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MANAGEMENT

Does Intellectual Capital Influence Sustainability Reporting in Indonesia's Energy and Mining Industry? Moderating Role of Audit Committee

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HISTORY

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ABSTRACT

Purpose: This study aims to investigate the influence of intellectual capital on sustainability reporting within the energy and mining industry in Indonesia. Additionally, it examines whether this influence is moderated by audit committee.

Method: This research employs a quantitative approach, utilizing secondary data from 32 energy and mining companies listed on the Indonesia Stock Exchange (IDX) for the period of 2020–2023. Partial least squares structural equation modeling (PLS-SEM) was applied to test the hypotheses.

Result: The findings reveal several significant outcomes. First, intellectual capital positively influences sustainability reporting. Second, audit committee serves as a moderator in the relationship between intellectual capital and sustainability reporting.

Practical Implications for Economic Growth and Development: This study underscores the necessity for firms to enhance their internal capabilities, particularly in the domains of intellectual capital and governance functions, to improve sustainability disclosures. Such improvements may promote transparency, bolster investor confidence, and contribute to sustainable economic development in emerging markets.

Originality/Value: This research contributes to the resource-based view theory and agency theory by illustrating the dual role of governance mechanisms in sustainability practices and providing new evidence regarding the contingent relationship between intellectual capital and sustainability reporting within the context of a developing country.

Keywords: *Intellectual Capital, Sustainability Reporting, Audit Committee, Resource-Based View, Agency Theory*

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INTRODUCTION

In recent years, sustainability reporting has increasingly become institutionalized among global corporations, reflecting heightened stakeholder expectations for transparency and accountability regarding sustainability performance. According to the KPMG sustainability reporting survey, approximately 71% of the world's top 5,800 companies align their reporting with the Global Reporting Initiative, indicating a robust trend toward standardized non-financial disclosures (KPMG, 2024). In emerging markets such as Indonesia, the Financial Services Authority (OJK) has enacted POJK No. 51/POJK.03/2017 to mandate sustainability disclosures for public companies and financial institutions. A recent study conducted by the Pratama Institute (Ismail, 2025) reported that only 464 of 938 listed companies (approximately 49%) published sustainability reports, with fewer than 6% obtaining assurance from an independent third party. This deficiency in assurance underscores institutional challenges in Indonesia, particularly among firms in high-impact industries such as energy and mining. Similarly, Budianto et al. (2025) found that only 31% of 51 public companies in Indonesia included externally verified sustainability disclosures, raising concerns regarding the credibility, comparability, and comprehensiveness of these reports (Kuzey & Uyar, 2017; Saptono et al., 2023).

This gap is particularly pressing in resource-intensive sectors, such as energy and mining, which serve as significant contributors to national economies while also being among the largest sources of environmental degradation and social controversy. These industries account for a substantial portion of national carbon emissions and frequently face intense scrutiny from regulators and civil society (Kuzey & Uyar, 2017). Therefore, enhancing the transparency and quality of sustainability reporting in these sectors is imperative not only for regulatory compliance but also for maintaining legitimacy, securing stakeholder trust, and attracting responsible investment.

In the context of sustainability reporting, companies are expected to disclose integrated and balanced information across economic, social, and environmental dimensions (Cantele & Zardini, 2018; Elkington, 1994). The quality of such disclosures, as reflected in their credibility, relevance, and comprehensiveness, is strongly influenced by a company's ability to develop and leverage its intellectual capital. Drawing from the Resource-Based View (RBV), intellectual capital is recognized as a strategic, intangible asset that is valuable, rare, inimitable, and irreplaceable, thereby playing a crucial role in enhancing the quality of sustainability reports by signaling both internal commitment and competitive positioning (Barney, 2000). Companies with well-developed intellectual capital are more adept at embedding sustainability into managerial processes, accurately interpreting stakeholder expectations, and translating complex sustainability performance into meaningful and comprehensive disclosures (Dumay et al., 2019).

Several empirical studies have sought to explore the determinants of sustainability reporting, particularly the role of intellectual capital. For instance, Bananuka et al. (2023) found that human and relational capital significantly influenced sustainability disclosure practices, while structural capital did not. Similarly, Nakyeyune et al. (2023) revealed that intellectual capital, bolstered by knowledge management practices, enhances sustainability reporting in Uganda's financial sector. In contrast, Hartawan et al. (2022), focusing on Indonesian LQ45 firms, reported no significant relationship between intellectual capital and sustainability reporting. Furthermore, Realivazquez et al. (2019) discovered that only human capital significantly impacted sustainability in Mexican livestock organizations.

These mixed findings suggest the presence of contextual moderators that may shape the relationship between intellectual capital and sustainability reporting. One potential moderating factor is corporate governance, particularly the audit committee. Prior research indicates that audit committees enhance the credibility and quality of disclosures through their independence, expertise, and oversight capacity (Al-Shaer & Zaman, 2016; Frias-Aceituno et al., 2013). However, research explicitly examining the moderating role of audit committees in the relationship between sustainability reporting and intellectual capital remains limited, particularly within the context of emerging markets.

This gap highlights the necessity of investigating how governance mechanisms, such as audit committees, interact with internal resources like intellectual capital to shape sustainability reports. Moreover, Haji (2015) posited that audit committees could improve the quality of non-financial statements, including the disclosure of the three components of intellectual capital and sustainability reporting. Consequently, this study aims to examine the influence of intellectual capital on sustainability reporting and to analyze the moderating role of the audit committee. The novelty of this research lies in its integration of RBV theory and agency theory to elucidate how intangible strategic resources and governance structures jointly influence sustainability disclosures. This study contributes theoretically by extending the RBV framework to incorporate governance as a contextual enhancer or constraint, and practically by providing insights into effective oversight for firms pursuing sustainability performance.

Hypotheses Development

According to the Resource-Based View, sustainable competitive advantage is achieved when firms possess resources that are valuable, rare, inimitable, and non-substitutable (Barney, 2000). Among these resources, intellectual capital—which encompasses human capital, structural capital, and relational capital—is recognized as a critical intangible resource that enables organizations to develop strategic competencies and integrate sustainability principles into their core operations (Stewart & Ruckdeschel, 1998).

Human capital contributes to sustainability through managerial competence, ethical awareness, and employee engagement in identifying and addressing sustainability issues (Soewarno & Tjahjadi, 2020). Structural capital, which includes databases, reporting systems, and organizational routines, facilitates the accurate and efficient collection, validation, and dissemination of environmental, social, and governance (ESG) information. Relational capital reinforces stakeholder relationships, enhances responsiveness to societal expectations, and bolsters the credibility of sustainability disclosures (Cuozzo et al., 2017; Dumay et al., 2019). When these components are strategically aligned with sustainability objectives, intellectual capital operates not merely as a static asset, but as a dynamic capability that fosters innovation and long-term value creation (Teece, 2007).

Nevertheless, as emphasized by agency theory (Jensen & Meckling, 1976), the divergence of interests between managers and external stakeholders necessitates governance mechanisms that ensure transparency and accountability. Within this framework, the audit committee assumes a pivotal oversight role in safeguarding the credibility and integrity of both financial and non-financial disclosures. An effective audit committee not only reviews sustainability reports for accuracy and compliance but also promotes the strategic utilization of intellectual capital in sustainability initiatives (Sierra-García et al., 2015).

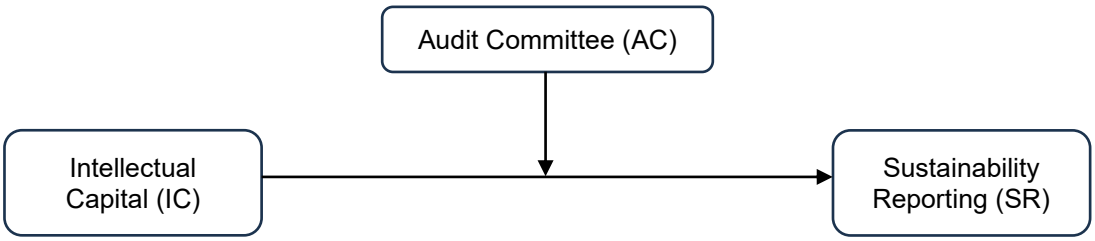
Furthermore, audit committees equipped with sufficient ESG-related expertise and independence are better positioned to assess the materiality of disclosed sustainability information and to identify symbolic disclosure practices, such as greenwashing (Ghitti et al., 2023; Gregory, 2024). Through proactive monitoring and governance, the audit committee strengthens the internal alignment between sustainability strategies and organizational capabilities, ensuring that sustainability reporting authentically reflects managerial commitment and performance.

Based on the preceding discussion, the following hypotheses are formulated:

H1: Intellectual capital has a significant effect on sustainability reporting.

H2: The audit committee moderates the relationship between intellectual capital and sustainability reporting.

Figure 1. Research Framework



Source: Developed by the authors (2025)

METHOD

This study employs a quantitative research methodology utilizing secondary data sourced from energy and mining companies listed on the Indonesia Stock Exchange (IDX) for the period spanning 2020 to 2023. The research design involved purposive sampling of firms that consistently published sustainability reports during the observation period. A total of 32 companies met the established criteria and were selected as the final sample for analysis.

Data were obtained from annual reports and sustainability disclosures, accessed through the official websites of the respective companies or the IDX. The variables considered in this study are as follows:

a) Sustainability Reporting (dependent variable) is assessed using the Sustainability Reporting Disclosure Index (SRDI), which is based on 91 items derived from the Global Reporting Initiative (GRI) G4 guidelines. Each item is scored dichotomously (1 = disclosed; 0 = not disclosed).

b) Intellectual Capital (independent variable) is evaluated using the Value-Added Intellectual Coefficient model, as developed by Pulic (2000).

c) Audit Committee (moderating variable) is quantified based on the proportion of independent members within the audit committee, calculated as the number of independent members divided by the total number of committee members.

Table 1. Variable Measurement

Variable	Definition	Measurement	Source
Sustainability Reporting	Degree of sustainability disclosure	Sustainability Reporting Disclosure Index (SRDI) constructed based on the Global Reporting Initiative (GRI) G4 guidelines.	Dissanayake (2020)
Intellectual Capital	Firm's ability to generate value from intellectual assets	Value Added Capital Employed (VACA), Value Added Human Capital (VAHU), and Structural Capital Value Added (STVA).	Pulic (2000)
Audit Committee	Proportion of independent members in the audit committee	Ratio of independent audit committee members to total audit committee members.	Aprianti et al. (2022)

Source: Compiled by the authors (2025)

RESULT AND DISCUSSION

Descriptive Statistics

Descriptive statistics were employed to encapsulate the characteristics of the primary research variables: Sustainability Reporting (SR), Intellectual Capital (IC), and Audit Committee (AC). Table 2 delineates the mean, median, minimum, maximum, skewness, and kurtosis for each variable.

Table 2. Descriptive Statistics

Variable	Mean	Median	Min	Max	Kurtosis	Skewness
SR	0.40	0.40	0.05	0.75	-1.17	0.14
IC	2.43	2.38	0.24	4.67	0.10	0.28
AC	0.80	1.00	0.16	1.00	-0.49	-1.10

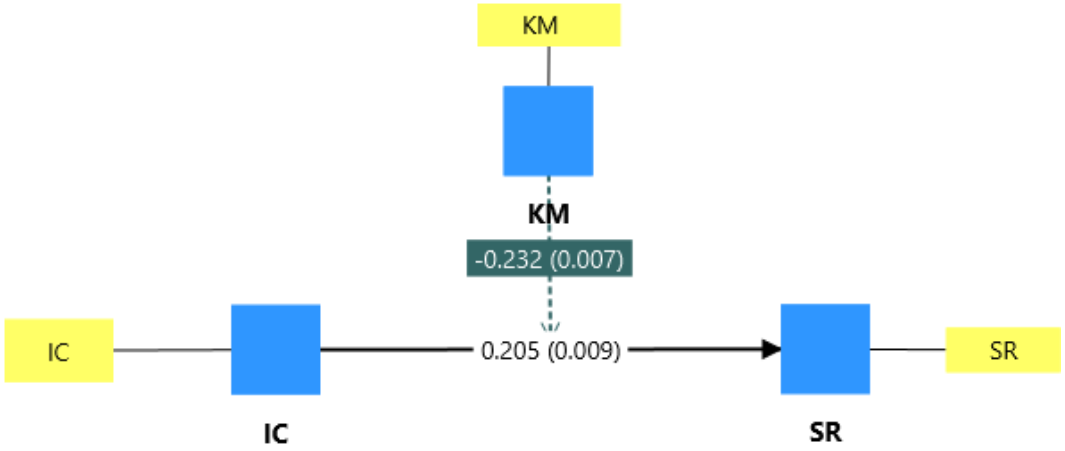
Source: Processed data (2025)

The average sustainability reporting score (SR) was 0.40, indicating that, on average, companies disclosed only 40% of the Global Reporting Initiative (GRI)-based indicators. The intellectual capital (IC) had a mean value of 2.43, reflecting a diverse capacity among firms to leverage intangible assets. The audit committee (AC) variable exhibited a high average score of 0.80, suggesting that the majority of companies maintained a significant proportion of independent members.

Structural Model Analysis

We initially conducted a Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis to assess the strength of the relationship between the independent and dependent variables. The results of the PLS-SEM analysis are presented in Figure 2 and Table 3 below.

Figure 2. Estimated PLS Model



*KM is audit committee (AC)

Source: Processed data (2025)

Figure 2 presents the findings from the estimation of the PLS-SEM structural model, illustrating the relationships among three primary constructs: intellectual capital, audit committee, and sustainability reports. The path coefficients and corresponding p-values are indicated on each connecting line between the variables. First, the path coefficient from

intellectual capital to sustainability reports is 0.205, with a statistically significant p-value of 0.009. This indicates a positive and statistically significant influence of intellectual capital on sustainability reporting. Second, the moderating interaction between intellectual capital and the audit committee in relation to sustainability reporting exhibits a path coefficient of -0.232, accompanied by a p-value of 0.007, suggesting a negative and statistically significant effect.

Table 3 below delineates the findings of the path analysis examining the impact of intellectual capital on sustainability reporting, moderated by the audit committee. This table includes the original coefficient values, t-statistics, and p-values.

Table 3. Result of Structural Model Analysis (Model 1)

Variable	Coef.	t-statistics	p-values
IC	0.205	2.616	0.009*
AC	0.456	2.345	0.019*
AC*IC	-0.232	2.708	0.007*
R^2	0.073		

*significance at 5% level, IC is intellectual capital, AC is audit committee

Source: Processed data (2025)

The findings of the analysis indicate that the relationship between intellectual capital and sustainability reporting is statistically significant, with a p-value of 0.009, which is less than the 0.05 threshold, and a path coefficient of 0.205. This suggests that intellectual capital exerts a considerable influence on sustainability reporting. Additionally, the interaction effect between intellectual capital and the audit committee on sustainability reporting is characterized by a path coefficient of -0.035 and a p-value of 0.048, also below the 0.05 significance level. This signifies that the audit committee plays a significant moderating role in the relationship between intellectual capital and sustainability reporting. Furthermore, the direct effect of the audit committee on sustainability reporting is represented by a path coefficient of 0.456 and a p-value of 0.019, which is again below the 0.05 threshold. This finding indicates that the moderation type exerted by the audit committee can be classified as quasi-moderation, given that the audit committee also has a direct influence on sustainability reporting (Hair et al., 2021).

The R-squared test is designed to assess the degree to which exogenous constructs account for the variability of endogenous constructs. As illustrated in Table 3, the combination of intellectual capital (IC), audit committee (AC) and their interaction accounts for merely 7.3% of the variation in sustainability reporting levels. The remaining 92.7% of the variance is attributable to variables that are not included within the model. While this proportion is comparatively low, it is deemed acceptable in exploratory research that involves complex variables and indirect influences (Hair et al., 2021).

Table 4 below presents a comprehensive structural model analysis examining the relationship between various elements of intellectual capital—specifically, human capital, structural capital, and relational capital—and sustainability reporting. Model 2 (VACA, representing Relational Capital) indicates that human capital exerts an insignificant effect on sustainability reporting, evidenced by a path coefficient of -0.066 and a p-value of 0.472. Moreover, Models 3 (VAHU, indicative of Human Capital) and 4 (STAVA, denoting Structural Capital) similarly reflect an insignificant impact on sustainability reporting.

Table 4. Result of Structural Model Analysis (Model 2)

Variable	IC- VAICM (Model 1)		IC- VACA (Model 2)		IC-VAHU (Model 3)		IC-STAVA (Model 4)	
	Coef.	P-value	Coef.	P -value	Coef.	P-value	Coef.	P-value
IC	0.205	0.009*	-0.066	0.472***	-0.484	0.124***	0.051	0.819**

Variable	IC- VAICM (Model 1)		IC- VACA (Model 2)		IC-VAHU (Model 3)		IC-STAVA (Model 4)	
	Coef.	P-value	Coef.	P -value	Coef.	P-value	Coef.	P-value
AC	0.456	0.019*	-0.072	0.733***	0.005	0.020*	-0.163	0.574**
AC x IC	-0.232	0.007*	0.095	0.597***	-0.017	0.049*	0.132	0.63**

*significance at 5% level, **significance at 10% level, ***Not significance
IC is intellectual capital, AC is audit committee

Source: Processed data (2025)

Discussion

The Influence of Intellectual Capital on Sustainability Reporting

The results of the initial hypothesis test indicate that intellectual capital exerts a significant influence on sustainability reporting. Empirical evidence suggests that firms possessing elevated levels of intellectual capital demonstrate a greater capacity to generate high-quality sustainability reports. In accordance with Resource-Based View (RBV) theory, intellectual capital, which encompasses human capital, relational capital, and structural capital, is characterized as an intangible asset that is valuable, rare, inimitable, and non-substitutable (Barney, 2000). These assets not only catalyze innovation and enhance internal efficiency but also serve as strategic corporate resources that contribute to the establishment of a robust reputation, bolster corporate legitimacy, and improve the quality and relevance of sustainability efforts.

This finding further corroborates prior research that underscores the significance of intellectual capital in fostering transparency and accountability in sustainability disclosures. Marilis et al. (2024) demonstrated that intellectual capital positively impacts sustainability disclosure by enhancing stakeholder communication and information efficiency. Additionally, Bananuka et al. (2023) and Hartawan et al. (2022) identified that proficient human resources, including expertise in sustainability issues and reporting literacy, can substantially improve the quality of sustainability reports. This is consistent with the findings of Mawardi et al. (2023), who highlighted that human capital plays a more pivotal role in sustainability disclosure than other components within the Indonesian banking sector. Comparable results were reported by Chairani and Zuraida (2021), who noted that individual competencies within organizations are critical determinants in the production of high-quality sustainability reports in the energy sector. Furthermore, Karya and Mimba (2023) concluded that, although structural and relational capital are theoretically significant, their practical contributions to sustainability reporting tend to be limited in the absence of reliable human capital. Consequently, human capital emerges as the primary driver of effective sustainability practices in energy and mining enterprises.

The Role of the Audit Committee in Moderating the Impact of Intellectual Capital on Sustainability Reporting

The results of the hypothesis testing indicate that the audit committee significantly moderates the relationship between intellectual capital and sustainability reporting. This finding substantiates the relevance of agency theory, which posits that governance mechanisms, such as audit committees, are responsible for monitoring managerial actions to ensure alignment with shareholders' interests, thereby mitigating agency conflicts (Jensen & Meckling, 2012). The audit committee plays a pivotal role in enhancing corporate accountability and transparency, particularly with respect to the disclosure of sustainability practices. An effective audit committee, characterized by adequate independence and expertise, is expected to ensure that sustainability-related information is managed and disclosed by the company in an objective, accurate, and standards-compliant manner (Al-Shaer & Zaman, 2018; Aprianti et al., 2022).

However, this study reveals that the moderating effect of audit committees on the relationship between intellectual capital and sustainability reporting is negative, suggesting that audit committee oversight may weaken this relationship. This trend is particularly pronounced in energy and mining companies in Indonesia, which are capital-intensive, high-risk, and operate under stringent environmental and social regulatory frameworks. As highlighted by previous studies, in highly regulated industries, sustainability reporting is often more influenced by institutional pressure than by voluntary strategic initiatives (Kuzey & Uyar, 2017; Wicaksono & Setiawan, 2024). In the Indonesian context, this pressure is further intensified by Financial Services Authority (OJK) Regulation No. 51/POJK.03/2017 concerning Sustainable Finance, alongside increasing expectations from international investors and financial institutions to integrate Environmental, Social, and Governance (ESG) criteria into their funding due diligence processes.

Audit committees frequently adopt a rigid, compliance-oriented oversight approach, prioritizing adherence to legal requirements over the strategic communication of qualitative and intangible information, such as intellectual capital (Mawardi et al., 2023; Velte, 2024). This observation aligns with Al-Shaer's (2020) argument that, in the absence of adequate sustainability expertise, audit committees may focus exclusively on verifiable metrics and eschew more challenging disclosures, thereby limiting the depth and strategic value of sustainability reports. Moreover, the deficiency of ESG-specific competencies within many audit committee structures in emerging markets remains a significant barrier to effective sustainability oversight (Kuzey & Uyar, 2017; Sierra-García et al., 2015).

This finding corroborates the arguments presented by Kalbuana et al. (2022) and Hendrati et al. (2023), who contend that audit committees emphasizing risk control and regulatory compliance, while overlooking strategic sustainability objectives, may inadvertently suppress value-based reporting practices. This observation supports the broader corporate governance literature, which suggests that board-level monitoring mechanisms can produce unintended consequences if their priorities are not aligned with the implementation of strategic assets (Gregory, 2024; Teece, 2007).

CONCLUSION

This study examines the impact of intellectual capital on sustainability reporting and the moderating role of audit committees within 32 energy and mining firms in Indonesia. The findings indicate that intellectual capital significantly enhances the quality of sustainability reporting. Furthermore, audit committees are shown to exert a significant influence on the relationship between intellectual capital and sustainability reporting, demonstrating a negative moderating effect. This suggests that oversight mechanisms may impede the disclosure of sustainable practices. In the context of the energy and mining sector, characterized by substantial environmental risks, regulatory scrutiny, and public pressure, the quality of sustainability reporting emerges not only as a function of internal capabilities but also as a response to pronounced external pressures. As such, companies must navigate a delicate balance between governance compliance, regulatory adherence, and strategic flexibility in their communication of sustainability initiatives.

It is essential to recognize that the explanatory power of this model is relatively low, at merely 7.3%. While this level is acceptable in exploratory research, particularly when probing complex constructs such as intellectual capital and sustainability disclosure, it indicates that additional variables may be required to more thoroughly elucidate the determinants of sustainability reporting. Future research should consider factors such as firm size, profitability, ownership structure, and sustainability assurance, which may enhance explanatory power.

In summary, this study contributes to the Resource-Based View and agency theory by illustrating that sustainability disclosure in the Indonesian energy and mining sector is influenced by the interplay between strategic intangible resources and governance oversight. From a practical standpoint, these findings highlight the imperative for companies to reconcile regulatory compliance with strategic flexibility in their sustainability disclosures. For high-

impact sectors such as energy and mining, investing in the development of intellectual capital and enhancing sustainability literacy among audit committees can elevate reporting quality, strengthen legitimacy, and cultivate long-term stakeholder trust.

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