



Green Intellectual Capital Moderates the Relationship Between Business Strategy and Green Accounting on Firm Value (Empirical Study of Energy Sector Companies Listed on the Indonesia Stock Exchange (IDX) for the 2021-2024 Period)

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ABSTRACT

This research investigates the moderating function of Green Intellectual Capital in the relationship between Business Strategy and Green Accounting with respect to Firm Value. The study employs secondary data derived from annual reports and sustainability reports of energy sector firms listed on the Indonesia Stock Exchange (IDX) during the 2021–2024 period. A purposive sampling technique was applied, yielding a sample of 49 companies and a total of 196 firm-year observations. The data were analyzed using Eviews 12. The results demonstrate that Business Strategy and Green Accounting jointly exert a significant influence on Firm Value. Furthermore, the moderation analysis indicates that Green Intellectual Capital does not significantly moderate the relationship between Business Strategy and Firm Value; however, it plays a significant moderating role in the relationship between Green Accounting and Firm Value.

INTRODUCTION

The development of the global economy in recent years has shown a fundamental shift in corporate reporting and performance evaluation systems, primarily due to increasing attention to sustainability and climate change issues. Environmental and social challenges have been proven to have direct implications for long-term economic stability as well as market perceptions of firm value (Gantiano et al., 2023). Firm value represents a comprehensive reflection of market perceptions of a company's performance, prospects, and sustainability, which is often identified through market capitalization or stock price movements. This assessment includes an evaluation of a company's ability to manage intangible assets, such as intellectual capital and environmental reputation, which substantially contribute to long-term value creation (Siswanti & Cahaya, 2020).

The level of market trust reflected in firm value also affects the ease of obtaining external financing, strengthens competitive positioning, and enhances corporate reputation in the eyes of stakeholders (Putri et al., 2023). This study aims to provide empirical contributions to understanding how the implementation of sustainability-based business strategies and green accounting practices can influence firm value, particularly when mediated by the effectiveness of green intellectual capital management. Practically, the findings of this study are expected to serve as a reference for corporate management in designing knowledge resource management strategies that are aligned with sustainability principles.

IMPLEMENTATION AND METHODS

The research questions addressed in this study focus on examining the effect of business strategy and green accounting on firm value, as well as the moderating role of green intellectual capital in strengthening this relationship. Theoretically, this study enriches the accounting and strategic management literature by highlighting the function of green intellectual capital as a key element in long-term value creation amid the transformation toward a green economy.

Signaling Theory

Signaling Theory explains how management conveys signals regarding a company's condition through the disclosure of corporate financial information (Spence, 1978).

Firm Value

Ardillah and Chandra (2021) state that firm value represents investors' perceptions of the performance and prospects of a business entity, which are generally reflected in stock prices in the capital market. Firm value essentially reflects the level of market confidence in a company's ability to create shareholder wealth and ensure long-term operational sustainability.

Business Strategy

Business strategy is a plan or set of actions undertaken by a company to achieve its business objectives. It involves identifying opportunities and challenges in the market, as well as developing tactics to capitalize on or address them (Hariyanto et al., 2019).

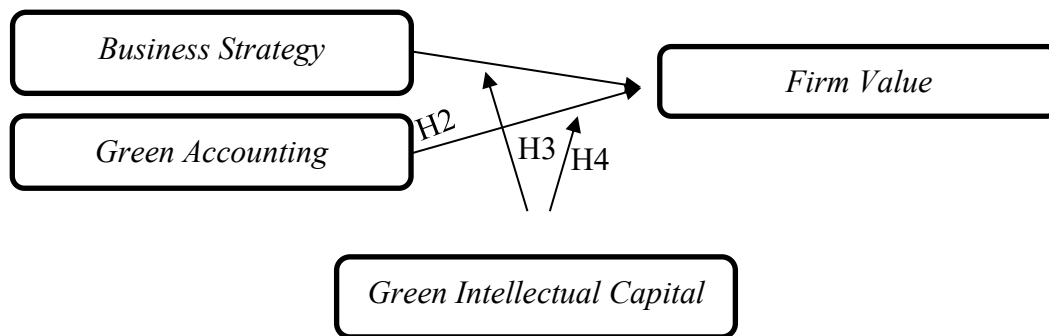
Green Accounting

Green accounting can be understood as a reporting system that integrates economic, social, and environmental aspects into the accounting process through the recognition, measurement, recording, summarization, reporting, and disclosure of information related to corporate activities (Gustinya, 2022).

Green Intellectual Capital

The concept of green intellectual capital proposed by Chen integrates environmental dimensions into the intellectual capital framework as an effort to address previous limitations in handling environmental issues (Lestari, 2023).

CONCEPTUAL FRAMEWORK



RESULTS AND DISCUSSION

Results of Descriptive Statistical Analysis

	FV	BS	GA	GIC
Mean	1.845357	0.298622	0.693878	0.750867
Median	0.950000	0.275000	1.000000	0.760000
Maximum	22.30000	1.000000	1.000000	1.000000
Minimum	0.000000	0.000000	0.000000	0.470000
Std. Dev.	2.988283	0.179993	0.462061	0.130972
Observations	196	196	196	196

Source: Data processed through Eviews 12, 2025

Firm Value (FV) exhibits a mean of 1.8456 and a median of 0.9500, suggesting that the distribution of observations is skewed with a concentration below the average. The maximum value reaches 22.3000, and the relatively large standard deviation of 2.9882 indicates substantial variation in firm value among the sampled companies. Business Strategy (BS) has an average value of 0.2986 with a median of 0.2750, and its values range from 0.0000 to 1.0000. The standard deviation of 0.1799 reflects a moderate degree of dispersion in the implementation of business strategies across firms. Green Accounting (GA) records a mean of 0.6938, with both the median and maximum values equal to 1.0000 and a minimum of 0.0000, indicating that a considerable number of firms have adopted green accounting practices. However, the standard deviation of 0.4620 suggests notable differences in the intensity of such adoption. Green Intellectual Capital (GIC) shows a mean value of 0.7508 and a median of 0.7600, with observed values ranging from 0.4700 to 1.0000. The relatively small

standard deviation of 0.1309 implies that the level of green intellectual capital is fairly uniform among the firms included in the study.

Model Selection

Chow Test

Based on the estimation results, the F-statistic is 4.279219 with a probability value of 0.0000. As this probability is below the 0.05 significance level, the Fixed Effect model is deemed more suitable than the Common Effect model.

Hausman Test

The test results indicate a chi-square value of 0.683122 with 2 degrees of freedom and an associated probability of 0.7107. Since this probability is greater than the 0.05 significance level, the Random Effect model is deemed more appropriate than the Fixed Effect model.

Lagrange Multiplier Test

The test results reveal a probability value of 0.0000. Given that this value falls below the 0.05 significance threshold, the Random Effect model is regarded as more appropriate than the Common Effect model.

Classical Assumption Tests

Normality Test

Based on the test results, the probability value is 0.0000. Since the probability value is less than 0.05, the data do not follow a normal distribution.

Multicollinearity Test

The correlation coefficients between Business Strategy (BS) and Green Accounting (GA) are 0.36057; between Business Strategy (BS) and Green Intellectual Capital (GIC) are 0.25856; and between Green Accounting (GA) and Green Intellectual Capital (GIC) are 0.68925.

Heteroskedasticity Test

Based on the test results, the probability value of Obs*R-squared is 0.0536 > 0.05. This indicates that there is no heteroskedasticity in the regression model, and therefore the model satisfies the classical assumptions.

Autocorrelation Test

The Durbin-Watson (DW) value obtained is 1.9561. Since the DW value lies between the upper bound (dU) and 4 - dU, namely 1.7868 < 1.9561 < 2.2132, it can be concluded that there is no autocorrelation, either positive or negative, in the regression model used.

Panel Data Regression Analysis

Variable	Coefficien			
	t	Std. Error	t-Statistic	Prob.
C	-0.049462	0.064346	-0.768689	0.4430
BS	0.215415	0.065160	3.305941	0.0011
GA	0.842560	0.054909	15.34477	0.0000

Source: Data processed through Eviews 12, 2025

$$Y = \alpha + \beta_1 BS + \beta_2 GA + \varepsilon$$

$$FV = -0,049462 + 0,215415 (BS) + 0,842560 (GA)$$

The estimated constant of -0.049462 indicates that when both Business Strategy and Green Accounting are assumed to be zero, the dependent variable takes a baseline negative value. The coefficient of the Business Strategy (BS) variable, which is 0.215415 , suggests that a one-unit increase in Business Strategy is associated with an increase of 0.215415 units in the dependent variable, holding other variables constant. Similarly, the Green Accounting (GA) coefficient of 0.842560 implies that each one-unit increase in Green Accounting leads to an increase of 0.842560 units in the dependent variable, *ceteris paribus*.

Coefficient of Determination Analysis

Based on the Random Effect model estimation, the Adjusted R-squared value is 0.626506 , indicating that approximately 62.65% of the variation in Firm Value (FV) can be explained by changes in Business Strategy (BS) and Green Accounting (GA). The remaining 37.35% of the variation in Firm Value is attributable to other factors not included in the model.

Hypothesis Testing

The estimation results show that Business Strategy has a coefficient of 0.2154 , with a t-statistic of 3.3059 and a probability value of 0.0011 , which is below the significance threshold of $\alpha = 0.05$. This evidence indicates that Business Strategy exerts a statistically significant influence on Firm Value, leading to the acceptance of hypothesis H1.

Similarly, Green Accounting demonstrates a coefficient of 0.8426 , accompanied by a t-statistic of 15.3448 and a probability value of 0.0000 , which is also below the $\alpha = 0.05$ significance level. These results confirm that Green Accounting has a significant effect on Firm Value; therefore, hypothesis H2 is accepted..

F-Test (Simultaneous Test)

The estimated F-statistic is 164.5480 with an associated probability value of 0.000000 . As this value is below the 0.05 significance level, the results indicate that Business Strategy (BS) and Green Accounting (GA) jointly exert a statistically significant influence on Firm Value

Selection of Moderated Regression Model

No	Method	Comparison	Result
1	Chow Test	Common vs Fixed	Fixed Effect Model
2	Hausman Test	Fixed vs Random	Random Effect Model
3	Lagrange Multiplier Test	Common vs Random	Random Effect Model

Results of Moderated Regression Analysis

$$Y = C + X1 + X2 + M + M*X1 + M*X2 + \varepsilon$$

$$FV = -0.079055 + 0.219897 (BS) + 0.330035 (GA) + 0.431743 (GIC) + 0.035076 (BS \times GIC) + 0.224927 (GA \times GIC) + \varepsilon$$

The estimated constant of -0.079055 implies that when all independent variables and their interaction terms are held at zero, the dependent variable remains at a negative baseline level. The coefficient of Green Intellectual Capital (GIC), amounting to 0.431743 , indicates that a one-unit increase in Green

Intellectual Capital is associated with an increase of 0.431743 units in the dependent variable, assuming other factors remain constant. Furthermore, the interaction term between Business Strategy and Green Intellectual Capital (BS×GIC) yields a coefficient of 0.035076, suggesting that a one-unit increase in the combined effect of Business Strategy and Green Intellectual Capital results in a corresponding increase of 0.035076 units. In addition, the interaction coefficient between Green Accounting and Green Intellectual Capital (GA×GIC) is 0.224927, indicating that a one-unit rise in this interaction term leads to an increase of 0.224927 units in the dependent variable, *ceteris paribus*.

CONCLUSION

Based on the empirical results, Business Strategy is found to have a significant impact on Firm Value. This result is consistent with the findings of Gantino et al. (2022), who argue that business strategy plays a crucial role in shaping firm value by guiding how firms compete, collaborate, and enhance the competitive positioning of their products and services within the market. In addition, Green Accounting is shown to significantly influence Firm Value, as environmental-related disclosures are perceived by investors as signals of superior quality and sound corporate governance, which enhance investor confidence and, in turn, contribute to higher firm value, in line with signaling theory (Spence, 1978).

Conversely, the interaction between Business Strategy and Green Intellectual Capital does not exhibit a significant effect on Firm Value. This finding aligns with the study by Adelisa and Mayangsari (2025), which suggests that Green Intellectual Capital has not yet been fully incorporated into investors' decision-making processes or effectively translated into green innovation capable of generating value.

In contrast, the combined effect of Green Accounting and Green Intellectual Capital is found to be significant in influencing Firm Value. This result supports the findings of Lestari (2023), who emphasizes that strong Green Intellectual Capital enhances the credibility of Green Accounting practices, thereby strengthening investor perceptions and optimizing their contribution to increasing Firm Value.

RECOMMENDATIONS

1. Future studies are encouraged to use a mixed-method approach to examine research responsiveness to other related variables.
2. Additional variables such as leverage, profitability, corporate social responsibility, and financial performance may be included in future research.
3. Future research should expand sectoral coverage in developing indices or carefully selected measurement locations to enable broader comparative analysis.

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