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The Influence of Environmental Accounting and Green Intellectual Capital on the Quality of Sustainability Reports

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ABSTRACT

This study aims to analyze the simultaneous influence of Environmental Accounting and Green Intellectual Capital on the Quality of Sustainability Reports in Indonesian mining sector companies. Employing a quantitative approach with a causal research design, the study population comprises mining companies listed on the Indonesia Stock Exchange during the 2021-2024 period. Samples were selected using purposive sampling, and data were analyzed using multiple linear regression with panel data, after undergoing classical assumption tests and best model selection (Fixed Effects Model). The findings indicate that Environmental Accounting has a positive and significant influence on the Quality of Sustainability Reports (probability value 0.0000 < 0.05). Similarly, Green Intellectual Capital also has a positive and significant influence on the Quality of Sustainability Reports (probability value 0.0000 < 0.05). The larger coefficient for Green Intellectual Capital (0.617442) compared to Environmental Accounting (0.319828) suggests a stronger association with sustainability report quality. Overall, Environmental Accounting and Green Intellectual Capital jointly explain 92.15% of the variation in the Quality of Sustainability Reports. The implications of this study highlight the importance of strengthening internal environmental accounting practices and developing green intellectual capital (employees' environmental knowledge capacity, environmental management systems, and relationships with external stakeholders) to produce more complete, transparent, and credible sustainability reports, especially in the mining sector which has high environmental impact intensity. This research contributes to the sustainability accounting literature by emphasizing the role of internal corporate mechanisms in improving report quality.

Keywords:*Environmental Accounting; Green Intellectual Capital; Quality of Sustainability Reports*

ABSTRACT

Penelitian ini bertujuan untuk menganalisis pengaruh Akuntansi Lingkungan dan Modal Intelektual Hijau secara simultan terhadap Kualitas Laporan Keberlanjutan pada perusahaan sektor pertambangan di Indonesia. Menggunakan pendekatan kuantitatif dengan desain penelitian kausal, populasi penelitian mencakup perusahaan pertambangan yang terdaftar di Bursa Efek Indonesia selama periode 2021-2024. Sampel dipilih menggunakan teknik purposive sampling, dan data dianalisis menggunakan regresi linier berganda dengan data panel, setelah melewati uji asumsi klasik dan pemilihan model terbaik (Fixed Effects Model). Hasil penelitian menunjukkan bahwa Akuntansi Lingkungan memiliki pengaruh positif dan signifikan terhadap Kualitas Laporan Keberlanjutan (nilai probabilitas 0,0000 < 0,05). Demikian pula, Modal Intelektual Hijau juga memiliki pengaruh positif dan signifikan terhadap Kualitas Laporan Keberlanjutan (nilai probabilitas 0,0000 < 0,05). Koefisien Modal Intelektual Hijau yang lebih besar (0,617442) dibandingkan Akuntansi Lingkungan (0,319828) menunjukkan bahwa modal intelektual hijau memiliki asosiasi yang lebih kuat dengan kualitas laporan keberlanjutan. Secara keseluruhan, Akuntansi Lingkungan dan Modal Intelektual Hijau mampu menjelaskan 92,15% variasi dalam Kualitas Laporan Keberlanjutan. Implikasi dari studi ini adalah pentingnya penguatan praktik akuntansi lingkungan internal serta pengembangan modal intelektual hijau (kapasitas pengetahuan lingkungan karyawan, sistem manajemen lingkungan, dan hubungan dengan pemangku kepentingan eksternal) untuk menghasilkan laporan keberlanjutan yang lebih lengkap, transparan, dan kredibel, khususnya di sektor pertambangan yang memiliki intensitas dampak lingkungan tinggi. Penelitian ini berkontribusi pada literatur akuntansi keberlanjutan dengan menyoroti peran mekanisme internal perusahaan dalam peningkatan kualitas laporan.

Kata Kunci: Akuntansi Lingkungan; Green Intellectual Capital; Kualitas Laporan Keberlanjutan

INTRODUCTION

Sustainability report quality has become a key concern in accounting and corporate governance practices as stakeholders demand greater transparency regarding the economic, social, and environmental impacts of business activities (Cho et al., 2021; KPMG, 2022). Companies are increasingly positioning sustainability reports as a strategic accountability tool because they document ESG (environmental, social, and governance) performance, policies, targets, and achievements that are not always reflected in financial statements (Michelon et al., 2021; GRI, 2021).

Investors use sustainability information to assess non-financial risks, business model resilience, and long-term value prospects because ESG factors correlate with risk profiles and the cost of capital (Cho et al., 2021; Hummel & Schlick, 2016). Regulators encourage improved disclosure quality through the establishment of standards and reporting requirements because capital markets require comparable, reliable, and auditable information to reduce information asymmetry and greenwashing practices (European Commission, 2022; IFRS Foundation, 2023). Reporting standards such as the GRI and the ISSB framework emphasize materiality, data traceability, and metric consistency because report quality is determined by the completeness, balance, accuracy, and verifiability of disclosures (GRI, 2021; IFRS Foundation, 2023).

The regulatory framework and sustainability reporting standards have directed companies in Indonesia to prepare ESG disclosures through reference to the Global Reporting Initiative (GRI) and the sustainability reporting obligations in POJK No. 51/POJK.03/2017. However, reporting practices in the mining sector still show wide variations in quality and consistency across companies (GRI, 2021; OJK, 2017; KPMG, 2022). Several empirical studies have found that mining companies' compliance with GRI environmental indicators tends to be low, particularly for quantitative, metric-based, and verifiable disclosures, such as emissions (GRI 305), water use and pollution (GRI 303), waste/effluent (GRI 306), and rehabilitation and post-mining impacts, which require coherent data and methodological explanations (GRI, 2021; Michelon et al., 2021).

Companies often emphasize program narratives and general commitments rather than providing trackable performance data, targets, baselines, and annual achievements. This leads to a gap in sustainability reports between symbolic compliance and the substantive quality of disclosures (Cho et al., 2021; Michelon et al., 2021; Deegan, 2002). Field evidence reinforces this gap, as the Indonesian government imposed sanctions and fines totaling over IDR 38 trillion on dozens of mining companies found operating illegally in forest areas. Reporting should reflect disclosure of compliance risks, material environmental impacts, and measurable improvement and recovery plans (Reuters, 2025).

International media investigative reports have uncovered cases of water pollution related to nickel mining activities, including the discovery of high levels of hexavalent chromium (Cr6) in the water sources of communities surrounding the mines. Public reports from the companies concerned were deemed inadequate in explaining the sources of impacts, water quality test results, and verified mitigation measures (The Guardian, 2025). These findings indicate that some companies use sustainability reports as a symbolic legitimation tool to build a perception of compliance, rather than as a truly verifiable representation of environmental performance by stakeholders (Cho et al., 2021; Deegan, 2002).

This situation emphasizes that the main problem in sustainability reporting lies not only in disclosure obligations but also in the company's internal capacity to produce reliable, measurable, and verifiable environmental information. It is in this context that various empirical studies have begun to highlight the importance of internal corporate mechanisms in shaping the quality of sustainability reports. Environmental accounting plays a crucial role in determining the quality of sustainability reports because it functions as an information system

that provides measurable, consistent, and verifiable environmental data. Through environmental accounting, companies are able to identify, classify, and quantify the environmental costs and impacts arising from operational activities, such as waste management costs, emissions, energy consumption, and environmental reclamation and rehabilitation obligations. The presence of this quantitative information enables sustainability reports to contain not only narrative commitments but also be supported by testable empirical evidence, thereby enhancing the completeness and reliability of sustainability reports. Empirical studies show that companies that implement comprehensive environmental accounting tend to produce sustainability reports with more complete and consistent levels of disclosure and have a lower risk of symbolic disclosure and greenwashing (Rahmawati et al., 2025; Verawaty & Nuryatno, 2025).

Furthermore, the role of green intellectual capital in improving the quality of sustainability reports can be explained through three main indicators: green human capital, green structural capital, and green relational capital. Green human capital reflects the knowledge, competence, and environmental awareness of employees, enabling companies to produce more accurate environmental data and understand relevant sustainability indicators in accordance with Global Reporting Initiative (GRI) standards. With human resources with adequate environmental capabilities, the process of identifying, measuring, and interpreting environmental information can be carried out more systematically and responsibly. Green structural capital includes environmental management systems, operational procedures, databases, and supporting technology integrated within the organization. The existence of these structures ensures that environmental information is collected consistently, well-documented, and verifiable, thereby reducing reliance on symbolic narratives in sustainability reports. Meanwhile, green relational capital relates to the quality of a company's relationships with external stakeholders, such as regulators, surrounding communities, suppliers, and environmental organizations. Strong, trust-based relationships increase both the pressure and incentive for companies to provide more transparent and credible environmental disclosures.

Previous research consistently shows that environmental accounting and green intellectual capital significantly influence the quality of corporate sustainability reports. Environmental accounting serves as a formal mechanism that enables companies to systematically identify, measure, and report environmental costs and impacts, resulting in more complete, accurate, and verifiable sustainability information. Rahmawati et al. (2021) and Teti and Supriatna (2022) found that companies that implement comprehensive environmental accounting tend to produce sustainability reports with higher levels of transparency and comparability, as disclosures are supported by quantitative data rather than simply descriptive narratives. Furthermore, green intellectual capital, encompassing green human capital, green structural capital, and green relational capital, serves as an intangible resource that strengthens an organization's internal capacity to manage environmental information and meet stakeholder expectations. Ariani and Puspita (2023) and Iqbal (2023) show that companies with high levels of green intellectual capital are able to prepare more substantive sustainability reports aligned with Global Reporting Initiative (GRI) standards, supported by employee environmental competency, adequate internal systems and procedures, and external relationships that foster transparency. Simultaneously, the combination of environmental accounting and green intellectual capital has been shown to improve the quality of sustainability reports while reducing symbolic disclosure practices, resulting in reports that better reflect a company's true environmental performance (Cho et al., 2021; Deegan, 2022).

Previous research on sustainability reporting (Hahn & Kühnen, 2020; Fuanni et al., 2024) generally focuses on external factors or a single factor to explain variations in the quality of sustainability disclosure. Several empirical studies have focused on the influence of

company characteristics, such as company size, profitability, leverage, and regulatory pressure, on the level of sustainability report disclosure, without evaluating the quality of the information presented in depth. Other studies (Michelon et al., 2021; Iqbal, 2023) have emphasized the relationship between environmental performance and sustainability reporting, assuming that companies with good environmental performance automatically produce high-quality sustainability reports, although empirical evidence shows inconsistent results.

Several studies have examined the role of environmental accounting in sustainability reporting, but most are limited to its impact on the level of disclosure or compliance with standards, rather than on the quality of sustainability reports, which include aspects of completeness, reliability, and verifiability of information (Verawaty & Nuryatno, 2025). On the other hand, research described (Chang & Chen, 2022; Sumiati & Isnaini, 2024) related to Green Intellectual Capital is generally directed at its impact on company performance, green innovation, or competitive advantage, while its relationship to the quality of sustainability reports is still relatively limited and often studied partially without integrating environmental accounting systems as a primary supporting mechanism.

Unlike previous research, this study fills a research gap by integrating environmental accounting and green intellectual capital as two key internal mechanisms that simultaneously influence the quality of sustainability reports. This study not only assesses the existence of disclosures but also specifically measures the quality of sustainability reports based on the Global Reporting Initiative (GRI) principles, thus distinguishing between symbolic and substantive disclosures. Furthermore, this study focuses on the mining sector in Indonesia for the 2021-2024 period, which has high environmental intensity and significant legitimacy risks. This provides a more contextual and relevant empirical contribution to the development of sustainability accounting literature and the formulation of non-financial reporting policies.

LITERATURE REVIEW

Stakeholder Theory

Stakeholder Theory states that a company is accountable not only to shareholders but also to various stakeholders whose interests are affected by the company's activities, including investors, regulators, employees, local communities, and environmental groups. Recent studies have emphasized that stakeholder pressure has increased in environmentally sensitive industries, particularly the mining sector, due to its substantial environmental and social impacts (Hörisch, Freeman, & Schaltegger, 2020).

Consequently, stakeholders are increasingly demanding transparent, comparable, and reliable sustainability information to assess environmental risks and long-term corporate sustainability. Therefore, sustainability reporting serves as a strategic accountability mechanism to reduce information asymmetry and strengthen stakeholder trust. In this context, Green Intellectual Capital acts as a proactive internal resource that enables mining companies to systematically manage environmental knowledge, integrate sustainability into organizational processes, and produce sustainability reports that effectively respond to stakeholder expectations.

Legitimacy Theory

Legitimacy theory explains that a company's survival depends on the extent to which its activities are perceived as consistent with prevailing social norms, values, and expectations. Recent literature has viewed legitimacy as a dynamic construct requiring sustained organizational effort, particularly in high-impact industries like mining (Suchman, 2020; Michelon, Pilonato, & Ricceri, 2021).

Mining companies face higher legitimacy risks due to environmental degradation, carbon emissions, and social conflicts associated with resource extraction. In response, sustainability

reporting is used as a legitimacy strategy to demonstrate environmental responsibility. However, empirical evidence suggests that legitimacy can only be maintained through substantive disclosure supported by measurable and verifiable data, rather than symbolic narratives (Cho, Laine, Roberts, & Rodrigue, 2021). Green Intellectual Capital strengthens this process by enhancing internal environmental capabilities and external credibility, enabling companies to produce sustainability reports that reflect their true environmental performance and strengthen organizational legitimacy.

Environmental Accounting

Environmental accounting is a systematic approach to identifying, measuring, and reporting environmental costs arising from corporate activities. In the context of sustainability, environmental accounting serves not only as an administrative tool but also as a critical information infrastructure that enables companies to measure environmental externalities that traditional accounting fails to capture. Hansen and Mowen, as cited in Verawaty and Nuryatno (2025), argue that conventional accounting systems inadequately capture the costs of ecological degradation, resulting in biased disclosures driven by narrative rather than data. These limitations ultimately undermine the credibility of sustainability reporting.

From a critical perspective, environmental accounting seeks to correct structural information asymmetries between companies and stakeholders. This is particularly important in the mining sector, where environmental intensity is inherently high due to land clearing, ecosystem disturbance, water contamination, carbon emissions, and land rehabilitation obligations. Empirical evidence from Verawaty and Nuryatno (2025) shows that mining companies that implement comprehensive environmental accounting produce more comprehensive, measurable, and verifiable sustainability reports. This reinforces the argument that the quality of sustainability reporting cannot rely solely on descriptive narratives; it must be based on quantifiable environmental data.

However, despite regulatory pressure, many companies adopt environmental accounting symbolically. Disclosures often include general statements about environmental responsibility without measurable indicators, creating room for greenwashing practices. Therefore, this study evaluates whether environmental accounting actually improves the quality of sustainability reports or merely serves as a symbolic legitimacy tool.

Although environmental accounting provides the formal system for identifying, measuring, and reporting environmental information, its implementation is often supported by organizational infrastructure such as environmental management systems, internal databases, reporting procedures, and digital information systems. These organizational resources are conceptually related to Green Structural Capital because both facilitate the collection, processing, and verification of environmental information.

Consequently, a potential conceptual overlap exists between Environmental Accounting and Green Structural Capital. Nevertheless, Environmental Accounting emphasizes accounting processes and environmental cost measurement, whereas Green Structural Capital represents the organizational capabilities and institutional infrastructure that support the implementation of those processes. Therefore, although the two constructs are closely related, they capture different dimensions of corporate environmental management and are treated as separate variables in this study.

H1: Environmental accounting has a positive influence on the quality of sustainability reports.

Green Intellectual Capital

Green Intellectual Capital (GIC) is an extension of the intellectual capital concept that emphasizes the creation of environmental value based on a company's knowledge and

intangible resources. GIC views environmental excellence as being determined not only by physical assets or regulatory compliance, but also by the knowledge capacity, internal systems, and relational networks that support sustainable environmental management (Chang & Chen, 2022). In this context, GIC serves as a strategic mechanism that enables companies to transform sustainability commitments into more structured, measurable, and accountable operational and reporting practices.

Green Human Capital

Green human capital refers to the knowledge, competencies, skills, and environmental awareness possessed by employees. According to Sumiati and Isnaini (2024), environmentally oriented human capital plays a crucial role in advancing green innovation and improving corporate sustainability performance. In the mining sector, where environmental risks are complex and systemic, employees with strong environmental capabilities are a key asset in ensuring responsible operations and effective sustainability disclosure.

Green Structural Capital

Green structural capital includes environmental management systems, green policies, environmental databases, procedures, and green innovation technologies embedded within an organization. These structural mechanisms provide the internal support needed to ensure that sustainability disclosures are accurate, consistent, and aligned with recognized standards such as the GRI. Verawaty and Nuryatno (2025) found that green structural capital has a substantial impact on reporting quality because it ensures the generation of reliable environmental data.

Green Structural Capital should not be viewed as a substitute for Environmental Accounting. While Environmental Accounting emphasizes the identification, measurement, and reporting of environmental costs and impacts, Green Structural Capital represents the organizational infrastructure including environmental management systems, databases, standard operating procedures, and information technology that enables environmental accounting to operate effectively. Thus, Green Structural Capital supports the implementation of Environmental Accounting but constitutes a distinct organizational capability.

Green Relational Capital

Green relational capital represents environmentally oriented relationships with external stakeholders, namely government agencies, local communities, suppliers, and environmental NGOs. According to Sumiati and Isnaini (2024), these relationships strengthen legitimacy pressures and encourage companies to increase the depth and transparency of environmental disclosure. In mining companies, relational capital is particularly important because social acceptance and regulatory approval are closely linked to environmental performance.

GIC reflects a company's internal capacity to translate sustainability principles into corporate-level strategies and reporting practices. Companies with strong GIC are better able to produce meaningful, structured, and credible sustainability reports. According to Iqbal (2023) observed that not all mining companies utilize their intellectual capital effectively, resulting in compliance-based sustainability reports that lack substance.

However, Green Intellectual Capital, particularly Green Structural Capital, may interact with Environmental Accounting because both rely on similar organizational resources such as environmental information systems, internal databases, and reporting procedures. This conceptual proximity raises the possibility of overlap between the two constructs. Nevertheless, Environmental Accounting represents an accounting based measurement mechanism focusing on the identification, measurement, and reporting of environmental costs and impacts, whereas Green Structural Capital reflects the organizational infrastructure and internal capabilities that support these accounting processes. Therefore, although both

constructs are conceptually related, they remain theoretically distinct and are examined separately in this study to assess their independent contributions to sustainability report quality.
H2: Green intellectual capital has a positive influence on the quality of sustainability reports.

Sustainability Report Quality

The quality of sustainability reports reflects the extent to which disclosures meet the principles of transparency, relevance, completeness, comparability, and verifiability as outlined in the GRI Standards and national regulations such as POJK 51/2017. Despite this regulatory framework, Iqbal (2023) noted that the quality of sustainability reports in the Indonesian mining sector remains inconsistent and often fails to capture true environmental performance.

Three critical issues often undermine reporting quality: Symbolic disclosure, where companies rely heavily on narrative CSR descriptions without measurable environmental metrics. Selective reporting, where positive environmental actions are highlighted while negative impacts are omitted. Greenwashing, where sustainability reporting becomes a strategic communication tool rather than an honest representation of environmental outcomes.

As mining companies face high environmental exposure and public scrutiny, the quality of sustainability reports is a key measure of their environmental accountability and governance integrity. Therefore, high-quality reports should reflect measurable environmental performance supported by environmental accounting systems and strengthened by the company's green intellectual capital.

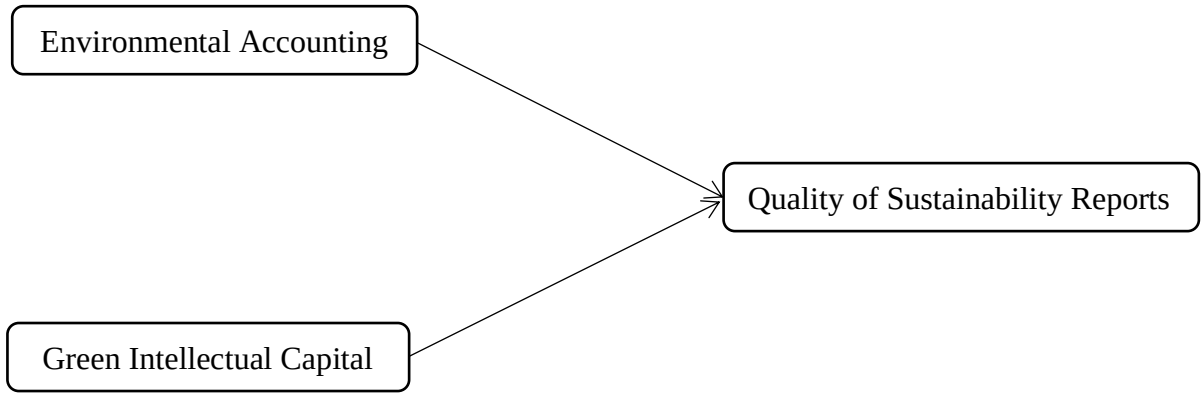

Figure 1.Conceptual Framework

RESEARCH METHODS

This study uses a quantitative approach with a causal research design to examine the influence of environmental accounting and green intellectual capital on the quality of sustainability reports. A quantitative approach was chosen because it allows for objective and empirical testing of relationships between variables through the analysis of measurable numerical data (Iqbal, 2023). This research is explanatory in nature, aiming to explain the causal relationship between the independent and dependent variables based on a theoretical framework and prior empirical evidence.

The study population included mining sector companies listed on the Indonesia Stock Exchange during the observation period of 2021–2024. The mining sector was selected based on the high intensity of environmental impacts and legitimacy pressures faced by companies, making the quality of sustainability reports a relevant and crucial issue (Hahn & Kühnen, 2020). The sample selection technique used purposive sampling with the following criteria:

1. The company published sustainability reports consecutively during the research period, and
2. The report is available in full in the company's annual report or sustainability report.

Table 1. Research Sample Criteria

Information	2021	2022	2023	2024
Publishing Annual Financial Reports and Sustainability Reports	38	38	38	38
Number of Sample Data Used		152		

This study can be divided into two categories: independent variables and dependent variables. The independent variables are Environmental Accounting (X1) and the Green Intellectual Model (X2), while the dependent variable is the Quality of Sustainability Reports (Y).

Table 2. Operational Definitions of Variables

Variables	Indicator	Measurement
Environmental Accounting	Disclosure of environmental costs (waste management, emissions, energy, land rehabilitation)	Content analysis based on GRI 300
	Environmental impact measurement and reporting	Content analysis
	Disclosure of expenses	Content Analysis
Green Intellectual Model	Green Human Capital (environmental training, competencies, awareness)	Content Analysis
	Green Structural Capital (EMS, ISO 14001, environmental systems)	Content Analysis
	Green Relational Model (stakeholder & community engagement in the environmental field)	Content Analysis
Quality of Sustainability Reports	Completeness of disclosure	GRI-based quality assessment
	Accuracy and consistency	GRI-based quality assessment
	Comparability and verification	GRI-based quality assessment

Scoring Method

All variables based on environmental accounting disclosure, green intellectual model, sustainability report quality are measured using a three-point scoring system:

2 = fully disclosed

1 = partially disclosed

0 = not disclosed

Each index is calculated using the following formula:

$$Index = \frac{\sum Score\ Items}{2\ x\ Total\ Items}$$

The data analysis technique used was multiple linear regression with panel data. Model selection (Chow and Hausman tests) determined whether to use Common Effects, Fixed Effects, or Random Effects. The regression equation used is:

$$QSR = \alpha + \beta_1\ EA + \beta_2\ GIC + \varepsilon$$

Where:

- *QSR* = Quality of Sustainability Reports
- α = Constant
- β_1, β_2 = Regression Coefficient
- *EA* = Environmental Accounting
- *GIC* = Green Intellectual Capital
- ε = Error term

Green Intellectual Capital and Environmental Accounting disclosures are identified using keyword based content analysis of annual and sustainability reports. The keywords are adapted from prior empirical studies and adjusted to the mining sector context.

ANALYSIS AND DISCUSSION

ANALYSIS

This section presents the results of the statistical analysis conducted in this study, including descriptive statistics, panel data model selection tests, classical assumption tests, and fixed-effects regression model estimation results. The discussion then connects these findings to the theoretical framework and previous research.

Table 3. Results of Descriptive Statistical Tests

	X1 (EA)	X2 (GIC)	Y (SRQ)
Mean	0.78	0.57	0.68
Median	0.83	0.60	0.71
Maximum	1,00	0.86	0.97
Minimum	0.33	0.20	0.32
Std. Dev.	0.20	0.17	0.17
Skewness	-0.75	-0.49	-0.48
Kurtosis	2.61	2.35	2.28
Jarque-Bera	15.28765	8.926915	9.079136
Probability	0.000479	0.011522	0.010678
Sum	119.5700	87.48000	104.8600
Sum Sq. Dev.	6.155189	4.415158	4.599197
Observations	152	152	152

Table 3 shows that Environmental Accounting (EA) has a mean value of 0.78, indicating that overall, mining companies in Indonesia have implemented fairly good environmental accounting practices in their reporting. However, the range between the minimum (0.33) and maximum (1.00) indicates significant variation in the level of environmental accounting disclosure among companies. The Green Intellectual Capital (GIC) variable has a mean of 0.57, indicating that companies' green intellectual capacity is at a medium to high level. The range from 0.20 to 0.86 also indicates differences in the level of GIC implemented by mining companies.

The Quality of Sustainability Reports (QSR) has an average value of 0.68, indicating that the quality of sustainability reporting by mining companies in Indonesia is generally good. However, the range from 0.32 to 0.97 indicates that there are still companies with low and high reporting quality. All three variables exhibit negative skewness, indicating that the data distribution tends to be concentrated at higher values, but with a longer tail to the left. The Jarque-Bera probability values for all variables are below 0.05, indicating that the research data is not normally distributed.

Table 4. Chow Test Results

Redundant Fixed Effects Tests
Equation: Untitled
Cross-section fixed effects test

Effects Test	Statistics	df	Prob.
Cross-section F	15.255742	(37,112)	0.0000
Cross-section Chi-square	273.353465	37	0.0000

The Chow Test results (Table 4) show a cross-section F probability value of 0.0000. Because this probability value is smaller than the 0.05 significance level, the null hypothesis (H0) stating that the Common Effects Model (CEM) is more appropriate is rejected. This means that the Fixed Effects Model (FEM) is more appropriate for analyzing this panel data than the CEM.

Table 5. Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: Untitled
Cross-section random effects test

Test Summary	Chi-Sq. Statistic	Chi-Sq. df	Prob.
Random cross-section	6.438784	2	0.0400

The Hausman Test results (Table 5) show a Chi-Sq. probability value of 0.0400. Because this probability value is smaller than the 0.05 significance level, the null hypothesis (H0) stating that REM is more appropriate is rejected. This means that the Fixed Effects Model (FEM) is more appropriate for analyzing this panel data than REM.

Based on the selection of the Fixed Effects model, the results of the regression estimation are as follows: Regression Equation (Estimate):

$$QSR = 0.082923 + 0.319828EA + 0.617442GIC + €$$

Classical Assumption Tests

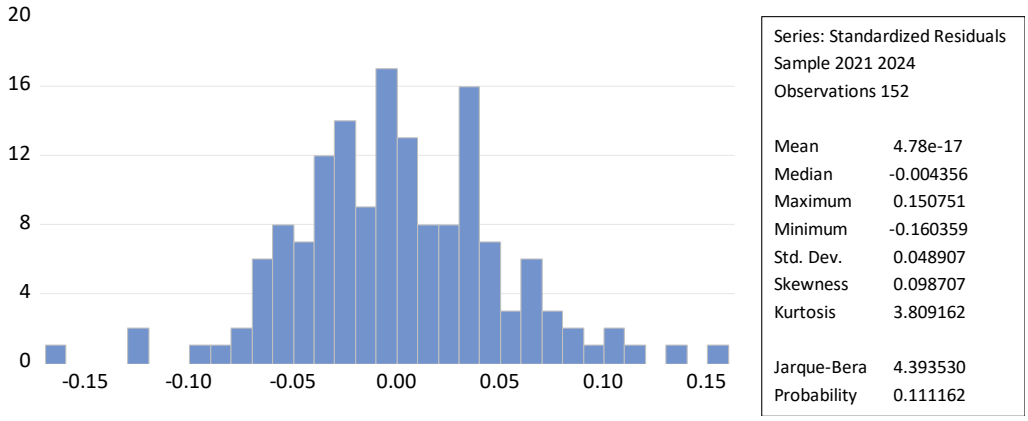

Figure 1. Normality Test Results

Based on figure 1 above, it shows that the probability value is probablitiy > 0.05 namely 0.111. This means that the data passes the normality test.

The results of the multicollinearity test show that there are no high correlation values

among the independent variables, as none 0,80. Therefore, it can be concludes that there is no multicollinearity among the independent variables (the data passes the multicollinearity test).

Table 6. Multicollinearity Test Results

	X1	X2
X1	1.000000	0.350566
X2	0.350566	1.000000

Based on Table 6, it can be seen that the data passes the multiollinearity test because the correlation value among the independent variables is less than 0.80, namely 0.350.

Table 7. Autocorrelation Test Results

R-squared	0.921469	Mean dependent var	0.689868
Adjusted R-squared	0.920415	S.D. dependent var	0.174523
S.E. of regression	0.049234	Akaike info criterion	-3.164906
Sum squared resid	0.361181	Schwarz criterion	-3.105224
Log likelihood	243.5329	Hannan-Quinn criter.	-3.140661
F-statistic	874.1666	Durbin-Watson stat	0.361265
Prob(F-statistic)	0.000000		

The Durbin-Watson statistic has a value of 0.361265 based on the Durbin-Watson test findings presented above. The Durbin-Watson statistical value ranges between -2 and +2, with a value of 0.361265, which is greater than -2 and less than +2. This indicates that the residuals do not show signs of excessive autocorrelation. Therefore, the data passes the autocorrelation test

Table 8. Heteroscedasticity Test Results

Dependent Variable: ABS(RESID)
Method: Panel Least Squares
Date: 08/25/26 Time: 12:09
Sample: 2021 2024
Periods included: 4
Cross-sections included: 38
Total panel (balanced) observations: 152

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014882	0.004558	3.264762	0.0014
X1	0.013558	0.015545	0.872189	0.3845
X2	-0.021942	0.018354	-1.195523	0.2338

Based on the results of the Glejser heteroscedasticity test, the probability values are > 0.05, namely 0.384 and 0.233, indicating that the data passes the heteroscedasticity test

Table 9. Regression Analysis and Hypothesis Testing

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.082923	0.016416	5.051411	0.0000
X1	0.319828	0.055980	5.713231	0.0000
X2	0.617442	0.066097	9.341455	0.0000
R-squared	0.921469	Mean dependent var		0.689868
Adjusted R-squared	0.920415	SD dependent var		0.174523
SE of regression	0.049234	Akaike info criterion		-3.164906
Sum squared residual	0.361181	Schwarz criterion		-3.105224
Log likelihood	243.5329	Hannan-Quinn criter.		-3.140661
F-statistic	874.1666	Durbin-Watson stat		0.361265
Prob(F-statistic)	0.000000			

1. *Coefficient of Determination (R-squared)*

   The R-squared value of the Fixed Effects model is 0.921469 (92.15%), and the Adjusted R-squared is 0.920415 (92.04%). This indicates that Environmental Accounting (EA) and Green Intellectual Capital (GIC) together are able to explain 92.15% of the variation in the Quality of Sustainability Reports (QSR). This indicates that the model has very high predictive and explanatory capabilities. The remaining 7.85% is explained by other variables outside this research model.

2. *F Test (Simultaneous Significance Test)*

   The F-statistic is 874.1666 with a probability value of 0.0000, indicating that Environmental Accounting and Green Intellectual Capital simultaneously have a significant effect on Sustainability Report Quality.

3. *T-Test (Partial Significance Test)*

   The Impact of Environmental Accounting (EA) on the Quality of Sustainability Reports (QSR):

   Environmental Accounting has a regression coefficient of 0.319828, with a t-statistic of 5.713231 and a probability value of 0.0000. Since the probability value is less than 0.05, Environmental Accounting has a positive and statistically significant effect on Sustainability Report Quality. Therefore, H1 is supported.

   The Influence of Green Intellectual Capital (GIC) on the Quality of Sustainability Reports (QSR): Green Intellectual Capital has a regression coefficient of 0.617442, with a t-statistic of 9.341455 and a probability value of 0.0000. Since the probability value is less than 0.05, Green Intellectual Capital has a positive and statistically significant effect on Sustainability Report Quality. Therefore, H2 is supported.

DISCUSSION

The Influence of Environmental Accounting on the Quality of Sustainability Reports

The results of the Fixed Effects Model (FEM) indicate that Environmental Accounting (EA) has a positive and statistically significant relationship with Sustainability Report Quality (SRQ). The estimated coefficient of Environmental Accounting is 0.319828, with a t-statistic of 5.713231 and a probability value of 0.0000, which is below the 5% significance level. Therefore, H1 is supported, indicating that companies with higher levels of Environmental Accounting tend to have higher Sustainability Report Quality.

This finding suggests that Environmental Accounting provides an internal information mechanism for identifying, measuring, and documenting environmental costs and impacts. In the mining sector, environmental activities such as waste management, energy consumption, emissions control, land rehabilitation, and environmental protection require measurable information. The availability of such information can support companies in preparing sustainability reports that are more complete, systematic, and verifiable. Thus, Environmental Accounting can reduce the dependence of sustainability reporting on general narrative disclosures and strengthen the substantive quality of reported information.

This finding is consistent with the perspective of Stakeholder Theory, which emphasizes that companies are expected to provide relevant and transparent information to stakeholders affected by corporate activities. Environmental Accounting enables companies to provide environmental information that is more measurable and useful for stakeholders. The finding is also consistent with Legitimacy Theory, because reliable environmental information can help companies demonstrate that their environmental activities are aligned with societal expectations.

The Influence of Green Intellectual Capital on the Quality of Sustainability Reports

The FEM results also show that Green Intellectual Capital (GIC) has a positive and statistically significant relationship with Sustainability Report Quality. The coefficient of GIC is 0.617442, with a t-statistic of 9.341455 and a probability value of 0.0000. Because the probability value is below 0.05, H2 is supported.

The larger coefficient of GIC compared with Environmental Accounting indicates that GIC has a stronger estimated association with Sustainability Report Quality within the reported model. This result suggests that environmental knowledge, organizational systems, and stakeholder relationships may contribute substantially to a company's ability to prepare sustainability reports.

Green Human Capital provides employees with environmental knowledge and competencies needed to identify and interpret sustainability information. Green Structural Capital provides organizational systems, procedures, databases, and technologies that support the collection and documentation of environmental information. Meanwhile, Green Relational Capital strengthens relationships with regulators, communities, suppliers, and other stakeholders, thereby increasing incentives for transparent environmental disclosure.

The finding supports Stakeholder Theory, because GIC strengthens the company's ability to respond to increasing stakeholder demands for transparent and credible sustainability information. It also supports Legitimacy Theory, as environmental knowledge and organizational capabilities can help companies demonstrate that their activities are consistent with social and environmental expectations.

CONCLUSION

This study concludes that Environmental Accounting and Green Intellectual Capital have a positive and significant effect on the Quality of Sustainability Reports of mining companies in Indonesia during 2021–2024. Environmental Accounting contributes to improving the quality of sustainability reports by supporting the identification, measurement, and disclosure of environmental information in a more systematic and measurable manner. Green Intellectual Capital also contributes to improving sustainability report quality through environmental knowledge and competencies of employees, organizational systems and procedures, and relationships with external stakeholders.

The results indicate that strengthening internal environmental accounting practices and green intellectual capital is important for companies in the mining sector to produce sustainability reports that are more complete, transparent, and credible. The findings therefore emphasize that the quality of sustainability reporting is not only related to compliance with reporting requirements but also to the company's internal capacity to manage and communicate environmental information.

Overall, this study contributes to the sustainability accounting literature by demonstrating the importance of Environmental Accounting and Green Intellectual Capital as internal mechanisms associated with Sustainability Report Quality, particularly in the context of the Indonesian mining sector during 2021–2024.

Implications

The findings provide several implications for companies and regulators. For companies, the results indicate the importance of strengthening Environmental Accounting and Green Intellectual Capital as internal mechanisms supporting sustainability reporting. Environmental information should be systematically recorded, documented, and linked to measurable environmental performance rather than being limited to general narrative

statements.

For regulators, particularly the Financial Services Authority (OJK), the findings suggest the potential importance of encouraging companies to strengthen environmental information systems and environmental-related organizational capabilities. However, the recommendation to incorporate GIC into regulatory risk assessment should be implemented cautiously because GIC is an intangible construct and its measurement in this study uses a content analysis scoring system of 0, 1, and 2.

Therefore, GIC should not be directly adopted as a mandatory regulatory metric without a standardized measurement framework. OJK could initially develop standardized disclosure guidelines covering measurable dimensions of Green Human Capital, Green Structural Capital, and Green Relational Capital. The indicators should be accompanied by clear definitions, documentation requirements, and, where possible, supporting evidence that can be independently verified.

Such standardization would reduce subjectivity in content analysis and make GIC-related information more comparable across companies. In this way, GIC could potentially become a supplementary indicator for evaluating corporate sustainability capabilities rather than functioning as a stand-alone measure of environmental performance.

Limitations and Suggestions

This study has several limitations. First, the measurement of Environmental Accounting, Green Intellectual Capital, and Sustainability Report Quality relies partly on content analysis of corporate disclosures. Therefore, the scores primarily capture what companies choose to disclose in their reports and may not fully represent their actual environmental practices or tangible environmental impacts. In particular, the GIC measurement using a 0–1–2 scoring approach involves a degree of researcher judgment and may therefore contain subjectivity.

Second, the study focuses only on companies in the Indonesian mining sector during 2021–2024. Consequently, the findings may not be directly generalizable to companies in other sectors or countries with different regulatory and environmental characteristics.

Third, the reported regression model presents a Durbin-Watson statistic of 0.361265, indicating potential positive autocorrelation in the residuals. This represents an important econometric limitation because autocorrelation can affect the reliability of conventional standard errors and statistical significance. Therefore, the statistical conclusions should be interpreted cautiously, and future research should apply appropriate robust estimation techniques or alternative panel-data specifications to address this issue.

Fourth, the study also identifies a potential conceptual overlap between Environmental Accounting and Green Structural Capital because both may rely on similar organizational resources, including environmental information systems, internal databases, procedures, and reporting mechanisms. This overlap may contribute to the relatively high explanatory power of the model and should be examined more carefully in future research through additional diagnostic tests and alternative model specifications.

REFERENCES

Asiaei, K., Bontis, N., Alizadeh, R., & Yaghoubi, M. (2022). Green intellectual capital and environmental management accounting: Natural resource orchestration in favor of environmental performance. *Business Strategy and the Environment*, 31(1), 76–93. https://doi.org/10.1002/bse.2875

Baiyere, A., Salmela, H., Nieminen, H., & Kankainen, T. (2025). Assessing digital capabilities for digital transformation—The MIND framework. *Information Systems Journal*, 35(1), 6–38. https://doi.org/10.1111/isj.12519

Dian Sumarna, A. (2025). The Effect of Green Accounting and Intellectual Capital on Firm Value. In *Jurnal Akuntansi dan Perpajakan* (Vol. 11, Issue 1). http://jurnal.unmer.ac.id/index.php/ap

Jhunjhunwala, S., & Fatima, S. (2025). Two Decades of Research on the Relation of CSR With Earnings Management: Mapping Heterogeneity and Future AGENDA. In *Corporate Social Responsibility and Environmental Managemen*t (Vol. 32, Issue 3, pp. 3438–3453). John Wiley and Sons Ltd. https://doi.org/10.1002/csr.3115

Maharani, SA, & Akbar, FS (2025). The Role of Green Accounting in Improving the Quality of Sustainability Reports. *Atestasi: Scientific Journal of Accounting*, 8(2), 286–295. https://doi.org/10.57178/atestasi.v8i2.1577

Norsita, M., & Iqbal, M. (2023). Analysis of sustainability report disclosure and intellectual capital on the profitability of Indonesian mining sector companies.

Nuryatno, M. (2025). Asian Journal of Management Entrepreneurship and Social Science The Influence Of Green Accounting And Green Intellectual Capıtal On Sustaınabılıty Report Qualıty Moderated By Green Organızatıonal Culture. https://ajmesc.com/index.php/ajmesc

Priamita, R., Ayu Putri Sirait, D., Muliana Br Sebayang, M., & Cahya Sagala, I. (2025). The Influence Of Green Accounting, Intellectual Capital, And Firm Size On The Financial Performance Of Mining Companies Listed On The Indonesia Stock Exchange (Idx) From 2022 To 2024.

Suharyani, RIUAWJ (2019). The effect of stakeholder pressure and corporate governance on the quality of sustainability reports. http://ejournal.umm.ac

Sumaryo, S., Hasanudin, A., Bastian, E., & Ramdhani, D. (2023, October 17). Level of Disclosure of Green Intellectual Capital in Indonesian Mining Companies in Order to Save the Earth from Carbon Emissions. https://doi.org/10.4108/eai.4-11-2022.2329870

Sumiati, S., & Isnaini, A. (2024). The Power of Green Intellectual Capital: Driving Sustainability and Profitability through ESG Practices. *Journal of Management Applications*, 22(4), 1135–1153. https://doi.org/10.21776/ub.jam.2024.022.04.14

Wulandari, DS (2025). Strategic Adaptation and Taxation Strategy. 20, 121–136. https://doi.org/10.5281/putar.10049652#412