

GREEN ACCOUNTING AND GREEN INTELLECTUAL CAPITAL ON FINANCIAL PERFORMANCE MODERATED WITH GOOD CORPORATE GOVERNANCE

Ni Komang Pusparini¹, I Ketut Sujana²

¹ Accounting Department, Faculty of Economics and Business, Universitas Udayana, Indonesia, komang.pusparini133@student.unud.ac.id

² Accounting Department, Faculty of Economics and Business, Universitas Udayana, Indonesia, ketutsujana_fe@unud.ac.id

* Corresponding Author: e-mail : komang.pusparini133@student.unud.ac.id

Abstract: Financial performance shows how well a company manages its resources to achieve its goals. In the context of sustainability, companies in the transportation and logistics sector for the period 2021–2024, as high contributors to carbon emissions, are faced with demands to implement environmentally friendly practices. This study aims to examine the influence of green accounting and green intellectual capital (GIC) on financial performance, as well as the role of good corporate governance (GCG) as a moderating variable. The research sample consists of 24 companies in the transportation and logistics sector listed on the Indonesia Stock Exchange for the period 2021–2024, selected using purposive sampling. The data were analyzed using moderated regression analysis (MRA), and the selection of GCG indicators used confirmatory factor analysis (CFA). The results show that green accounting and GIC support improved financial performance, but GCG does not strengthen this relationship. This study suggests improving the quality of GCG to be in line with the company's sustainability commitments.

Keywords: Green Accounting; Green Intellectual Capital; Good Corporate Governance; Financial Performance; Return on Assets.

INTRODUCTION

Financial performance shows how well a company manages its resources to achieve its goals. In the context of sustainability, companies in the transportation and logistics sector for the period 2021–2024, as high contributors to carbon emissions, are faced with demands to implement environmentally friendly practices. This study aims to examine the influence of green accounting and green intellectual capital (GIC) on financial performance, as well as the role of good corporate governance (GCG) as a moderating variable. The research sample consists of 24 companies in the transportation and logistics sector listed on the Indonesia Stock Exchange for the period 2021–2024, selected using purposive sampling. The data were analyzed using moderated regression analysis (MRA), and the selection of GCG indicators used confirmatory factor analysis (CFA). The results show that green accounting and GIC support improved financial performance, but GCG does not strengthen this relationship. This study suggests improving the quality of GCG to be in line with the company's sustainability commitments.

The transportation sector in Indonesia accounts for around 44% of national carbon emissions (KLHK, 2023), making it one of the sectors under the highest pressure to implement environmentally friendly strategies. The Financial Services Authority (OJK) through POJK No. 51/POJK.03/2017 requires companies to prepare sustainability reports covering environmental, social, and governance aspects. To address this requirement, green accounting and green

intellectual capital (GIC) have emerged as approaches being adopted by companies to integrate sustainability issues into their business strategies.

Several previous studies have shown that green accounting and GIC can improve corporate efficiency and reputation, thereby impacting financial performance (Dewi et al., 2024; Xie et al., 2021). However, other findings show no significant relationship between the two (Sukirman & Dianawati, 2023). These differing results indicate a research gap that requires further exploration, one approach being to incorporate the moderating variable of good corporate governance (GCG) into the relationship.

The novelty of this study lies in the integration of three main concepts, namely green accounting, GIC, and GCG, into a single empirical model based on panel data in the Indonesian transportation sector. In addition, this study uses a confirmatory factor analysis (CFA) approach to select the best GCG indicators, an approach that is still rarely used in the context of sustainability accounting in Indonesia. This approach is expected to provide more objective and applicable results for corporate decision-makers and regulators. This study aims to examine the influence of green accounting and green intellectual capital on financial performance, as well as to analyze whether good corporate governance can strengthen this relationship as a moderating variable.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Literature Review

Stakeholder theory

The stakeholder theory was first introduced by the Stanford Research Institute in 1963 and later elaborated upon by Freeman (1984). This theory explains that the sustainability and success of a company do not only depend on the interests of shareholders, but also on the company's ability to balance the interests of other stakeholders, such as employees, customers, suppliers, the community, and the environment. Companies that are able to maintain good relationships with stakeholders through transparency, accountability, and attention to environmental impacts tend to gain greater support, whether in the form of trust, loyalty, or investment. Thus, stakeholder theory emphasizes that a company's value and performance can be improved through harmonious relationship management with all interested parties.

In the context of this study, stakeholder theory is used to explain the role of green accounting and green intellectual capital as forms of corporate responsibility toward the environment. Green accounting helps companies integrate the costs and benefits of environmentally friendly activities into financial reports, thereby improving efficiency and reputation in the eyes of stakeholders. Meanwhile, green intellectual capital, which includes knowledge, skills, and innovation based on the environment, can create sustainable competitiveness and strengthen stakeholder trust. However, the effectiveness of these two practices is greatly influenced by good corporate governance (GCG) as a moderating mechanism. Good corporate governance ensures that management policies are implemented transparently and accountably, so that the positive impact of GA and GIC implementation can be optimized in improving financial performance (Kyere & Ausloos, 2020).

Financial performance reflects a company's ability to manage resources to generate profits and added value for stakeholders (Yudhia et al., 2021). According to Rahayu (2020), financial performance can be measured by various financial ratios, one of which is Return on Assets (ROA), which is relevant for assessing the effectiveness of a company's use of assets in generating profits. In this study, ROA was chosen as a proxy because it is appropriate for the

capital-intensive nature of the transportation sector.

Green accounting is an accounting development that integrates environmental cost and benefit information into financial statements (Putri et al., 2024). According to Dewi et al. (2024), the application of green accounting can improve cost efficiency, transparency, and company legitimacy in the eyes of stakeholders. This supports stakeholder theory, which emphasizes the importance of environmental accountability as a form of fulfilling stakeholder expectations.

Green Intellectual Capital. Chen (2008) introduced the concept of green intellectual capital as a form of intellectual capital adaptation with sustainability principles. GIC consists of three components: green human capital, green structural capital, and green relational capital. Jirakraisiri et al. (2021) found that GIC can support environmentally friendly innovation and strengthen company competitiveness. Thus, GIC is seen as playing an important role in improving financial performance through sustainability strategies.

Good corporate governance is a corporate governance system that ensures the management of a company is carried out in accordance with the principles of transparency, accountability, responsibility, independence, and fairness (Misutari & Ariyanto, 2021). According to Wei et al. (2023), the implementation of good GCG can improve the effectiveness of supervision, minimize conflicts of interest, and strengthen the company's relationship with stakeholders. In this study, GCG is seen as being able to moderate the relationship between green accounting and green intellectual capital with financial performance.

Hypotheses

The Impact of Green Accounting on Financial Performance.

Based on stakeholder theory (Freeman, 1984), companies are required to consider the interests of all stakeholders, including the environment, making the implementation of green accounting a form of accountability. This implementation is expected to improve legitimacy and financial performance. Dewi et al. (2024) and Pratiwi & Rahayu (2018) found that green accounting has a positive effect on profitability, although Sukirman & Dianawati (2023) showed insignificant results. Therefore, the first hypothesis is that green accounting has a positive effect on financial performance.

H1: Green accounting has a positive effect on financial performance.

The Effect of Green Intellectual Capital on Financial Performance.

Green intellectual capital (GIC) consists of green human capital, green structural capital, and green relational capital, which are believed to be able to create environmentally friendly innovations and increase company competitiveness (Chen, 2008). In line with stakeholder theory, GIC supports the fulfillment of stakeholder expectations through sustainability strategies. Research by Chandra & Agustine (2019) and Jirakraisiri et al. (2021) shows that GIC has a positive impact on financial performance, but research by Nr & Yurniwati (2018) found no significant impact. Therefore, the second hypothesis is that green intellectual capital has a positive impact on financial performance.

H2: Green intellectual capital has a positive effect on financial performance.

The Moderating Role of Good Corporate Governance in the Relationship Between Green Accounting and Financial Performance.

Good corporate governance (GCG) plays a role in ensuring that sustainability practices are carried out in accordance with the principles of transparency, accountability, and oversight (Misutari & Ariyanto, 2021). In the context of stakeholder theory, GCG is believed to strengthen the influence of green accounting on financial performance by minimizing conflicts of interest

and increasing investor confidence. Research by Fitriyani & Sungkar (2024) and Misutari & Ariyanto (2021) shows that GCG strengthens the relationship between sustainability practices and company performance. Therefore, the third hypothesis is that good corporate governance moderates the influence of green accounting on financial performance.

H3: Good Corporate Governance strengthens the positive influence of Green Accounting on financial performance.

The Moderating Role of Good Corporate Governance in the Relationship between Green Intellectual Capital and Financial Performance.

In addition to strengthening the implementation of green accounting, good corporate governance is also believed to strengthen the influence of green intellectual capital on financial performance because good governance ensures that sustainable innovation strategies are implemented consistently and effectively. This aligns with stakeholder theory, which emphasizes the importance of stakeholder trust in a company's sustainability practices. Wei et al. (2023) found that GCG enhances the effectiveness of innovation strategies in supporting profitability. Therefore, the fourth hypothesis is that good corporate governance moderates the influence of green intellectual capital on financial performance.

H4: Good Corporate Governance strengthens the positive influence of Green Intellectual Capital on financial performance.

Figure 1 below presents a conceptual model illustrating the relationships between the variables tested in this study:

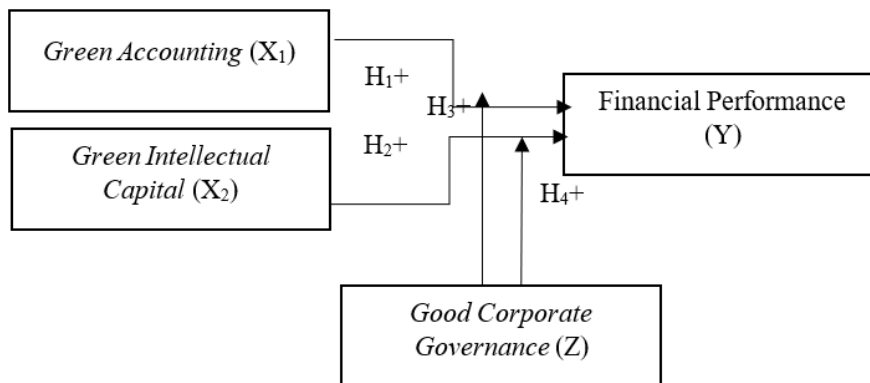


Figure 1 Conceptual Model

METHOD

This study uses a quantitative approach with a causal research design. The data used are secondary data obtained from annual reports and sustainability reports of transportation sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2021–2024. The research objects are transportation sector companies that have operational activities with high environmental impact, thus having strong relevance to sustainability practices. The research was conducted in Indonesia, with companies as the unit of analysis.

Population and Sample. The population in this study is all transportation sector companies listed on the Indonesia Stock Exchange (IDX) during the period 2021–2024. The sample was determined using purposive sampling, a sampling technique based on specific criteria tailored to the research objectives. This technique was chosen to ensure that only companies with complete and relevant The data were analyzed.

Table 1. Kriteria Sampel

Criteria	Number of Companies
Transportation and logistics companies listed on the IDX during the observation period of 2021–2024.	37
Transportation and logistics companies that were not consistently listed on the IDX during the observation period of 2021–2024.	(10)
Transportation and logistics companies whose annual reports and sustainability reports were not accessible during the observation period of 2021–2024.	(3)
Total number of companies sampled	24
Total research sample over the 4-year observation period	96

Based on these criteria, 24 companies were selected as research samples with a total of 96 observations.

Operational Definition of Variables. The operational definition of variables explains the concepts of each research variable systematically, including how they are measured quantitatively. This study uses one dependent variable, two independent variables, and one moderating variable.

Table 2. Operational Variable Definition

Variabel	Definisi Operasional	Indikator
Financial Performance (Y)	Financial performance is measured using the Return on Assets (ROA) ratio, which indicates a company's efficiency in utilizing total assets to generate profits. The higher the ROA value, the more efficient the company is in managing resources to obtain net profits.	$ROA = \frac{\text{Net Income for The Year}}{\text{Total Assets}} \times 100\%$
	Green accounting is an accounting reporting system that includes environmental costs in a company's financial statements as a form of accountability for ecological impacts	
Green Accounting (X₁)		Companies are given a score of 1 if they report on one of the environmental costs such as waste management, energy efficiency, or environmental rehabilitation in their annual or sustainability reports; and a score of 0 if they do not (Ramadhani et al., 2022).

(Dewi & Narayana, 2020). In this study, GA is measured using a dummy variable.

Green Intellectual Capital (X₂)

Green intellectual capital is intangible capital consisting of green human capital, green structural capital, and green relational capital. GIC is measured based on the amount of disclosure of these three dimensions in the company's annual or sustainability reports.

$$GIC = \frac{\text{Number of items disclosed by the company}}{\text{Number of items contained in the GIC}}$$

Good Corporate Governance (M)

GCG as a moderating variable is measured based on four indicators, namely the proportion of institutional ownership (IO), managerial ownership (MO), board of an audit committee (AC), and an independent board of commissioners (IC).

$$IO = \frac{\text{Total Institutional Share}}{\text{Number of shares outstanding}} \times 100\%$$

$$MO = \frac{\text{Number of shares owned by management}}{\text{Number of shares outstanding}} \times 100\%$$

$$AC = \frac{\sum \text{Number of Audit Committees}}{\text{Number of Board Members}} \times 100\%$$

$$IC = \frac{\text{Number of Independent Board Members}}{\text{Number of Board Members}} \times 100\%$$

The data analysis techniques used in this study employ secondary The data in the form of panel The data, which combines time series and cross-section The data, offering advantages in observing company dynamics over time while also enabling comparisons between companies. The analysis began with Confirmatory Factor Analysis (CFA) to test the validity of the good corporate governance (GCG) construct and select the most representative indicators from a set of available indicators. The next stage was descriptive statistical analysis, which aimed to describe the characteristics of the research data through measures of the data quantity, minimum value, maximum value, mean, and standard deviation. Next, panel regression model estimation is conducted using three main approaches: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). To determine the most appropriate

model, three testing stages are used: the Chow Test to compare CEM with FEM, the Hausman Test to compare FEM with REM, and the Lagrange Multiplier (LM) Test to compare CEM with REM. These three tests ensure the selection of the most appropriate panel model based on the characteristics of the research data.

After the panel regression model was selected, the next step was to conduct classical assumption tests to ensure the model's validity. The tests conducted included a heteroscedasticity test using the Breusch-Pagan method to assess whether the residual variance was constant across observations, while the multicollinearity test was not applied due to the presence of moderating variables that could potentially cause technical multicollinearity. The main analysis in this study was conducted using Moderated Regression Analysis (MRA) to test the extent to which GCG moderates the relationship between green accounting (GA) and green intellectual capital (GIC) on financial performance (ROA). The MRA model is formulated in the panel regression equation as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 M + \beta_4 X_1 M + \beta_5 X_2 M + \epsilon$$

Through these equations, direct relationships and interactions between variables are tested partially and simultaneously. The results of the analysis are then evaluated using the coefficient of determination (R^2) to measure how much of the variation in ROA can be explained by the model, model validity tests (F test or Wald Chi-square test) to assess simultaneous effects, and partial hypothesis tests (t-test) to assess the significance of each variable. The entire analysis of the data is carried out using STATA 15 software.

RESULTS AND DISCUSSION

Confirmatory Factor Analysis. Based on the results of Confirmatory Factor Analysis (CFA) on the construct of good corporate governance (GCG), which consists of managerial ownership (MO), institutional ownership (IO), board of audit committee (AC), and independent board of commissioners (IC), it was found that the MO indicator had a loading value of 0.73 with a significant p-value of 0.012, making it the strongest and most suitable indicator to represent the GCG construct. Meanwhile, although the IO indicator was significant with a loading of -0.86, it could not be used because the negative direction of the relationship did not align with the principles of the reflective model. The other two indicators, BoC and IC, were not significant with very low loading values, so their contribution to the GCG construct was considered weak. Therefore, this study only used the MO indicator as a representation of the GCG moderation variable in the moderation regression model.

Tabel 3. CFA Test Results

Variables	Loading coefficient (standard)	p-value	Interpretation
MO	0,73	0,012	Significant and strong
IO	-0,86	0,012	Significant (negative)
AC	-0,12	0,289	Not significant
IC	-0,06	0,624	Not significant

Descriptive statistics are used to provide an overview of the characteristics of the research data, which consists of return on assets (ROA) as the dependent variable, green accounting (GA) as the first independent variable, green intellectual capital (GIC) as the second independent

variable, and good corporate governance (GCG) represented by the managerial ownership (MO) indicator as the moderating variable. Before performing regression analysis, the data was examined to detect outliers that could potentially affect the validity of the estimates. Detection was performed using the interquartile range (IQR) method, where data was categorized as an outlier if it was below the lower limit ($Q_1 - 1.5 \times IQR$) or above the upper limit ($Q_3 + 1.5 \times IQR$). This method was chosen because it does not require a normal distribution and is more suitable for the financial data, which tends to be non-parametric (Ghozali, 2018). After data cleaning, the number of observations used in the regression analysis decreased from 96 to 67, so the analysis results are expected to be more accurate and representative.

Tabel 4. Results of Descriptive Statistical Analysis

Variabel	Before Outlier (N = 96)				After Outlier (N = 67)			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Y	0,698	0,245	-0,580	2,072	0,033	0,056	-0,064	0,179
X1	0,864	0,343	0	1	0,641	0,483	0	1
X2	0,565	0,224	0,11	0,94	0,630	0,206	0,167	0,944
M	0,081	0,188	0	0,76	0,125	0,217	0	0,75

Table 4 shows that the ROA variable underwent significant changes after the removal of outliers. The maximum value, which was originally 2.072 for Express Trasindo Utama Tbk. (2021), decreased to 0.179, while the minimum value increased from -0.580 for Garuda Indonesia (Persero) Tbk. (2021) to -0.065 . The average ROA decreased from 0.059 to 0.033, followed by a decrease in standard deviation from 0.263 to 0.057. These changes indicate that the distribution of ROA after cleaning became more stable, concentrated, and free from the influence of extreme values that could distort the regression analysis results.

Panel Data Regression Model

The panel data model combines the cross-sectional and time-series data of the The data. This study uses three estimation approaches: CEM, FEM, and REM. All three are compared to determine the best model according to the data characteristics.

Tabel 5. Common Effect Model (CEM)

Variabel	Coefficient	t- Statistik	p- Value
X1 (GA)	0,0275	2,07	0,042
X2 (GIC)	0,1267	4,12	0,000
M (KM)	0,4917	5,03	0,000
X1M (GA x KM)	-0,0767	-1,18	0,242
X2M (GIC x KM)	-0,6456	-3,84	0,000
_cons	-0,0719	-3,29	0,002
R- squared : 0,3870			
Adj R- squared : 0,3368			
Prob>F : 0,0000			

Common Effect Model (CEM)

The CEM estimation results in Table 5 show that the variables of green accounting (GA), green intellectual capital (GIC), and managerial ownership (KM) have a significant positive effect

on return on assets (ROA). GA has a coefficient of 0.0275 with a p-value of 0.042, while GIC has a coefficient of 0.1267 with a p-value of 0.000, meaning that the higher the implementation of green accounting and green intellectual capital management, the higher the company's profitability. KM is also significantly positive with a coefficient of 0.4917, confirming that management ownership of shares can enhance financial performance. Meanwhile, the interaction between GA and KM is not significant (p-value 0.242), so GCG does not moderate the relationship between GA and ROA. Conversely, the interaction between GIC and KM has a significant negative effect (coefficient – 0.6456; p-value 0.000), indicating that managerial ownership actually weakens the influence of GIC on ROA. Overall, the CEM model is significant (Prob > F = 0.0000) with an Adjusted R-squared of 0.3368, meaning that approximately 33.68% of the variation in ROA can be explained by the variables in the model.

Tabel 6. Fixed Effect Model (FEM)

Variabel	Coefficient	t- Statistik	p- Value
X1 (GA)	0,0303	2,37	0,023
X2 (GIC)	0,0519	0,89	0,380
M (KM)	0,4494	3,10	0,004
X1M (GA x KM)	-0,0979	-2,00	0,052
X2M (GIC x KM)	-0,4380	-1,97	0,056
_cons	-0,0338	-0,87	0,392
R-squared (within) : 0,2359			
Prob>F : 0,0000			

Fixed Effect Model (FEM)

The FEM estimation takes into account differences in characteristics between companies. The results show that GA has a significant positive effect on ROA (coefficient 0.0303; p-value 0.023), confirming that the implementation of green accounting consistently improves financial performance. The GIC variable has a positive direction but is not significant (p-value 0.380), so it has not been proven to contribute significantly to profitability. KM is again significantly positive (coefficient 0.4494; p-value 0.004), indicating that the greater the managerial ownership, the higher the financial performance. However, the moderating role of GCG through the interactions GA×KM and GIC×KM is not significant (p-value 0.052 and 0.056), although both coefficients are negative. This suggests that KM tends to weaken the influence of GA and GIC on ROA, although this weakening is not statistically significant. Overall, the FEM model is significant (Prob > F = 0.0000) with an R-squared (within) of 0.2359.

Tabel 7. Random Effect Model

Variabel	Coefficient	z- Statistik	p- Value
X1 (GA)	0,0306	2,68	0,007
X2 (GIC)	0,1045	2,62	0,009
M (KM)	0,4757	4,26	0,000
X1M (GA x KM)	-0,0981	-2,12	0,034
X2M (GIC x KM)	-0,5310	-2,92	0,004
_cons	-0,0645	-2,23	0,026
R-squared : 0,3670			
Prob > chi ² : 0,0001			

Random Effect Model (REM)

The REM estimation results (Table 4.6), selected based on the Hausman test, show that GA and GIC both have a significant positive effect on ROA, with coefficients of 0.0306 (p-value 0.007) and 0.1045 (p-value 0.009), respectively. This confirms that both the implementation of green accounting and the development of green intellectual capital contribute significantly to improving corporate profitability. The KM variable is also significantly positive (coefficient 0.4757; p-value 0.000), confirming the role of managerial ownership in improving financial performance. Unlike CEM and FEM, in the REM model, the moderating role of KM is significantly negative: the interaction between GA and KM has a coefficient of -0.0981 (p-value 0.034), and the interaction between GIC and KM has a coefficient of -0.5310 (p-value 0.004). This indicates that managerial ownership actually weakens the influence of GA and GIC on company profitability. Overall, the REM model is significant (Prob > $\chi^2 = 0.0001$) with an R-squared value of 0.3670, meaning that 36.70% of the variation in ROA can be explained by the research variables.

The Chow test was conducted to determine whether the common effect model (CEM) or fixed effect model (FEM) was more appropriate. The test results showed an F value of 4.42 with a probability of 0.0000 (< 0.05). This means that there is a significant difference between the model that does not take into account the individual effects of companies (CEM) and the model that includes individual effects (FEM). Thus, the null hypothesis is rejected, and FEM is declared more appropriate than CEM.

After the FEM was selected from the previous test, a Hausman test was conducted to compare the fixed effect model (FEM) with the random effect model (REM). The test results showed a $\chi^2(5)$ value of 2.63 with a probability of 0.7574 (> 0.05). This value indicates that there is no significant difference between FEM and REM, so the null hypothesis cannot be rejected. Thus, the random effect model (REM) is considered more efficient to use.

Tabel 8. Chow Test and Hausman Test

Test Name	Approach Tested	Result	Selected Approach
Chow Test	CEM vs FEM	Prob > F = 0,000	FEM
Hausman Test	FEM vs REM	Prob > $\chi^2 = 0,7574$	REM

Table 8 shows the results of the Chow test, which obtained a Prob > F value of 0.000, indicating that the fixed effect model (FEM) is more appropriate than the common effect model (CEM). However, the Hausman test results gave a Prob > χ^2 value of 0.7574, meaning that there was no significant difference between FEM and the random effect model (REM), so REM was considered more appropriate. The difference in the results of these two tests indicates inconsistency in model selection, necessitating further testing.

Therefore, the Breusch-Pagan Lagrange Multiplier (LM) test was conducted to directly compare CEM and REM. This additional test aims to ensure the most appropriate panel regression model is used, so that the estimation results can be interpreted more accurately and reflect the overall characteristics of the research data. The test results showed a chi-square value of 18.65 with a probability of 0.0002 (< 0.05), meaning the null hypothesis was rejected. This indicates that REM is more appropriate than CEM, as there is significant individual variance in the data.

Tabel 9. Model Selection Test Results

Test Name	Approach Tested	Result	Selected Approach
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Chow Test	CEM vs FEM	Prob > F = 0,000	FEM
Hausman Test	FEM vs REM	Prob > chi ² = 0,7574	REM
Breusch-Pagan Lagrange (LM)	Multiplier CEM vs REM	Prob > chi ² = 0,0002	REM

Based on the three tests conducted, the best model used in this study is the random effect model (REM). This model is considered more efficient than FEM and CEM because it is able to capture random variations between companies and produce estimates that satisfy the best linear unbiased estimator (BLUE) property (Gujarati, 2009).

Panel Data Moderated Regression Analysis. The model used in this study is moderated regression analysis (MRA) with a random effect model (REM) approach, which aims to test the effect of green accounting (X₁) and green intellectual capital (X₂) on financial performance (ROA), with good corporate governance (KM) as the moderating variable. The interaction variables used are X₁M (GA × KM) and X₂M (GIC × KM) to capture the moderating role. Based on the MRA test results on the REM, the R² (overall) value obtained was 0.3670, meaning that 36.70% of the variation in ROA can be explained by the independent variables and interactions in the model, while the remainder is influenced by factors outside the research model. Additionally, the Prob > Chi² value of 0.0001 indicates that the regression model is significantly simultaneous, leading to the conclusion that the combination of green accounting, green intellectual capital, good corporate governance, and the interactions among these variables collectively influence corporate financial performance.

Tabel 10. Analisis Regresi Moderasi Data Panel

Variabel	Coefficient	z- statistik	p- value
X ₁ (GA)	0,0306	2,68	0,007
X ₂ (GIC)	0,1045	2,62	0,009
M (KM)	0,4757	4,26	0,000
X ₁ M (GA x KM)	-0,0981	-2,12	0,034
X ₂ M (GIC x KM)	-0,531	-2,92	0,004
_cons	-0,0645	-2,23	0,026
R ² (overall) = 0,3670			
Wald Chi ² = 25,63			
Prob > Chi ² = 0,0001			

Table 10 shows the results of the moderated regression analysis (MRA) with a random effect model, yielding the following regression equation:

$$ROA = -0,0645 + 0,0306X_1 + 0,1045X_2 + 0,4757M - 0,0981X_1M - 0,5310X_2M + \varepsilon.$$

The equation shows that the constant value of -0.0645 represents the company's basic ROA when green accounting (GA), green intellectual capital (GIC), good corporate governance (GCG), and the interaction between variables are zero. The GA (X₁) coefficient of 0.0306 is significant at the 1% level, indicating that the implementation of green accounting contributes significantly to improving the company's financial performance. Similarly, GIC (X₂) also shows a significant coefficient of 0.1045, meaning that the higher the green intellectual capital, the better the company's profitability. The moderating variable, GCG proxied by managerial ownership (M), also has a positive and significant effect on ROA with a coefficient of 0.4757, meaning that the higher

the managerial ownership, the better the financial performance achieved. However, different results emerge for the interaction variable: GA × GCG (X_{1M}) has a coefficient of -0.0981 and is significant, meaning that the presence of GCG weakens the positive relationship between GA and ROA. Similarly, the interaction GIC × GCG (X_{2M}) with a coefficient of -0.5310 is also significant, indicating that managerial ownership weakens the influence of green intellectual capital on profitability. Thus, although GA, GIC, and GCG individually have a positive effect on financial performance, the role of GCG as a moderating variable in this study is negative, as it weakens the influence of both sustainability variables on ROA.

Model Validity Test. The Model Validity Test (Wald χ^2) was conducted to assess the significance of the model simultaneously. The regression results show a Wald χ^2 value of 25.63 with a probability of 0.0001, which is less than the 5% significance level. This proves that the variables of green accounting (GA), green intellectual capital (GIC), good corporate governance (GCG), and moderating interactions (GA × GCG and GIC × GCG) collectively influence return on assets (ROA). Thus, the panel regression model used is statistically significant and suitable as a basis for hypothesis testing.

Coefficient of Determination Test. The Coefficient of Determination (R^2) test is used to measure the model's ability to explain variations in ROA. The analysis results show an R^2 (within) value of 0.2404, meaning that approximately 24.04% of ROA variation is explained by the dynamics of independent variables within the company over time. The R^2 (between) value of 0.3998 indicates that 39.98% of ROA variation is caused by differences in characteristics between companies. The R^2 (overall) value of 0.3670 indicates that, overall, the model is able to explain 36.70% of the variation in company financial performance. This value indicates that the model has sufficient explanatory power in the context of the annual panel data for the transportation sector analyzed.

t- Test. The Hypothesis Test (t-test) was used to determine the effect of each variable on ROA. The test results show that green accounting (X_1) has a significant positive effect on ROA (coefficient 0.0306; $p = 0.007$), so H_1 is accepted. Green intellectual capital (X_2) also has a significant positive effect (coefficient 0.1045; $p = 0.009$), so H_2 is accepted. However, the interaction between GA × GCG (X_{1M}) has a significant negative effect (coefficient -0.0981; $p = 0.034$), so H_3 is rejected. Similarly, the interaction between GIC × GCG (X_{2M}) has a significant negative effect (coefficient -0.5310; $p = 0.004$), so H_4 is rejected. Thus, although GA and GIC are proven to improve financial performance, the moderating role of GCG actually weakens the relationship between the two and ROA.

of this study indicate that green accounting (GA) has a positive influence on corporate financial performance, so it can be concluded that the higher the implementation of green accounting in corporate activities, the greater the financial performance that can be achieved. The implementation of GA is not merely a form of administrative compliance, but also a business strategy that provides added value through the integration of environmental issues into the corporate accounting system. By identifying, measuring, recording, and reporting the costs and benefits of environmental activities transparently, companies can more easily assess the economic impact of environmental policies, reduce resource waste, and minimize environmental risks that could lead to additional costs in the future. This process directly impacts operational efficiency, protects the company's reputation, and enhances stakeholder trust, ultimately leading to increased profitability.

This finding aligns with Freeman's (1984) stakeholder theory, which states that a company's success and sustainability are largely determined by its ability to maintain good relationships with all stakeholders, including investors, consumers, employees, the government, and the

community. By effectively implementing GA, a company sends a positive signal that it is accountable for the environmental impacts of its business activities, thereby gaining social legitimacy and support from stakeholders. This stakeholder trust is crucial as it can enhance consumer loyalty, increase investment opportunities, and improve a company's access to funding sources. Various empirical studies also reinforce these findings, such as Riyadh (2020), who found that GA has a significant positive effect on financial performance, as well as Dewi et al. (2024) and Bangun et al. (2024), who emphasize that the implementation of GA strengthens environmental reporting accountability, improves reputation, and strengthens stakeholder trust. Additionally, Choiriah & Lysandra (2022) in their study of the Indonesian manufacturing sector found that GA not only impacts operational efficiency but also creates barriers to entry for new competitors and enhances perceptions of corporate sustainability.

Thus, the results of this study confirm that GA has a real contribution to improving financial performance, both through internal mechanisms such as operational efficiency and environmental risk management, and through external mechanisms such as enhanced reputation, legitimacy, and stakeholder trust. The implementation of GA makes companies better prepared to face increasingly stringent environmental regulations while strengthening their competitive position in the long term. Therefore, it can be concluded that GA is an important tool in sustainability strategies that not only impacts social responsibility but also provides significant financial benefits for companies.

The Impact of Green Intellectual Capital on Corporate Financial Performance. The results of the study indicate that green intellectual capital (GIC) has a positive effect on a company's financial performance. This means that the higher the level of disclosure and management of GIC, the better the financial performance. As an intangible asset, GIC includes knowledge, experience, policies, and innovations that focus on environmental sustainability (Chen, 2008). The components of GIC include green human capital (employee competencies, awareness, and skills in managing environmental issues), green structural capital (systems, organizational culture, and environmentally friendly technologies that support business activities), and green relational capital (relationships with consumers, suppliers, and the community based on trust and environmental concern). Optimizing these three aspects can improve operational efficiency, drive environmentally friendly product innovation, and strengthen the company's competitive position. This ultimately impacts the company's profitability and financial performance (Darwish et al., 2023).

The findings of this study align with the results obtained by Chandra & Augustine (2019), Firmansyah (2017), and Omar et al. (2017), which all indicate that GIC has a significant influence on a company's financial performance. These results indicate that intellectual resource management focused on sustainability can enhance competitive advantage while reducing future business risks. With the increasing awareness of the public and regulators regarding environmental issues, companies that can integrate GIC into their operations will gain social legitimacy and trust from stakeholders. This aligns with the stakeholder theory proposed by Freeman (1984), which states that a company's long-term success is greatly influenced by its ability to meet stakeholder expectations. By leveraging GIC, companies can create sustainable value, strengthen their reputation, enhance market confidence, and ultimately improve financial performance. Therefore, it can be concluded that GIC not only serves as a strategic resource but also as a crucial instrument in a company's sustainability strategy.

Good Corporate Governance Moderates the Influence of Green Accounting on Company Financial Performance. The results of the study indicate that good corporate governance (GCG), proxied by managerial ownership, actually weakens the influence of green accounting on

company financial performance. The moderation regression results show that the interaction coefficient between green accounting and GCG (X_{1M}) is negative (-0.0981) and significant with a p-value of 0.034 (< 0.05). This means that although the implementation of green accounting has been proven to have a positive effect on return on assets (ROA), the presence of managerial ownership in the GCG structure actually reduces the effectiveness of this effect. This condition may reflect the existence of internal conflicts of interest, where managers who own a small number of shares do not have a strong sense of ownership of the company, and therefore tend to behave opportunistically. This situation ultimately results in green accounting practices being implemented suboptimally and even potentially being used merely as a symbolic instrument (greenwashing) to meet regulations and public expectations, without contributing meaningfully to improving the company's financial performance.

These results align with the findings of Putri et al. (2022), who state that GCG does not strengthen the influence of green accounting on financial performance because its implementation in many companies remains merely formal and administrative compliance, not yet internalized as part of the company's strategy. Ulfa et al. (2023) also emphasize that the low proportion of management share ownership makes the managerial ownership mechanism, as one of the GCG indicators, ineffective in encouraging managers to actively participate in supporting sustainability programs. As a result, managerial ownership is unable to perform its oversight and control functions effectively, instead opening the door to opportunistic behavior that undermines the positive impact of green accounting. In a theoretical context, stakeholder theory (Freeman, 1984), which emphasizes that a company's success is determined by its ability to meet stakeholder interests, is not fully relevant to explain these findings, as the role of GCG does not function properly in ensuring stakeholder interests. Instead, agency theory (Jensen & Meckling, 1976) is more appropriate, as this theory explains the conflict of interests between owners and managers. Low managerial ownership increases the risk of managers making decisions for personal and short-term interests, rather than prioritizing corporate sustainability. Thus, GCG in the form of managerial ownership in this study has not functioned as a strengthening mechanism but rather as a factor weakening the relationship between green accounting and financial performance.

Good Corporate Governance Moderates the Influence of Green Intellectual Capital on Company Financial Performance. The results of the study indicate that good corporate governance (GCG) weakens the influence of green intellectual capital (GIC) on a company's financial performance. This means that high managerial ownership actually reduces the positive impact of green intellectual capital on return on assets (ROA). This may occur because managers with significant ownership may focus more on short-term profits and invest less in developing GIC, which requires time to yield financial results, or they may not fully recognize the strategic value of GIC in improving financial performance.

This aligns with the research by Hasan et al. (2025), which states that good corporate governance has not been able to moderate the relationship between green intellectual capital and financial performance because its role remains limited to formal compliance. The gap between the normative functions of GCG and the need for strategic oversight of environmentally based asset management prevents the contribution of GIC from being maximized optimally in improving company performance. Managerial ownership cannot moderate the relationship between green intellectual capital and financial performance. This may be due to a lack of managerial commitment to sustainability, a dominant focus on short-term goals, and low levels of understanding and disclosure regarding the importance of GIC in creating economic value (Sagala et al., 2025). Additionally, potential conflicts of interest between managers' roles as managers and as shareholders may also reduce the effectiveness of GIC management.

Managerial ownership is unable to moderate the influence of green intellectual capital on financial performance, indicating that stakeholder theory is not yet fully relevant in this context. Theoretically, the theory assumes that companies will respond to the interests of stakeholders, including in terms of managing environmentally-based intellectual resources to create long-term value. However, in practice, managerial ownership does not encourage the strengthening of the role of GIC, which indicates a mismatch between the interests of managers and the sustainability goals of the company. Therefore, agency theory is more appropriate to explain this condition, as it highlights the potential conflict of interest between managers and owners that can hinder the effectiveness of managing strategic resources such as GIC.

Implications. The theoretical implications of this study reinforce stakeholder theory by showing that the application of green accounting and green intellectual capital (GIC) can improve a company's financial performance through legitimacy, trust, and positive reputation in the eyes of stakeholders, while also expanding academic understanding that the effectiveness of sustainability practices is also influenced by the quality of good corporate governance (GCG), which in this study actually weakens the relationship, thereby making the relevance of agency theory worth considering. Practically, the results of this study emphasize the importance for companies, especially in the transportation and logistics sector, to not only treat sustainability practices as administrative compliance, but to strategically integrate them into business reporting and operational systems, for example through environmental innovation, human resource capacity building, and strengthening reporting transparency. Additionally, companies need to build a more proactive organizational culture toward sustainability, as formal governance quality, such as managerial ownership, has not been fully effective in strengthening the relationship between sustainability and financial performance.

CONCLUSION, IMPLICATION AND LIMITATION

This study proves that green accounting and green intellectual capital have a positive effect on the financial performance of companies in the transportation and logistics sector from 2021 to 2024. The implementation of green accounting helps operational efficiency and increases stakeholder trust, while environmentally-based intellectual capital management can strengthen competitiveness and profitability. However, the results of the moderation test indicate that good corporate governance, proxied by managerial ownership, actually weakens the influence of green accounting and green intellectual capital on financial performance. This suggests that GCG mechanisms have not yet optimally functioned as enablers of sustainable practices and may even create conflicts of interest that undermine the effectiveness of corporate sustainability strategies.

This study has several limitations. First, the scope is limited to transportation and logistics companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2024, so the results cannot be generalized to other sectors. Second, green accounting is still measured using dummy variables, and green intellectual capital is assessed through content analysis, focusing more on the presence of information rather than the quality of implementation. Third, the GCG variable is represented by only one indicator, namely managerial ownership based on the CFA, so it does not fully capture the complexity of corporate governance.

For companies, these results provide an incentive to ensure that the implementation of green accounting and green intellectual capital is not merely a matter of compliance but is truly integrated into business strategies and decision-making, including in enhancing human resource capacity and strengthening an organization-oriented culture focused on sustainability. Companies also need to improve the quality of GCG through optimizing the role

of the board of commissioners, audit committee, and transparency in reporting to enhance the impact of sustainability practices on performance. For future researchers, it is recommended to expand the scope of sectors, use more comprehensive measurement methods such as GRI Standards or ESG indices, and develop a more complete GCG construct with combined indicators, so that research results are more accurate, representative, and generalizable.

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