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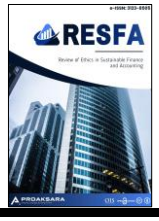

The Effect of Green Intellectual Capital, Green Accounting, and Carbon Emission Disclosure on Enterprise Value: The Moderating Role of Managerial Ownership

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ABSTRACT

This study seeks to examine the influence of green intellectual capital (GIC), green accounting (GA), and carbon emission disclosure (CED) on financial performance, as proxied by enterprise value (EV), whilst also evaluating the moderating role of managerial ownership in mining sector companies listed on the Indonesia Stock Exchange over the 2020–2024 period. A quantitative approach was employed, with secondary data gathered from corporate financial statements and annual reports. Through purposive sampling, a total of 58 companies were selected, yielding 290 observations in aggregate. Data analysis was done by multiple linear regression and Moderated Regression Analysis (MRA) with IBM SPSS 26. The findings reveal that green intellectual capital and green accounting exert a negative and significant effect on enterprise value, whereas carbon emission disclosure was found to bear a positive and significant impact on enterprise value. Managerial ownership was similarly determined to impose a negative and significant effect on enterprise value. As a moderating variable, managerial ownership was shown to reinforce the relationship between green accounting and enterprise value, yet proved unable to moderate the effects of either green intellectual capital or carbon emission disclosure. An Adjusted R-Square value of 0.756 suggests that 75.6 per cent of the variation in enterprise value is accounted by the variables within the research model, with the remaining portion attributed to factors beyond the model. These findings suggest that investments directed toward environmental sustainability do not invariably produce short-term economic gains; nonetheless, transparency in carbon emissions disclosure may strengthen investor confidence and enhance corporate value.

Keywords: Carbon Emission Disclosure, Enterprise Value, Green Intellectual Capital, Green Accounting, Managerial Ownership.

1. INTRODUCTION

Firm value is one of the important indicators that reflects investors' perceptions of growth prospects, a company's ability to create economic value, and the sustainability of company performance in the future. In the mining sector, measuring firm value becomes increasingly important because of the industry's characteristics, which are capital intensive, carry high risk, are influenced by commodity price fluctuations, and face demands for transition toward a low carbon economy. In this context, Enterprise Value (EV) is considered more comprehensive than accounting based indicators because it not only reflects the market value of equity, but also takes into account debt structure, cash position, and other funding components so that it is able to describe the company's economic value more thoroughly (Wisesheet, 2026). The phenomenon of improved performance among Indonesian nickel mining companies, such as PT Aneka Tambang Tbk (ANTM) and PT Vale Indonesia Tbk (INCO), shows that mineral downstream policies, the development of processing and refining facilities, and increasing demand for nickel as a raw material for electric vehicle batteries are able to strengthen company competitiveness and reinforce investor optimism toward the national mining industry. Yet firm value is not only determined by economic performance, but also by the company's ability to integrate sustainability aspects through the implementation of Environmental, Social, and Governance (ESG) practices.

From the perspective of the Resource-Based View (RBV), a company's competitive advantage is determined by its ability to manage strategic resources that are valuable, rare, difficult to imitate, and not easily substituted (Barney, 1991). In the context of sustainability, these resources are reflected through green intellectual capital, green accounting, and carbon emission disclosure. Green intellectual capital describes a company's ability to manage knowledge, human resource competencies, organizational systems, and stakeholder relationships that are environmentally oriented so that they can improve innovation, efficiency, and company competitiveness (Huang & Kung, 2011; Yusoff et al., 2019). Green accounting shows a company's ability to identify, measure, and disclose information related to environmental costs so that it supports operational efficiency, risk control, and increased company accountability (Susilawati et al., 2025). Meanwhile, carbon emission disclosure reflects company transparency in disclosing carbon emission information as a form of commitment to climate change mitigation and the achievement of sustainability targets, which has the potential to increase legitimacy and investor trust. Although in theory these three practices can increase firm value through improved reputation and market trust, the results of previous studies still show inconsistency. Several studies found that green intellectual capital, green accounting, and carbon emission disclosure have a positive effect on firm value (Anugraini et al., 2025; Gantino et al., 2023; Jimmy & Setijaningsih, 2026; V. R. Sari et al., 2025), while other studies show insignificant results or results in a different direction (Adelisa & Mayangsari, 2025; Amelia, 2025; Pelawi & Inawati, 2024).

In addition to inconsistency in research results, most previous studies still use accounting based indicators of firm value such as Return on Assets (ROA) and Return on Equity (ROE), which describe historical performance more than market perception of the company's overall economic value. The use of Enterprise Value in the mining sector becomes more relevant because it is able to represent firm value by taking into account market conditions, capital structure, and the company's ability to create long term value. Research on the simultaneous integration of green intellectual capital, green accounting, and carbon emission disclosure on enterprise value while taking into account internal governance mechanisms is also still relatively limited, particularly for mining companies in Indonesia. Therefore, this study includes managerial ownership as a moderating variable because from the perspective of Agency Theory, share ownership by management can align the interests of managers and shareholders so that it encourages decision making that is more oriented toward the long term. Managers who hold share ownership tend to be more motivated to optimize company resources, improve sustainability practices, and reduce opportunistic behavior (Barney, 1991; Kusumardana et al., 2022; Teece et al., 1997). Based on the empirical phenomenon, theoretical foundation, and research gap described above, this study aims to analyze the effect of green intellectual capital, green accounting, and carbon emission disclosure on enterprise value with managerial ownership as a moderating variable in mining sector companies in Indonesia.

2. LITERATURE REVIEW

2.1. The Effect of Green Intellectual Capital on Enterprise Value

Green intellectual capital (GIC) contributes to increasing enterprise value through the management of human resources, organizational systems, and stakeholder relationships that are sustainability oriented (Chen, 2008). Green human capital drives environmentally friendly innovation that increases efficiency and profitability (Yusoff et al., 2019), while green structural capital strengthens environmental systems and procedures to increase operational efficiency, and green relational capital strengthens reputation, customer loyalty, and market access so that it supports an increase in firm value (Sumiati & Isnaini, 2024). From the perspective of the Resource-Based View (RBV), GIC is a strategic resource that is valuable, difficult to imitate, and integrated so that it is able to create sustainable competitive advantage and increase investor trust (Barney, 1991; Chen, 2008). Empirically, a number of studies show that green intellectual capital has a positive effect on firm value (Adelisa & Mayangsari, 2025; Anugraini et al., 2025; Ericho & Amin, 2024; V. R. Sari et al., 2025; Wahyuni, 2026), however other studies found an insignificant effect (Adelisa & Mayangsari, 2025; Lestari et al., 2022; Nurulhaliza, 2024; Winingsih & Suripto, 2025). Based on the theoretical foundation and the results of previous studies above, the first hypothesis proposed is:

H01: There is no significant effect of green intellectual capital on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha1: There is a significant effect of green intellectual capital on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.2. The Effect of Green Accounting on Enterprise Value

Green accounting is a practice of integrating environmental costs into a company's financial reports as a form of responsibility toward environmental aspects (Yuniwiansyah & Rahayu, 2022). The implementation of green accounting helps companies identify environmental costs more accurately, increase resource use efficiency, and reduce risk due to non-compliance with environmental regulations (Fitriaudi et al., 2025). This condition has the potential to increase company reputation, investor trust, and ultimately drive an increase in enterprise value.

Based on the Resource-Based View (RBV), green accounting is a strategic capability that can become a source of competitive advantage if it meets the characteristics of valuable, rare, inimitable, and organized (Barney, 1991). The transparency and accountability produced also strengthen company reputation, expand access to funding, lower the cost of capital, and increase firm value. A number of studies show that green accounting has a positive effect on firm value (Gantino et al., 2023; Gustinya, 2022; Munawaroh et al., 2026; Yuliani & Prijanto, 2022). However, other studies found that green accounting has no significant effect on firm value (Amelia, 2025; Melvani & Arsjah, 2025; Winingsih & Suripto, 2025). Therefore, based on the theoretical foundation and the results of previous studies, the second hypothesis is formulated as follows:

H02: There is no significant effect of green accounting on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha2: There is a significant effect of green accounting on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.3. The Effect of Carbon Emission Disclosure on Enterprise Value

Carbon emission disclosure reflects a company's environmental commitment while also increasing transparency, operational efficiency, and profitability through emission management, energy efficiency, and control of environmental costs (Bhakti & Wulandari, 2025; Lina & Adelia, 2025). From the perspective of the Resource-Based View (RBV), carbon emission disclosure is a strategic capability that is able to create competitive advantage because it meets the characteristics of valuable, rare, inimitable, and organized (Barney, 1991). This capability becomes a positive signal to investors regarding the company's commitment to sustainability, thereby increasing reputation, reducing information asymmetry, strengthening market trust, and ultimately driving an increase in enterprise value.

Empirically, research shows that carbon emission disclosure has a positive effect on firm value because it increases investor trust, strengthens reputation, and supports sustainable operational efficiency (Simon et al., 2022). Similar findings are also reported by Jimmy and Setijaningsih (2026); Simon et al. (2022); as well as Yuliandhari et al. (2023). However, different results were put forward by Pelawi and Inawati (2024) and Fadila (2025) who found that carbon emission disclosure has no effect on firm value. This difference in findings shows that the economic benefit of carbon emission disclosure has not been consistent, although theoretically it still has the potential to increase enterprise value through increased transparency, company reputation, investor trust, and support for Environmental, Social, and Governance (ESG) aspects. Therefore, based on the theoretical argument and previous empirical findings, this study formulates the third hypothesis as follows:

H03: There is no significant effect of carbon emission disclosure on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha3: There is a significant effect of carbon emission disclosure on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.4. The Effect of Managerial Ownership on Enterprise Value

Managerial ownership is a governance mechanism that is able to align the interests of management with shareholders so that it reduces agency conflict and drives an increase in firm value (Jensen & Meckling, 1976). The greater the proportion of shares held by management, the higher the incentive to make decisions oriented toward the creation of long term value. From the perspective of the Resource-Based View (RBV), managerial ownership also strengthens the use of strategic resources, such as managerial knowledge, experience, and

capability, so that it increases efficiency, competitive advantage, and investor trust which ultimately has an impact on increasing enterprise value (Barney, 1991). This condition is in line with the view that the higher the managerial ownership, the greater the motivation of management to improve company performance and value because they also feel the benefits and risks of decisions as shareholders (Alamsyah & Yulianti, 2022; L. S. Dewi & Abundanti, 2019). Empirically, the positive effect of managerial ownership on firm value is supported by research (Anugraini et al., 2025; L. S. Dewi & Abundanti, 2019; Rustendi & Jimmi, 2008), although other studies show different results, namely that managerial ownership has no significant effect on firm value (Bagaskara et al., 2021; Nugroho, 2017; Syahyono, 2020). Based on the theoretical foundation and previous research above, the following hypothesis is formulated:

H04: There is no significant effect of managerial ownership on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha4: There is a significant effect of managerial ownership on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.5. The Ability of Managerial Ownership to Moderate the Effect of Green Intellectual Capital on Enterprise Value

Green intellectual capital is an accumulation of a company's knowledge, competence, systems, and relations that is oriented toward environmental sustainability, covering green human capital, green structural capital, and green relational capital (Chen, 2008). From the perspective of the Resource-Based View (RBV), green intellectual capital is a strategic resource that is valuable and difficult to imitate so that it is able to create competitive advantage if managed optimally (Barney, 1991). However, these benefits depend heavily on the quality of management's stewardship. Based on Agency Theory, managerial ownership is able to align the interests of managers and shareholders so that it encourages more effective management of green intellectual capital to increase firm value (Jensen & Meckling, 1976). Managerial ownership also drives the optimization of green human capital, green structural capital, and green relational capital as part of the company's business strategy (Chen, 2008). Nevertheless, the results of research on the effect of green intellectual capital on enterprise value still show inconsistency (Adelisa & Mayangsari, 2025; Anugraini et al., 2025; Lestari et al., 2022; Nurulhaliza, 2024; V. R. Sari et al., 2025; Wahyuni, 2026; Winingsih & Suripto, 2025), which indicates a role for a moderating variable. Therefore, managerial ownership is predicted to be able to strengthen the effect of green intellectual capital on enterprise value, so that the fifth hypothesis is formulated.

H05: Managerial ownership is not able to strengthen the effect of green intellectual capital on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha5: Managerial ownership is able to strengthen the effect of green intellectual capital on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.6. The Ability of Managerial Ownership to Moderate the Effect of Green Accounting on Enterprise Value

The implementation of green accounting reflects a company's commitment to integrating environmental aspects into its accounting system and decision making through cost recognition, performance measurement, and disclosure of environmental information (Achmar & Susanti, 2025). From the perspective of the Resource-Based View (RBV), green accounting is a strategic capability that has the potential to increase enterprise value, however its economic benefit depends on the effectiveness of management's stewardship (Barney, 1991). Based on Agency Theory, managerial ownership is able to align the interests of managers and shareholders so that it encourages the implementation of green accounting that is oriented toward the creation of firm value, not merely regulatory compliance (Jensen & Meckling, 1976). Nevertheless, the results of research on the effect of green accounting on enterprise value still show inconsistency (Gantino et al., 2023; Munawaroh, 2026; Amelia, 2025; Melvani & Arsjah, 2025; Winingsih & Suripto, 2025), which indicates a role for a moderating variable. Therefore, managerial ownership is predicted to be able to strengthen the effect of green accounting on enterprise value, so that the sixth hypothesis is formulated as follows:

H06: Managerial ownership is not able to strengthen the effect of green accounting on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha6: Managerial ownership is able to strengthen the effect of green accounting on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

2.7. The Ability of Managerial Ownership to Moderate the Effect of Carbon Emission Disclosure on Enterprise Value

Carbon emission disclosure is a form of company capability in managing and communicating environmental information strategically through the disclosure of quantitative and qualitative data regarding carbon emissions, risks, and prospects to support decision making that is oriented toward sustainability (Rachmawati et al., 2025). However, the effect of carbon emission disclosure on enterprise value still shows inconsistent results (N. P. K. K. Dewi & Nyoman Badera, 2023; Jaya & Nugraheni, 2024; Maryanti et al., 2025; D. R. Putri & Murtanto, 2023; M. R. Putri et al., 2025; Windari, 2025). Under these conditions, managerial ownership is seen as able to strengthen this relationship because managers who are also shareholders have a greater incentive to use carbon emission information to increase operational efficiency, manage environmental risk, and create firm value. Based on Agency Theory (Jensen & Meckling, 1976), managerial ownership aligns the interests of managers and shareholders so that it encourages the more optimal implementation of carbon emission disclosure. Meanwhile, the Resource-Based View (Barney, 1991) explains that the effective management of carbon emission information can become a strategic capability that is valuable, difficult to imitate, and able to create sustainable competitive advantage. Thus, the combination of these two theories shows that managerial ownership has the potential to strengthen the effect of carbon emission disclosure on enterprise value through improved decision making quality, efficiency, and investor trust. Based on the description above, this study formulates the following hypothesis.

H07: Managerial ownership is not able to strengthen the effect of carbon emission disclosure on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

Ha7: Managerial ownership is able to strengthen the effect of carbon emission disclosure on enterprise value in mining sector companies listed on the Indonesia Stock Exchange in the 2020-2024 period.

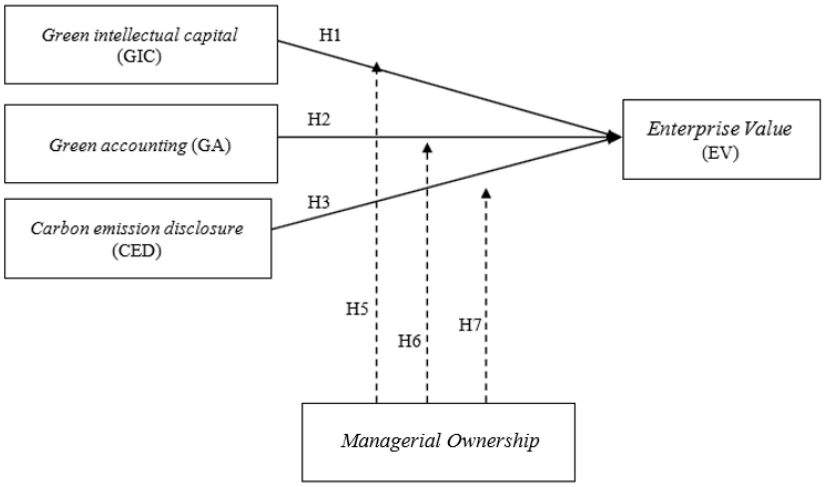

Figure 1. Conceptual Framework

3. RESEARCH METHODS

3.1. Unit of Analysis

The unit of analysis of this research is an organization, which in this case is companies in the energy sector. The focus of attention is the financial reports sourced from energy sector companies listed on the IDX. The object observed is secondary data sourced from financial reports published in the 2020-2024 period.

3.2. Population

Population is a defined group of items or people that has specific attributes or characteristics identified by the researcher for analysis, from which conclusions are drawn (Sugiyono, 2023). Population covers the entirety of items being studied. A sample is a subset of the overall population's quantity and attributes (Sugiyono, 2017). The population of this research is main board energy sector issuers listed on the IDX totaling 65 issuers.

3.3. Sample

The determination of the sample in this research uses the purposive sampling method, which is a sample determination technique based on certain considerations made by the researcher based on characteristics or traits of the population that are already known beforehand (Gunawan, 2022). The data used in this research is secondary data obtained from the financial reports and annual reports of mining sector companies listed on the Indonesia Stock Exchange (IDX) during the 2020-2024 period. Based on these criteria, of the 65 mining sector companies listed on the IDX, there were 3 companies that were not listed consecutively during the 2020-2024 period and 4 companies that did not present complete financial reports, so that 58 companies were obtained as the final sample. With an observation period of 5 years, the total data observed in this research is 290 observations.

3.4. Data Collection Technique

This research was conducted through documentary study, collecting data from various sources and then analyzing the financial reports of mining sector companies listed on the IDX for the years 2020, 2021, 2022, 2023, and 2024. The data is sourced from the IDX website, www.idx.co.id, for the years 2020-2024.

3.5. Variable Operationalization

The variables of this research consist of one dependent variable, three independent variables, one moderating variable, and three control variables. The dependent variable in this research is enterprise value (Y), which is a measure of total firm value that reflects market value more comprehensively than using market capitalization alone. The independent variables consist of Green Intellectual Capital (X1), green accounting (X2), and Carbon Emission Disclosure (X3). Green Intellectual Capital is the capability, relationships, and intellectual elements of a company related to environmental protection and innovation (Maryanti et al., 2025), which in this research is measured using a disclosure index. Green accounting is an accounting approach that integrates environmental costs such as waste management, carbon emissions, and ecological restoration into company reports (Budiantini et al., 2025), with measurement based on environmental costs. Meanwhile, Carbon Emission Disclosure refers to the disclosure of information related to carbon emissions, mitigation strategy, and environmental impact control efforts in the research of M. R. Putri et al. (2025), which is measured using indicators from the CDP Climate Change Disclosure Framework with a score of 1 if disclosed and 0 if not disclosed.

The moderating variable in this research is managerial ownership, which is a condition when managers hold company shares so that they act as both shareholders and decision makers (Royani et al., 2021). This variable is measured using the ratio of the number of shares held by management directors to total shares outstanding. The control variables used include firm size, leverage, and firm age. Firm size describes company size which can be measured through various indicators such as total assets and sales, and in this research is proxied using the natural logarithm of assets. Leverage shows the proportion of assets financed through debt (K. I. Sari & Wahyuni, 2023) and is measured using the Debt to Equity Ratio (DER), which is the ratio of total liabilities to total equity. Meanwhile, firm age describes the length of time a company has been established and under management control (Rathnayake and Gang, 2017 in Kusnarti & Iswara, 2025), which is calculated based on the difference between the research year and the company's founding year (N. P. K. K. Dewi & Badera, 2023).

3.6. Data Analysis Technique

Research data was analyzed using IBM SPSS version 26. The analysis began with descriptive statistics to describe the characteristics of the research data. Next, classical assumption tests were carried out, covering normality, multicollinearity, heteroscedasticity, and autocorrelation tests to ensure the feasibility of the regression model. Hypothesis testing was carried out using multiple linear regression analysis to test the effect of Green Intellectual Capital, Green Accounting, and Carbon Emission Disclosure on financial performance as proxied by Enterprise Value. To test the role of Managerial Ownership as a moderating variable, this research uses Moderated Regression Analysis (MRA) through the formation of an interaction variable between the independent variable and the moderating variable. In addition, Firm Size, Leverage, and Firm Age are used as control variables. Hypothesis testing was carried out through the t test, F test, and coefficient of determination (Adjusted R squared) with a significance level of 5%.

4. RESULTS AND DISCUSSION

4.1. Research Results

4.1.1. Classical Assumption Test Results

A. Normality Test

The normality test was carried out using the One-Sample Kolmogorov-Smirnov method on the LN_EV variable. The test results show an Asymp. Sig. (2-tailed) value of 0.200, which is greater than the significance level of 0.05, so it can be concluded that the research data is normally distributed. This result shows that the LN_EV transformation succeeded in improving the data distribution and meeting the normality assumption required in regression analysis. Thus, the regression model in this research is suitable to be used for further hypothesis testing.

B. Multicollinearity Test

The multicollinearity test was carried out by looking at the tolerance and Variance Inflation Factor (VIF) values of each variable. All variables in this research have tolerance values above 0.10 and VIF values below 10, so it can be concluded that the regression model does not experience symptoms of multicollinearity. Thus, the relationship between the independent variables in the research does not show a high correlation and the model is suitable to be used for further testing.

C. Heteroscedasticity Test

The results of the heteroscedasticity test using a scatterplot graph show that the data points are randomly scattered above and below the number 0 on the Y axis and do not form a certain pattern, such as a wavy, narrowing, or widening pattern. This shows that the regression model in this research does not experience symptoms of heteroscedasticity. Thus, the regression model meets the heteroscedasticity assumption and is suitable to be used for further analysis.

D. Autocorrelation Test

The results of the autocorrelation test using Durbin-Watson show a value of 0.856. This value is within the range of -2 to +2 so that the regression model in this research is declared free of autocorrelation. Thus, the residuals in the regression model do not have a relationship between observation periods and the research model is suitable to be used for further hypothesis testing.

4.1.2. Moderated Regression Analysis (MRA)

Table 1. Results of the Moderated Regression Analysis (MRA) Test

Coefficients[a]								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10.232	0.897		11.409	0.000		
	GIC	-1.086	0.476	-0.135	-2.280	0.023	0.242	4.130
	GA	-0.253	0.036	-0.219	-7.030	0.000	0.872	1.147
	CED	1.734	0.557	0.202	3.114	0.002	0.202	4.958
	KM	-1.122	0.462	-0.135	-2.426	0.016	0.271	3.692
	ABS_GIC_KM	-0.003	0.132	-0.001	-0.024	0.981	0.245	4.083
	ABS_GA_KM	0.221	0.082	0.110	2.702	0.007	0.509	1.965
	ABS_CED_KM	0.059	0.125	0.030	0.473	0.637	0.207	4.820
	FSIZE	0.689	0.031	0.739	22.504	0.000	0.784	1.275
	FAGE	-0.018	0.004	-0.134	-4.322	0.000	0.879	1.138
	DER	-0.049	0.021	-0.072	-2.366	0.019	0.904	1.106

a. Dependent Variable: LN_EV

This research uses Enterprise Value (EV) as a proxy for financial performance which is transformed into natural logarithm form (LN_EV) to address non normal data distribution, reduce the influence of outliers, and increase the stability of the regression model. Hypothesis testing was carried out using Moderated Regression Analysis (MRA) with the absolute difference value method to reduce the problem of multicollinearity in the

moderating variable. The variables tested include Green Intellectual Capital (GIC), Green Accounting (GA), and Carbon Emission Disclosure (CED) as independent variables, and Managerial Ownership (KM) as the moderating variable.

The research results show that GIC and GA have a significant negative effect on Enterprise Value, while CED has a significant positive effect on Enterprise Value. Managerial Ownership also has a significant negative effect on Enterprise Value. In its moderating role, Managerial Ownership is only proven to strengthen the effect of Green Accounting on Enterprise Value, but is not able to moderate the relationship between GIC or CED and Enterprise Value. In addition, the control variables show that Firm Size has a significant positive effect, while Firm Age and Leverage have a significant negative effect on Enterprise Value.

Figure 2. Illustrative Graph of Moderation Direction

Figure 2 presents an illustration of the moderation relationship direction based on the MRA regression coefficients, which shows that at low levels of managerial ownership, the implementation of green accounting tends to be followed by a larger decrease in enterprise value, while at high levels of managerial ownership, this negative impact is relatively smaller. This indicates that managerial ownership has the potential to become a governance mechanism able to reduce investors' negative perception of environmental implementation costs through more effective investment management. However, this graph is only illustrative because this research uses the absolute difference moderation method, namely |ZGA minus ZKM|, not a product interaction model (Ghozali, 2021), so simple slope analysis cannot be applied because this method does not measure the change in slope at a certain moderator level, but rather assesses the difference in distance between the independent variable and the moderator in influencing the dependent variable. The test results show that the variable ABS_CED_KM has a regression coefficient of 0.059 with a significance value of 0.637 greater than 0.05, so that managerial ownership is not able to moderate the effect of carbon emission disclosure on enterprise value. For the control variables, firm size has a positive and significant effect on enterprise value (beta = 0.689; p = 0.000), while firm age (beta = -0.018; p = 0.000) and leverage (beta = -0.049; p = 0.019) have a negative and significant effect on enterprise value.

4.1.3. Hypothesis Testing

A. t Test

The regression coefficient value shows the direction of the relationship between the independent and dependent variables, while the significance value (Sig.) is used to determine whether the resulting effect is statistically significant.

Table 2. t Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.232	0.897		11.409	0.000
	GIC	-1.086	0.476	-0.135	-2.280	0.023
	GA	-0.253	0.036	-0.219	-7.030	0.000
	CED	1.734	0.557	0.202	3.114	0.002
	KM	-1.122	0.462	-0.135	-2.426	0.016
	ABS_GIC_KM	-0.003	0.132	-0.001	-0.024	0.981
	ABS_GA_KM	0.221	0.082	0.110	2.702	0.007

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
ABS_CED_KM	0.059	0.125	0.030	0.473	0.637
FSIZE	0.689	0.031	0.739	22.504	0.000
FAGE	-0.018	0.004	-0.134	-4.322	0.000
DER	-0.049	0.021	-0.072	-2.366	0.019

a. Dependent Variable: LN_EV.

Based on the results of the t test in Table 3, the green intellectual capital (GIC) variable has a negative and significant effect on enterprise value, so the research hypothesis is accepted. This result shows that improved management of green intellectual capital has not been fully appreciated by the market because its economic benefit tends to require time to be realized. The green accounting (GA) variable also has a negative and significant effect on enterprise value, which indicates that the environmental costs incurred by companies can still be perceived as a short term burden. In contrast, carbon emission disclosure (CED) has a positive and significant effect on enterprise value, which shows that the transparency of carbon emission information is able to give a positive signal to investors. The managerial ownership (KM) variable has a negative and significant effect on enterprise value. In the moderation test, the ABS_GIC_KM variable shows that managerial ownership is not able to moderate the effect of green intellectual capital on enterprise value, so the moderation hypothesis is rejected. The ABS_GA_KM variable shows that managerial ownership is able to moderate the effect of green accounting on enterprise value, so the moderation hypothesis is accepted. Meanwhile, the ABS_CED_KM variable shows that managerial ownership is not able to moderate the effect of carbon emission disclosure on enterprise value, so the moderation hypothesis is rejected. For the control variables, firm size has a positive and significant effect on enterprise value, while firm age and leverage have a negative and significant effect on enterprise value, which shows that the characteristics of company size, age, and funding structure also influence firm value.

B. F Test

Table 4. F Test Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	767.937	10	76.794	90.466	0.000[b]
	Residual	236.835	279	0.849		
	Total	1004.772	289			

a. Dependent Variable: LN_EV

b. Predictors: (Constant), DER, FSIZE, ABS_CED_KM, FAGE, GA, GIC, ABS_GA_KM, KM, ABS_GIC_KM, CED

Based on Table 4, the results of the F test show that the research model is simultaneously significant, so that the variables green intellectual capital, green accounting, carbon emission disclosure, managerial ownership, the moderation interaction variables, and the control variables together are able to explain the variation in enterprise value. This result shows that the regression model used is suitable to test the relationships between the research variables. In addition, the natural logarithm transformation of the dependent variable (LN_EV) was carried out to improve the characteristics of the data distribution, reduce the level of skewness, and increase the stability and reliability of the regression model estimation results.

C. Coefficient of Determination Test (R^2)

The coefficient of determination (R^2) is used to measure the ability of the independent variables to explain the variation in enterprise value.

Table 5. Results of the Coefficient of Determination Test (R squared)

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.874[a]	0.764	0.756	0.92134	0.864

a. Predictors: (Constant), DER, FSIZE, ABS_CED_KM, FAGE, GA, GIC, ABS_GA_KM, KM, ABS_GIC_KM, CED
b. Dependent Variable: LN_EV

Based on Table 5, the results of the coefficient of determination test show that the research model has a strong explanatory ability for the variation in Enterprise Value. The Adjusted R Square value shows that most of the change in firm value can be explained by the variables Green Intellectual Capital, Green Accounting,

Carbon Emission Disclosure, managerial ownership, the moderating variables (ABS_GIC_KM, ABS_GA_KM, ABS_CED_KM), and the control variables (Firm Size, Firm Age, and Leverage), while the remainder is influenced by other factors outside the research model. The R value also shows a strong relationship between all the independent, moderating, and control variables and Enterprise Value, while the Std. Error of the Estimate value indicates that the model has a relatively low level of prediction error. The use of the natural logarithm transformation on the dependent variable (LN_EV) was carried out to improve the data distribution, reduce skewness, and increase the stability and reliability of the regression estimation results.

4.2. Discussion

4.2.1. The Effect of Green Intellectual Capital on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) testing in the t test in Table 2, the green intellectual capital variable has a regression coefficient of -1.086 with a t value of -2.280 and a significance of 0.023 less than 0.05. This result shows that green intellectual capital has a negative effect on enterprise value, so the research hypothesis is accepted. The negative coefficient direction indicates that an increase in green intellectual capital is instead followed by a decrease in firm value. This condition shows that investment in the development of green human resources, environmentally friendly technology, green innovation, and sustainability systems is still perceived by the market as a short term cost burden. In addition, based on the data pattern of this research for the 2020-2024 period, the level of green intellectual capital of the sample companies tends to be high and homogeneous, while enterprise value fluctuates due to external factors such as changes in commodity prices, mining industry conditions, the global economy, and the characteristics of enterprise value which are influenced by cash and cash equivalents. Investors also still tend to prioritize short term financial indicators over the benefits of long term environmental investment.

This research result is not in line with the Resource Based View Theory put forward by (Barney, 1991), which explains that strategic resources that are valuable, unique, difficult to imitate, and not substitutable are able to create competitive advantage and improve company performance. This finding also differs from the research of (Chen, 2008) which states that green intellectual capital through green human capital, green structural capital, and green relational capital can increase a company's competitive advantage, as well as the research of (Yusoff et al., 2019) which found that green structural capital and green relational capital contribute to business sustainability. In addition, this result is not in line with Anugraini et al. (2025) which found a positive effect of green intellectual capital on firm value. However, this research result supports the findings of Adelisa and Mayangsari (2025) which shows that green intellectual capital has a negative effect on firm value because companies are still low in disclosing aspects of green intellectual capital and have not fully considered this factor in investment decisions. Thus, the implementation of green intellectual capital in mining sector companies and related industries in Indonesia during the 2020-2024 period has not been able to optimally increase enterprise value because its economic benefit has not been fully reflected in market valuation in the short term.

4.2.2. The Effect of Green Accounting on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) testing in the t test (Table 2), the green accounting variable has a regression coefficient of -0.253, a t value of -7.030, and a significance of 0.000 less than 0.05. This result shows that green accounting has a negative and significant effect on firm value as proxied by enterprise value, so the research hypothesis is accepted. This finding notes that increased implementation of green accounting has not been able to increase firm value, because environmental costs such as waste management, pollution control, environmentally friendly technology, and sustainability reporting are still viewed as a burden that can suppress profitability in the short term. Further, this negative relationship is also thought to be shaped by the measurement of green accounting using the ratio of environmental costs to net profit, so that when net profit decreases, the green accounting ratio increases even though environmental costs remain relatively unchanged. Companies with high enterprise value such as ADRO, BYAN, PTBA, ITMG, and GEMS have large net profits so that the proportion of environmental costs to net profit is lower. This condition shows that the Indonesian capital market in the mining sector during the 2020-2024 period still considers profitability and cash flow prospects more than an increase in environmental costs.

This research result is not in line with the Resource Based View Theory put forward by Barney (1991), which explains that a company's strategic resources that have the characteristics of valuable, rare, inimitable,

and non-substitutable (VRIN) can create competitive advantage and increase firm value. This finding also differs from the research of Munawaroh (2026) which states that green accounting has a positive effect on firm value, as well as Pramiana et al. (2024) which shows that the implementation of green accounting can increase stakeholder trust through compliance with environmental aspects. However, this research result supports the findings of Adelisa and Mayangsari (2025) as well as Prasetiyo and Annisa (2025) which state that green accounting can have a negative impact on firm value in the short term due to the high cost of environmental implementation. Thus, the implementation of green accounting in mining sector companies and related industries in Indonesia has not been fully appreciated by investors, because its economic benefit tends to be long term in nature, while the market is still more focused on financial indicators that are directly visible.

4.2.3. The Effect of Carbon Emission Disclosure on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) testing in the t test (Table 2), the carbon emission disclosure variable has a regression coefficient of 1.734, a t value of 3.114, and a significance level of 0.002 less than 0.05. This result shows that carbon emission disclosure has a positive and significant effect on firm value as proxied using enterprise value, so the research hypothesis is accepted. The positive coefficient shows that the higher the level of carbon emission disclosure, the higher the firm value. This indicates that investors and stakeholders give a positive response to companies that have good environmental transparency because carbon emission disclosure reflects the company's commitment to sustainability, environmental risk management, and increased company legitimacy. Companies with broader carbon disclosure tend to have a better image so that they are able to increase investor trust and drive an increase in firm value.

Based on the data pattern of the research, companies with a high level of Carbon Emission Disclosure (CED) such as ADRO, BYAN, PTBA, ITMG, and GEMS also show an increase in market value. This condition reinforces that carbon emission disclosure becomes a positive signal to investors regarding the quality of governance and business sustainability of the company. This result is in line with the Resource Based View Theory put forward by Barney (1991), that effective management of environmental resources and strategy can create competitive advantage for a company. This finding is also supported by Lina and Adelia (2025) who state that transparent carbon emission disclosure is able to increase reputation and stakeholder trust, Maryanti et al. (2025) who explain that companies with a high level of carbon emission disclosure are better able to manage environmental risk, and Putri and Murtanto (2023) who show that carbon emission disclosure increases public recognition of the company. In addition, Windari (2025) states that carbon emission transparency can attract investors oriented toward sustainable investment. Thus, carbon emission disclosure is proven to be able to increase the enterprise value of mining sector companies and related industries in Indonesia during the 2020-2024 period.

4.2.4. The Effect of Managerial Ownership on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) testing in the t test (Table 2), the managerial ownership variable has a regression coefficient of -1.122, a t value of -2.426, and a significance of 0.016 less than 0.05. This result shows that managerial ownership has a negative and significant effect on enterprise value, so the hypothesis is accepted. This means that an increase in share ownership by management tends to be followed by a decrease in firm value. This condition indicates that high managerial ownership has not been able to optimally increase firm value because it can trigger managerial entrenchment behavior, namely an increase in management dominance in decision making so that shareholder oversight becomes weaker. As a result, management has the potential to be more oriented toward internal interests and short term gains rather than a long term firm value increasing strategy.

The results of this research show that companies with high enterprise value such as ANTM, PTBA, ITMG, GEMS, and INCO have relatively low levels of managerial ownership, while companies with high managerial ownership such as PSAB, GDST, FIRE, and BTON tend to have lower enterprise value. This finding does not fully support the Resource Based View Theory (Barney, 1991) or Agency Theory (Jensen & Meckling, 1976), which explain that strategic resources and managerial ownership can increase firm value through the alignment of the interests of management and shareholders. This research result is not in line with Anugraini et al. (2025) which found a positive effect of managerial ownership on firm value, but is in line with Hidayat and Pesudo (2019) which states that managerial ownership can have a negative impact due to opportunistic actions by management that prioritize personal interests more than shareholder interests. Thus, in mining

sector companies and related industries during the 2020-2024 period, an increase in managerial ownership has not been able to optimally create an increase in enterprise value.

4.2.5. The Role of Managerial Ownership in Moderating the Effect of Green Intellectual Capital on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) test in Table 2, the interaction between green intellectual capital and managerial ownership (ABS_GIC_KM) has a regression coefficient of -0.003 with a significance value of 0.981 greater than 0.05. This result shows that managerial ownership is not able to moderate the effect of green intellectual capital on enterprise value, so the research hypothesis is rejected. This condition is caused by the low proportion of management share ownership in most sample companies, so that it has not been able to give a strong influence on strategic decisions or investor perception. In addition, changes in enterprise value in the mining sector are more influenced by fluctuations in market capitalization due to commodity prices and market conditions than by management ownership structure. This finding is not fully in line with Agency Theory which states that managerial ownership can reduce conflicts of interest between managers and shareholders because managers also feel the benefits and risks of company decisions (Jensen & Meckling, 1976). However, the effectiveness of this mechanism depends heavily on the size of the proportion of shares held by management, if ownership is low, management's ability to influence strategic policy is also limited (Shleifer & Vishny, 1997).

This research result can also be explained through the perspective of the Resource-Based View Theory (RBV) which states that green intellectual capital is a strategic resource that creates competitive advantage through green human capital, green structural capital, and green relational capital (Barney, 1991). Successful management of green intellectual capital is more influenced by the quality of human resources, organizational systems, company culture, and stakeholder relationships than by the level of management share ownership. In line with Stakeholder Theory, the benefit of green intellectual capital is more directed at improving reputation, environmental efficiency, and meeting stakeholder expectations which are long term in nature (Freeman & McVea, 2001). In addition, the concept of managerial entrenchment explains that the relationship between managerial ownership and firm value is not always linear because an increase in ownership beyond a certain point can make management increasingly difficult to supervise (Morck et al., 1988). Thus, the benefit of green intellectual capital requires time to be reflected in an increase in firm value because it is related to the building of long term sustainability capability (Yusoff et al., 2019).

4.2.6. The Role of Managerial Ownership in Moderating the Effect of Green Accounting on Enterprise Value

Based on the results of the moderated regression analysis (MRA) test in Table 5, the interaction variable of green accounting and managerial ownership (ABS_GA_KM) has a coefficient of 0.221 with a significance value of 0.007 (less than 0.05), which shows that managerial ownership moderates by weakening the negative effect of green accounting on enterprise value. This means that the higher the managerial ownership, the smaller the market's negative perception of the environmental costs incurred by the company. This pattern is seen in PT Adaro Energy Indonesia Tbk (ADRO) which increased its environmental costs from around Rp165 billion in 2020 to Rp907 billion in 2024, yet still maintained a high market capitalization and enterprise value supported by management ownership of around 3.9 billion shares. Similar conditions were also found in BYAN, MDKA, and MEDC, where companies with higher managerial ownership tend to be able to maintain firm value despite making large environmental investments. In contrast, companies with low managerial ownership show that an increase in environmental costs is more often perceived as a burden that can suppress short term profitability, thereby impacting a decrease in enterprise value.

This finding shows that the involvement of management as shareholders increases the credibility of environmental investment decisions because management has interests that are aligned with shareholders in creating long term value. This research result is in line with the Resource Based View Theory (Barney, 1991) which explains that the management of strategic resources, including environmental practices and green accounting, can create sustainable competitive advantage. In addition, this finding supports Agency Theory (Jensen & Meckling, 1976) that managerial ownership is able to reduce conflicts of interest and encourage decision making oriented toward increasing firm value. This result is also consistent with the research of Salisa et al. (2021) which states that Good Corporate Governance can strengthen the relationship between green accounting and firm value through increased transparency, environmental responsibility, and investor trust. Thus, managerial ownership plays an important role in increasing the effectiveness of green accounting

implementation in creating enterprise value in mining sector companies listed on the Indonesia Stock Exchange during the 2020-2024 period.

4.2.7. The Role of Managerial Ownership in Moderating the Effect of Carbon Emission Disclosure on Enterprise Value

Based on the results of the Moderated Regression Analysis (MRA) test in Table 2, the interaction variable of carbon emission disclosure and managerial ownership (ABS_CED_KM) has a regression coefficient of 0.059 with a significance value of 0.637 greater than 0.05. This result shows that managerial ownership is not able to moderate the effect of carbon emission disclosure on enterprise value. The low proportion of management share ownership in most sample companies, with some companies even having no managerial ownership at all, causes management to not yet have a sufficiently strong economic incentive to influence carbon emission disclosure policy or investor perception. In addition, enterprise value in the mining sector is more influenced by external factors such as market capitalization, total debt, commodity prices, market conditions, and profit prospects than by the proportion of management share ownership. From the perspective of the Resource-Based View (RBV), managerial ownership should be able to become an internal resource that supports competitive advantage through the effective management of company resources (Barney, 1991). However, the results of this research show that low managerial ownership causes this role to not yet be running optimally. In line with agency theory, managerial ownership is expected to be able to align the interests of management and shareholders (Jensen & Meckling, 1976), but in this research this mechanism has not been strong enough to influence the relationship between carbon emission disclosure and enterprise value.

The insignificance of the managerial ownership moderation effect shows that investors do not yet view management share ownership as a factor able to increase the effectiveness of carbon emission disclosure in creating firm value. Investors tend to consider financial performance, growth prospects, and a company's ability to create long term value more. In addition, carbon emission disclosure can still give rise to negative consequences because this information has the potential to reveal a company's high emission levels and increase the cost of measurement, reporting, and implementation of emission reduction programs (G. Dewi, 2025). Safutri et al. (2023) also explain that carbon emission disclosure is still voluntary in nature so that companies do not yet have a full obligation to disclose the amount of carbon emissions produced. Thus, the research hypothesis is rejected, meaning that managerial ownership is not able to strengthen the effect of carbon emission disclosure on enterprise value in mining sector companies and related industries listed on the Indonesia Stock Exchange during the 2020-2024 period.

5. CONCLUSION

This research aims to analyze the effect of green intellectual capital, green accounting, and carbon emission disclosure on enterprise value with managerial ownership as a moderating variable in mining sector companies and related industries listed on the Indonesia Stock Exchange during the 2020-2024 period. The research uses 58 companies with a total of 290 observations. The research results show that green intellectual capital and green accounting have a negative and significant effect on enterprise value, which shows that environmental investment is still viewed as a short term burden by the market. In contrast, carbon emission disclosure has a positive and significant effect on enterprise value because carbon emission transparency is able to increase investor trust. Managerial ownership has a negative and significant effect on enterprise value, while the moderation test shows that managerial ownership is not able to strengthen the effect of green intellectual capital and carbon emission disclosure on enterprise value, but is able to strengthen the effect of green accounting on enterprise value.

This research supports the Resource-Based View Theory (Barney, 1991) that environment based resources can become a company's strategic capability, although the economic benefit is not always visible in the short term. In addition, the research results support Agency Theory regarding the role of managerial ownership in aligning the interests of management and shareholders, particularly in the implementation of green accounting. Practically, this research provides implications for companies to improve environmental management and sustainability transparency, for investors as material for consideration in assessing a company's environmental commitment, and for regulators in the development of environmental reporting policy. This research has limitations because it only covers the mining sector and the 2020-2024 period and

uses a limited set of variables. Future research is recommended to expand the sector and observation period and add other variables such as good corporate governance, profitability, audit quality, environmental performance, or institutional ownership in order to obtain more comprehensive results.

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