Moderated Regression Analysis (MRA) which shows that all variables significantly affect firm value (p less than 0.050). Notably, sustainability reporting negatively impacts firm value. However, the interaction between sustainability reporting and audit quality positively affects firm value, with a coefficient of 0.226 and a significance level of 0.005, confirming the moderating role of audit quality.

The estimation results show that the constant (C) of 0.78639 is statistically significant (t = 3.79, p = 0.0375), indicating the average value of firm value when all other variables are zero. The coefficient for Sustainability Reporting (SR) is 0.20167, with t ≈ 1.998 and p = 0.0007, indicating that a one-unit increase in SRDI score significantly increases Tobin's Q by an average of 0.20 units, supporting H1. The coefficient for Audit Quality (AQ) is negative, namely -0.2102 (t = -3.44; p = 0.0468), indicating that on net Big4 audits appear to reduce firm value, but this significance needs to be interpreted carefully because it may be caused by other variables contained. The SR×AQ interaction of 0.2656 (t = 3.59; p = 0.0051) is significantly positive, confirming that the positive effect of sustainability reporting on firm value increases when the company is audited by Big4, supporting H2. In other words, although the role of Big4 audit itself has a negative effect, when combined with ESG reporting, its contribution becomes positive and strengthens the relationship between SR and firm value. Methodologically, p-value <0.05 for most coefficients indicates strong empirical evidence for the existence of main effects and interaction effects in this moderation regression model.

Table 2. MRA Statistical Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.78639	2.6104	3.7918	0.0375
SR	0.20167	2.7504	1.9983	0.0007
AQ	-0.2102	3.866	-3.4415	0.0468
SR*AQ	0.2656	4.0519	3.5857	0.0051

Based on the table MRA Statistical Test Result above, the moderation equation of this research is as follows:

$$Firm\ value = 0,78639 + 0,20167SRit - 0,2102AQit + 0,2656SRit * AQit$$

Based on table 2, it can also be seen that the result of this study indicates audit quality plays a role in strengthening the relationship between sustainability reporting on the firm value. The result of this study that indicated stakeholders believe that companies audited by Big 4 are free of significant misstatements, promoting, and strengthening their trust in these firms to invest more.

Table 3. Coefficient of Determination Test

Model	Value
R-squared	0.3333
Adjusted R-squared	0.3726
S.E. of regression	0.5361
Sum squared resid	10.444
Log likelihood	-25.481
F-statistic	4.358
Prob (F-statistic)	0.0101

The next test carried out is the coefficient of determination test. Table 3 shows that the model shows an R squared of 0.3333, which means that about 33.3% of the variation in Firm Value is explained by the variables Sustainability Reporting, Audit Quality, and their interactions indicating a moderate strength in the relationship of the variables.

Adjusted R squared (0.3726) The adjusted R-squared of 0.3726 indicates that the variables used affect 37.26 percent of the firm value, with the remaining 62.74 percent influenced by other variables. Standard Error of Regression = 0.5361 indicates the average deviation of the model prediction from the actual data, with a total residual value of 10.444, which is quite small and indicates the consistency of the model. Log-likelihood = -25.481 is the value used in model selection; the higher (less negative) the value, the better the model fit although its interpretation is more appropriate when compared to other models. Finally, F statistic = 4.358 with Prob = 0.0101 is significant at the 5% level, indicating that collectively the independent variables and moderators can explain the variability of Firm Value better than the null model without predictors. Overall, although the model is able to explain some of the variability of Firm Value significantly, there is still 67% of unexplained variation, so researchers can consider additional variables for further analysis.

DISCUSSION

The relationship between sustainability reporting and firm value is dynamic and shaped by multiple theoretical frameworks, notably agency theory. This study finds that sustainability reporting has a significant positive effect on the firm value of coal mining companies in Indonesia. These findings support previous research suggesting that transparent disclosure of Environmental, Social, And Governance (ESG) information strengthens corporate reputation and investor trust, thereby enhancing firm value. According to Suhartini et al. (2024), Indonesian mining companies with comprehensive sustainability reports especially those aligned with Global Reporting Initiative (GRI) standards exhibited improved firm value, reinforcing the role of standardized ESG disclosures in investor evaluations.

However, prior research reveals mixed results. For instance, Pamungkas and Meini (2023) identified a negative and significant effect of sustainability reporting on firm value, indicating that some investors may perceive ESG disclosures as superficial or lacking relevance to financial performance. Similarly, Suhartini et al. (2024) noted that sustainability reporting had no direct effect on firm value during 2018–2022, suggesting that reporting practices in Indonesia may not yet be mature enough to influence investor behavior. In contrast, studies by Linh et al. (2022) and Amin et al. (2024) concluded that well-structured sustainability communication positively impacts firm valuation, as it enables investors to better assess long-term performance and non-financial risks.

From an agency theory perspective, sustainability reporting functions as a mechanism to reduce information asymmetry between managers (agents) and shareholders (principals). In the absence of reliable disclosure, shareholders may suspect opportunistic managerial behavior, increasing agency costs. Voluntary ESG disclosure demonstrates managerial accountability, reduces uncertainty, and enhances transparency, which in turn builds investor confidence and increases firm value (Jensen & Meckling, 1976).

Importantly, this study finds that audit quality strengthens the positive relationship between sustainability reporting and firm value. Companies audited by Big Four firms exhibit a more pronounced impact of ESG disclosures on firm valuation. This supports the notion that high audit quality enhances the credibility and reliability of reported sustainability information. Zahid et al. (2022), El-Deeb et al. (2023), and Suranta et al. (2025) similarly found that external audits of high quality significantly reinforce the influence of ESG performance on firm value in Indonesian companies.

The reinforcing effect of audit quality is particularly relevant in the context of the coal industry. As a highly scrutinized and environmentally sensitive sector, coal mining companies face significant stakeholder pressure to demonstrate responsible and transparent operations. This institutional scrutiny heightens the importance of credible third-party verification. In this regard, Big Four auditors not only validate the accuracy of financial data but also serve as trusted verifiers of ESG information, which is essential in mitigating the skepticism that often surrounds sustainability reporting in extractive industries. The findings align with DeAngelo (1981), who emphasizes that audit quality

enhances monitoring functions and limits managerial discretion, thereby serving as a key governance mechanism. Kong et al. (2020) further support this view by demonstrating that audit credibility increases stakeholder trust, especially in industries where reputational risk is high.

In sum, audit quality plays a crucial moderating role by reinforcing the integrity of ESG disclosures, particularly within the coal mining sector, where environmental and regulatory risks are prominent. The presence of high-quality audits mitigates concerns over “greenwashing” and assures investors of the authenticity and reliability of sustainability efforts, ultimately strengthening the link between sustainability reporting and firm value.

CONCLUSION

This study investigates the impact of sustainability reporting on the firm value of Indonesian coal mining companies, with audit quality examined as a moderating variable. The results demonstrate that sustainability reporting has a significant positive influence on firm value. This finding aligns with agency theory, which suggests that enhanced transparency through sustainability disclosures helps reduce information asymmetry between managers and shareholders, leading to greater investor confidence and improved firm performance. The presence of high-quality audits improves the credibility of sustainability disclosures, serving as an effective monitoring mechanism to ensure the reliability of information presented to stakeholders.

This study has several important limitations. First, it focuses only on publicly traded coal mining companies in Indonesia, so the findings may not be applicable to other sectors or developing countries. Second, the use of secondary data from annual and sustainability reports is potentially biased due to variations in the quality and depth of disclosure across companies. Third, the measurement of audit quality using proxies of auditor reputation (Big4) and company size may not fully represent the effectiveness of more complex audits. These limitations are not design errors, but rather inherent challenges in the choice of data and methodology. These results have significant implications for both theory and practice. Theoretically, they provide empirical support for the application of agency theory in understanding corporate sustainability behavior and its financial consequences. Practically, they emphasize the importance for Indonesian coal mining firms to invest in high-quality sustainability disclosures and to engage credible audit firms to maximize the financial value derived from transparency. Future research could enhance validity by incorporating qualitative assessments, exploring other moderating variables such as corporate governance mechanisms, or applying the model in cross-industry or cross-country contexts to test the robustness of these findings.

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