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Green innovation and corporate value: The mediating role of financial performance and the moderating role of green accounting

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Abstract

This study examined how Green Innovation affects Firm Value in non-financial companies listed on the Indonesia Stock Exchange, both directly and mediated by Financial Performance, and analyzed the role of Green Accounting as a moderator of the relationship between Green Innovation and Financial Performance. We employed a quantitative approach using 767 panel data observations of non-financial companies listed on the Indonesia Stock Exchange between 2015 and 2023, and used robust standard errors to correct biases in standard errors that may arise due to heteroskedasticity (unequal variance of errors) or autocorrelation (serial correlation in errors), which often occur in panel data. The results indicate that Green Innovation increases Firm Value, and Financial Performance mediates the influence of Green Innovation on Firm Value. The findings also indicate that Green Accounting can strengthen the influence of Green Innovation on Financial Performance. Practical implications highlight the need for government efforts to strengthen regulations related to the implementation and disclosure of Green Accounting, and provide recommendations for investors to consider green innovation in their investment decisions.

Keywords: Financial performance, Firm value, Green accounting, Green innovation.

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1. Introduction

Firm value reflects investors' perceptions of a company's overall prospects and performance, and is a key consideration in investment decisions. In the context of capital markets, firm value is often measured by stock price [1]. A high stock price reflects investors' perceptions of the company's long-term prospects and the sustainability of its performance. An increase in firm value reflects investors' confidence in the sustainability of the business and the efficiency of resource management by the management [2]. Therefore, increasing firm value has become a strategic goal that companies seek to achieve through various managerial approaches, including sustainability strategies. Amid growing global awareness of sustainability issues, companies that do not manage the environmental impact of their operations risk experiencing a decline in reputation and stock prices. In some cases, the decline in firm value is not due to fundamental financial factors but rather environmental issues.

A number of studies reveal that incidents of environmental pollution caused by corporate activities can significantly reduce a company's market value [3]. The environmental consequences of such activities have a negative impact on a company's reputation, reflected in a decline in stock prices as an indication of reduced firm value [3]. Pressure from government regulations, consumers, and investors is driving companies to focus not only on financial gains but also on social and environmental responsibility. It further emphasizes the urgency of green innovation in modern business management. Companies need to adopt innovation strategies aimed at reducing negative environmental impacts through energy efficiency, waste management, and the development of environmentally friendly products and processes, which are crucial strategies for achieving a competitive advantage [4].

From the perspective of the Resource-Based View theory, companies can increase their value through the management of valuable, rare, inimitable, and non-substitutable resources. In this context, green innovation can be categorized as a dynamic capability that is difficult to imitate and contributes to sustainable competitive advantage [5]. However, there is debate regarding the impact of Green Innovation on Firm Value. Research conducted by Agustia et al. [6] and Damas et al. [2] shows that Green Innovation has a positive and significant effect on Firm Value. The results of the research conducted by Agustia et al. [6] state that a company's Green Innovation can improve production process efficiency and enhance the company's environmental performance, thereby increasing firm value. These results differ from the research conducted by Yao et al. [7], which shows that Green Innovation does not affect firm value, especially in developing countries. The inconsistency of previous research results motivates further research on the influence of Green Innovation on company value through the mediation of financial performance.

Companies that implement Green Innovation may not immediately gain an increase in market value, but through improved efficiency, cost savings, and enhanced reputation, improvements in financial performance may occur first. Most previous studies have only examined direct relationships, without comprehensively examining the mediation process, particularly in the context of developing countries such as Indonesia, which have different regulatory characteristics, organizational cultures, and industrial structures compared to developed countries. The implementation of Green Innovation practices can enhance a company's financial performance [8], and improved financial performance can increase a company's value [9-11]. Before investing, potential investors will evaluate a company's financial performance through financial ratio analysis to determine its value [12]. The better the company's financial performance, the higher its value, as companies with good financial performance are considered more capable of generating stable profits in the future. These findings are consistent with the results of studies by Prena and Muliyawan [9], Akmalia, et al. [13] and Anugraini and Khusnah [10] which show that Financial Performance has a positive effect on Firm Value.

However, challenges arise when companies find it difficult to measure and manage the environmental impact of implementing Green Innovation. Excessive environmental management has a negative impact on financial performance [14]. Green Accounting is necessary to ensure that the impact of Green Innovation can be measured, monitored, and reported transparently to stakeholders. Through Green Accounting, companies can manage environmental costs and benefits more effectively, strengthen accountability, and ensure that green innovations can have a positive impact on the company's financial performance. Green Accounting as a management communication tool refers to the inclusion of environmental costs, which provides information on the total costs incurred for environmental management and can serve as evidence to the public that the company has created innovations while still considering the environment and norms applicable in society [14]. Green accounting acts as a moderating mechanism that enhances the impact of Green Innovation on financial performance.

The novelty of this study lies in its conceptual framework and research focus. Previous studies have been limited to testing the direct relationship between green innovation and company value, without examining the mediating role of financial performance or the moderating effect of green accounting practices. This study attempts to fill this gap by constructing an integrative model in the context of Indonesia as a developing country with regulatory and governance characteristics that differ from those of developed countries, given that the urgency of environmental sustainability has become part of the national regulatory framework in Indonesia. Amidst this regulatory pressure, public companies in Indonesia need to demonstrate good sustainability performance to maintain investor confidence, ensure business continuity, and sustain their market value. Therefore, it is important to examine whether and how green innovation driven by regulation can truly impact financial performance and corporate value. Based on this background, this study aims to empirically test the model of the relationship between green innovation, financial performance, and corporate value, considering the moderating role of green accounting.

This study was conducted on non-financial sector companies listed on the Indonesia Stock Exchange. Non-financial sector companies were used as research samples to provide a comprehensive picture of the research phenomenon in companies whose operational activities have an impact on the environment. This study was conducted by utilizing data

from non-financial sector companies listed on the Indonesia Stock Exchange from 2015 to 2023. The research period aligns with the timeline of Indonesia's Sustainable Finance Strategic Plan (Sustainable Finance Roadmap Phase I (2015-2019) and Phase II (2021-2025)). Based on regulations, the implementation of this strategic plan will be carried out gradually, so the selection of the research period reflects companies' efforts on sustainability issues and the market's response to those efforts. This study is expected to contribute theoretically to the development of a corporate sustainability framework and practically to company management in designing green innovation strategies oriented toward long-term value creation.

2. Literature Review: Dan Hypotheses Development

2.1. Resource-Based View Theory

The Resource Based View (RBV) theory was first proposed by Wernerfelt [15], discussing how a company can achieve sustainable competitive advantage based on the resources it has. Competitive advantage refers to specific economic activities and the achievement of superior quality to create greater value for customers compared to competitors in a business activity, whether in the form of services or a combination thereof Anugraini and Khusnah [10]. This can be achieved by implementing the right strategies based on the utilization of all available resources within a business entity. A business entity is always required to be able to innovate, create products, increase business growth and services that contain differentiation and have the ability to reduce costs in business activities supported by the use of technology to gain a competitive advantage [16]. The innovation discussed in this study is green innovation, which is one of the environmental strategies that can be implemented to develop a business without violating government regulations [17]. Green innovation also aims to reduce negative impacts on the environment and create competitive advantages for companies [18].

2.2. Stakeholder Theory

The Stakeholder Theory was first proposed by Freeman [19] and used to explain corporate behavior and social performance. A company is an entity that operates not only for its own interests but also to provide benefits to its stakeholders. Stakeholder Theory provides a foundation for explaining why companies do not merely focus on providing financial benefits to shareholders [20]. The primary focus of this theory is that a company is not an entity that operates solely for its own interests but must provide benefits to its stakeholders. Management discloses this social and environmental responsibility information in order to manage stakeholders so that the company receives their support. Factors influencing this, according to Stakeholder Theory, are the implementation of Green Innovation and Green Accounting, which will ensure good financial performance, thereby having a positive impact on the company's image. A good company image will naturally attract the attention of stakeholders and annual report users, thereby improving financial performance and company value.

2.3. Green Innovation and Firm Value

The Resource-Based View (RBV) theory emphasizes how companies use existing resources to achieve a sustainable competitive advantage [15]. Competitive advantage can be achieved, among other things, through Green Innovation [18]. Companies can create innovative processes and products that impact environmental and economic value creation, thereby enhancing competitive advantage and improving company performance [21]. Previous literature indicates that Green Innovation has a positive and significant impact on company value [2, 6]. The better the Green Innovation practices in a company, the greater the appeal for investors to invest, thereby increasing stock prices. Based on the above explanation, the following hypothesis is formulated:

H_1: Green innovation has a positive effect on company value

2.4. Green Innovation and Financial Performance

The Resource-Based View (RBV) theory developed by Barney [22] states that strategic resources (valuable, rare, inimitable, non-substitutable) are the key to creating sustainable competitive advantage. Green innovation promotes the efficient use of raw materials, reduces raw material costs, and can guide companies to find new ways to convert waste into saleable products to generate additional income. This aligns with research conducted by Xie et al. [23], Yang et al. [24] and Asni and Agustia [17], which states that Green Innovation has a positive impact on financial performance. Based on this explanation, the second hypothesis is formulated as follows:

H_2: Green Innovation has a positive effect on financial performance

2.5. Financial Performances and Company Value

The Stakeholder Theory states that a company is not an entity that operates solely for its own interests but must provide benefits to its stakeholders. Therefore, the interests of stakeholders must be a top priority because their interests are the reason for and an integral part of a company's existence [19]. Companies with good financial performance tend to have higher firm value. Investors tend to be more interested in companies with good financial performance because they are considered more capable of generating stable profits in the future. Previous literature shows that the better a company's financial performance, the higher its value [9, 10]. Based on the above explanation, the third hypothesis is formulated as follows:

H_3: Financial performance has a positive effect on company value

2.6. Financial Performance Mediates the Effect of Green Innovation on Firm Value

The Resource-Based View (RBV) theory developed by Barney [22] states that strategic resources (valuable, rare, inimitable, non-substitutable) are the key to creating sustainable competitive advantage. RBV explains why companies that adopt Green Innovation are more likely to achieve good financial performance, as green innovation can reduce costs (such as recycling and energy efficiency) and enhance reputation, leading to increased market value (Firm Value). Green Innovation can improve a company's financial performance [8] so that improved financial performance can increase the company's value [9-11]. Based upon the previous explanation, the fourth hypothesis is formulated as follows.

H_4: Financial performance mediates the effect of green innovation on company value

2.7. Green Accounting Moderates the Effect of Green Innovation on Financial Performance

The Stakeholder Theory emphasizes that companies must be accountable not only to shareholders but also to all stakeholders, such as customers, governments, communities, and investors [19]. Green innovation practices require proper management of environmental costs so that they do not negatively impact a company's financial performance [25]. Management needs to implement Green Accounting as the foundation for formulating the company's green innovation strategy and as a communication medium between the company and stakeholders to demonstrate its commitment to sustainability, thereby enhancing financial performance. By adopting Green Accounting practices, companies can strengthen the impact of Green Innovation on financial performance. Based on the previous explanation, the fifth hypothesis is formulated as follows.

H_5: Green accounting moderates the effect of green innovation on financial performance

Referring to the hypotheses that have been formulated, the conceptual framework of this study can be seen in Figure 1 below.

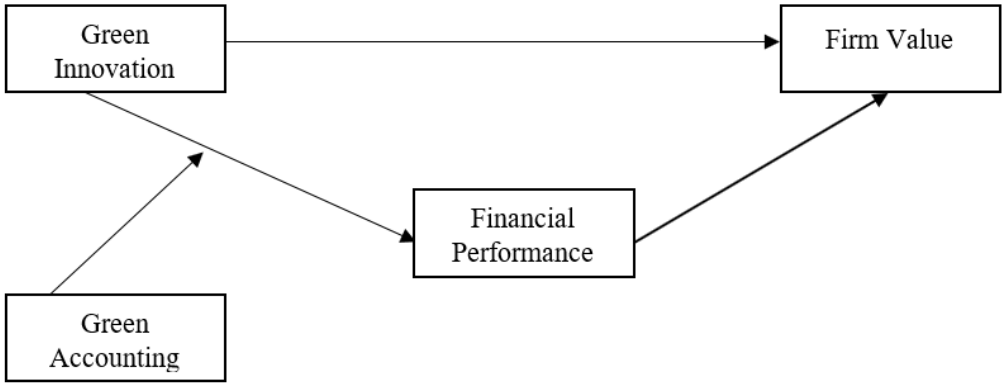

Figure 1.
Conceptual Framework.

3. Research Methods

3.1. Research Design

This study analyzed the direct and indirect effects of Green Innovation variables on company value through financial performance. It also tested the moderating effect of Green Accounting on the relationship between Green Innovation and financial performance. The study used company size and company age as control variables. This research was conducted in Indonesia using data from non-financial companies listed on the Indonesia Stock Exchange (IDX) from 2015 to 2023. These companies were chosen because the operational activities of financial companies are specific and different from those of non-financial companies [11]. This difference has the potential to create bias in the analysis if the two groups of companies are analyzed together. In addition, the activities of non-financial companies directly impact the environment, making them relevant to this study. The study period aligns with the timeline of Indonesia's financial sustainability strategic plan (Roadmap for Financial Sustainability Phase I (2015-2019) and Phase II (2021-2025)). Based on regulations, the implementation of this strategic plan will be carried out in stages, so the selection of the research period reflects companies' efforts on sustainability issues and the market's response to those efforts. Research data were obtained from annual reports and sustainability reports, using a purposive sampling technique. This study used 767 observations of non-financial companies on the Indonesia Stock Exchange from 2015 to 2023. The data were analyzed using panel regression analysis with STATA 16 software.

3.2. Research Variable Measurement

Our study analyzed the effect of green innovation on firm value and tested the effect of green innovation on firm value, controlled by the mediating variable of financial performance. This study also examined the moderating effect of green accounting on the relationship between green innovation and financial performance.

Step 1 examined the effect of Green Innovation (GI) on Financial Performance (FP) with the moderation of Green Accounting (GA)

$$FP = ß_0 + ß_1GI + ß_2GA + ß_3GI\_GA + ß_4SIZE + ß_5AGE + e \quad (1)$$

Step 2 assessed the effect of Green Innovation (GI) and Financial Performance (FP) on Firm Value (FV)

$$FV = ß_0 + ß_1GI + ß_2FP + ß_4SIZE + ß_5AGE + e \quad (2)$$

Firm value is the market perception based on financial performance and future prospects reflected in the market price of non-financial sector companies listed on the IDX for the period of 2015-2023. Firm value was measured using the PBV (Price Book to Value) ratio. The measurement of firm value is in line with previous research [26, 27]. Price to Book Value (PBV) is considered capable of illustrating how much the market values a company's book value. PBV is calculated by comparing the market price of a company's shares with its book value per share, thereby indicating the extent to which the market values the company's net equity.

Green Innovation is a new technology (hardware or software) related to products or production processes that promote energy efficiency, pollution reduction, waste recycling, green product design, and environmental management in non-financial companies listed on the IDX for the period of 2015-2023. The measurement of Green Innovation in this study refers to the indicators in the research by Xie et al. [23] using content analysis of annual reports and corporate sustainability reports. There are 8 indicators, each scored from 0 to 2. A score of 0 indicates no information, 1 indicates a general description without details, and 2 indicates a detailed explanation.

Financial performance reflects the success of non-financial companies listed on the IDX from 2015 to 2023. This performance was measured using the Return on Assets (ROA) ratio, as used in previous studies [9, 13]. ROA is a ratio that shows the return on the total assets used in a company. Return on Assets (ROA) can be calculated by dividing net income by total assets.

Green Accounting is the process of disclosing information related to environmental performance that demonstrates the accountability of non-financial companies' business activities on the Indonesia Stock Exchange (IDX) from 2015 to 2023. The measurement of Green Accounting refers to previous studies Budi and Zuhrohtun [28]; Cahyani and Puspitasari [29] and Angelina and Nursasi [30] using dummy variables, companies are assigned a score of 1 if they disclose one of the environmental cost components (such as waste recycling, research, or environmental development) in their annual report, and 0 if they do not. Table 1 describes the variables of the study.

Table 1.
Measurement of Research Variables.

Research Variable	Variable Measurement	Data Source	Sources
Firm Value	$PBV = \frac{\text{Price per share}}{\text{Book value per share}}$	Osiris database	Purwanto and Agustin [26], Henryanto [27] and Putri and Wiagustini [31]
Green Innovation	1. Aims to reduce the use of resources, water and energy and increase the efficiency of these resources. 2. Utilizing recycled materials, recycling techniques, and environmental technologies 3. Conducting environmental campaigns 4. Using/adapting equipment/technology to reduce energy, water, and waste 5. Modifying product designs to prevent pollution or hazardous materials in the production process 6. Making changes to product design to avoid pollutants or toxic compounds in the production process 7. Improving and designing environmentally friendly packaging for existing and new products 8. Modifying product design to increase energy efficiency during use	Annual Report, Sustainability Report	Xie et al. [23]
Financial Performance	$ROA = \frac{\text{Net Income}}{\text{Total Assets}}$	Osiris database	Prena and Muliyawan [9] and Akmalia et al. [13]
Green Accounting	1. If the company does not include one of the environmental cost components, such as waste recycling costs, environmental research and development costs, in the annual report, then it is assigned a value of 0. 2. If the company has one of the environmental cost components, such as waste recycling costs, research costs, or environmental development costs, in the annual report, it is assigned a value of 1.	Annual Report, Sustainability Report	Budi and Zuhrohtun [28], Cahyani and Puspitasari [29] and Angelina and Nursasi [30]
Company's Size	Natural logarithm of the total assets	Osiris database, Annual report	Cang et al. [32]
Company's Age	Number of years the firm has operated	Osiris database	Budi and Zuhrohtun [28]

3.3. Data Analysis Technique

Hypothesis testing in our study was conducted using inferential statistical analysis with panel data regression, processed using the STATA program. The analysis stages included: selection of the panel data model, model feasibility testing, regression coefficient testing to answer the hypothesis, and robustness testing to examine the stability of the model against specification variations. Descriptive statistics were used to analyze the collected data and identify the characteristics of the research variables. Descriptive statistical analysis provided an overview of the variables of Green Innovation, Environmental Performance, Financial Performance, Green Accounting, and Firm Value. The next stage involved panel regression model estimation and hypothesis testing. Panel data regression model estimation aims to determine the most appropriate approach, namely Pooled Least Squares (PLS), Fixed Effect Model (FEM), or Random Effect Model (REM). Model selection was carried out through the Chow Test, Hausman Test, and Lagrange Multiplier Test. Panel data regression analysis was used to test the research hypothesis. This study examined the effect of Green Innovation on Firm Value and tested the effect of Green Innovation on Firm Value controlled by the mediating variable of Financial Performance. This study also examined the moderating effect of Green Accounting on the relationship between Green Innovation and Firm Value. Hypothesis testing used the causal step method because there were mediating and moderating variables in the research model. This system of equations was referred to as a simultaneous equation system or structural model. Because the research problem was based on theory and concepts, the research model was called a hypothetical model. The structural equation system can be seen as follows:

Step 1 examined the effect of Green Innovation (GI) on Financial Performance (FP) with the moderation of Green Accounting (GA).

$$FP = \beta_0 + \beta_1 GI + \beta_2 GA + \beta_3 GI\_GA + \beta_4 SIZE + \beta_5 AGE + e \quad (1)$$

Step 2 measured the influence of Green Innovation (GI) and Financial Performance (FP) on Firm Value (FV).

$$FV = \beta_0 + \beta_1 GI + \beta_2 FP + \beta_4 SIZE + \beta_5 AGE + e \quad (2)$$

Furthermore, robustness tests are used to test the stability of models against specification variations [33]. Robustness testing allows researchers to explore the stability of key model estimates against reasonable model specification variations. In this study, the panel regression model was estimated using the Fixed Effect approach, which aims to control for unobserved but time-invariant heterogeneity among individual/firm units. Robust standard errors are used to correct biases in standard errors arising from heteroskedasticity (unequal variance of errors) or autocorrelation (serial correlation in errors), which are common in panel data [34]. In the context of panel regression, the robust standard error used is the clustered robust standard error at the panel unit level (e.g., firm or individual). It is done to accurately correct the residual variance for potential autocorrelation and heteroscedasticity within the same unit, without assuming full independence between observations within a single entity. With this approach, the regression coefficient (β) values are still obtained using the Least Squares Dummy Variable (LSDV) method, but the standard errors are adjusted to ensure validity even if the data contains heteroskedasticity and/or autocorrelation within the panel units. Therefore, all interpretations of the model parameter significance, particularly the t and p values, are based on calculations using robust standard errors. The use of robust standard errors makes the obtained estimates more statistically reliable, thereby enhancing the validity of research conclusions regarding the influence of independent variables on dependent variables.

4. Research Results

This study utilized data from all non-financial companies listed on the Indonesia Stock Exchange from 2015 to 2023. Based on the selection criteria, the sample size obtained was 767 observations. The sample consisted of 155 companies divided into nine (9) industry groups according to the Indonesia Stock Exchange Industrial Classification (IDX-IC). Table 2 shows the descriptive statistics of the research data.

Table 2.
Descriptive Statistics.

Variable	N	Mean	SD	Min.	Max.
GI	767	0.432	0.353	0	1.5
AK	767	0.580	0.494	0	1
FP	767	1.018	9.973	-54.87	51.7
FV	767	1.672	1.657	-2.86	9.75
SIZE	767	26.128	3.817	20.59	34.54
AGE	767	25.975	19.811	0	145

Based on the description in Table 2, Green Innovation (GI) obtained an average value of 0.432 with a standard deviation of 0.353, with the lowest value of 0 and the highest value of 1.5. The average score for Green Innovation (GI) among companies is 0.432, with relatively low variation. Green Accounting (GA) obtained an average score of 0.580 with a standard deviation of 0.494, with the lowest value being 0 and the highest value being 1. This variable tends to be coded as dummy data (0 = no, 1 = yes), so the average value of 0.580 indicates that around 58% of companies demonstrate good Green Accounting, while the rest have not yet implemented Green Accounting. The average value of Financial Performance (FP) is 0.653 with a standard deviation of 1.238. Financial performance shows a positive average, but the data dispersion is very high and extreme, both in the negative and positive directions. It indicates the presence of outliers or

significant disparities in company profitability. Firm Value (FV) obtained an average value of 1.672 with a standard deviation of 1.657, with the lowest value being -2.86 and the highest value being 9.75. The average company value is 1,672 with fairly high variation. For Company Size (SIZE), the average value is 26,128 with a standard deviation of 3,817. This value is consistent with large companies that tend to be listed on the stock exchange. Company Age (AGE) obtained an average value of 25.975 with a standard deviation of 19.811. The average age of the company is almost 26 years, with a very high range.

Panel regression models can be divided into three types: common effect (CE), fixed effect (FE), and random effect (RE). To select the appropriate model type, testing methods such as the LM test, Chow test, and Hausman test are performed. The LM test is used to choose between the common effect and random effect, with significant test results ($p < 0.05$) indicating that the random effect model is selected. The Chow test is conducted to choose between the common effect and fixed effect, with a significant test result ($p < 0.05$) indicating that the fixed effect model is selected. The Hausman test is performed to choose between random effect and fixed effect, with a significant test result ($p < 0.05$) indicating that the fixed effect model is selected. Table 3 shows the results of the panel regression model testing.

Table 3.
Panel Regression Model Testing Results.

Model	LM Test	Chow test	Hausman test	Conclusion
1	0.000	0.000	0.008	Fixed effect
2	0.000	0.000	0.000	Fixed effect

The results of testing the panel regression model selection in model 2, which examined the effect on financial performance, indicated a significance value (p) from the LM test of 0.000 ($p < 0.05$), leading to the selection of the random effect. Subsequently, the Chow test yielded a significance value (p) of 0.000 ($p < 0.05$), resulting in the selection of the fixed effect. Additionally, the Hausman test produced a significance value (p) of 0.000 ($p < 0.05$), confirming the choice of the fixed effect. Therefore, the appropriate panel regression model for Model 2 is the fixed effect model. For model 3, which assesses the effect on Firm Value, the LM test produced a significance value (p) of 0.000 ($p < 0.05$), indicating the selection of the random effect. However, both the Chow test and the Hausman test yielded significance values (p) of 0.000 ($p < 0.05$), leading to the selection of the fixed effect for both tests. Consequently, the fixed effect model is deemed appropriate for analyzing the effect on Firm Value in Model 3.

Table 4 displays the results of the fixed effect panel regression test with robust standard error, which examines the effect of Green Innovation (GI) on Financial Performance (FP) with Green Accounting (GA) as a moderator, formed using a fixed effect model.

Table 4.
Robust Test Results of Model 1.

Dependent Variable: Financial Performance				
Variable	**Coef.**	**SE**	**t**	**p**
GI	6.957	1.588	4.380	0.000
GA	-0.880	1.471	-0.600	0.551
GI_GA	8.271	2.057	4.020	0.000
SIZE	0.326	0.255	1.280	0.203
AGE	0.170	0.149	1.140	0.255
INDS	0.000	(omitted)		
Constanta	-16.553	8.164	-2.030	0.044
R-square	0.207			
F	31.640			
p	0.000			

The equation derived from the results of the equation is as follows:

$$FP = -16.553 + 6.957\ GI - 0.880\ GA + 8.271\ GI\_GA + 0.326\ SIZE + 0.170\ AGE + e$$

The results of the fixed effect panel regression with robust standard errors indicate that Green Innovation (GI) has a positive and significant effect on the dependent variable (coefficient 6.957; $p = 0.000$). Meanwhile, Green Accounting (GA) has a negative coefficient of -0.880, but it is not statistically significant ($p = 0.551$), suggesting that, individually, GA does not have a significant impact on the dependent variable. However, the interaction between GI and GA (GI_GA) shows a positive and significant effect (coefficient 8.271; $p = 0.000$), implying that green accounting enhances the effect of GI on the dependent variable. A coefficient of 0.326 with a p-value of 0.351 is not statistically significant, indicating that size does not determine financial performance in the context of green innovation. Additionally, a coefficient of 0.170 with a p-value of 0.191, which is statistically insignificant, suggests that company age has not shown a strong influence on financial performance, despite the positive direction of the relationship. The model is considered robust because the results of the robust error test are consistent with the main model. Furthermore, the R-square of 0.207 indicates that approximately 20.7% of the variation in financial performance can be explained by this model. This demonstrates the model's adequate explanatory power, especially in the context of social and economic data. The results of the simultaneous influence test

yielded an F value of 31.640 with a p-value of 0.000, indicating that the model as a whole is significant, meaning the combination of independent variables simultaneously influences the company's financial performance.

Table 5 presents the results of fixed effect panel regression testing with robust standard errors, which examine the effect of Green Innovation (GI), Environmental Performance (EP), and Financial Performance (FP) on Firm Value (FV), constructed using a fixed effect model.

Table 5.
Robust Test Results of Model 2

Dependent Variable: Firm Value				
Variable	**Coef.**	**SE**	**t**	**p**
GI	0.473	0.206	2.300	0.023
FP	0.031	0.009	3.360	0.001
SIZE	-0.030	0.030	-0.980	0.329
AGE	-0.071	0.027	-2.640	0.009
INDS	0.000	(omitted)		
Constanta	4.056	1.126	3.600	0.000
R-square	0.088			
F	11.680			
p	0.000			

The equation derived from the results of the equation is:

$$FV = 4.056 + 0.473\ GI + 0.031\ FP - 0.030\ SIZE - 0.071\ AGE + e$$

Based on the equation and table, it can be explained that the Green Innovation (GI) coefficient of 0.473, with a p-value of 0.014, has a positive and significant effect on company value, indicating that environmentally friendly innovation increases market valuation. The Financial Performance (FP) coefficient is 0.031, with a p-value of 0.000, indicating a positive and significant influence on firm value, suggesting that profitability enhances firm value. The Company Size (SIZE) coefficient is -0.030, with a p-value of 0.554, indicating no significant effect on firm value, suggesting that company size does not influence firm value. The Company Age (AGE) coefficient is -0.071, with a p-value of 0.000, indicating a negative and significant effect on firm value, suggesting that younger companies are more highly valued by the market, as they are perceived to be more adaptive, innovative, and responsive to change. Furthermore, the R-square of 0.088 indicates that the model can explain approximately 8.8% of the variation in firm value. This result is moderate considering numerous other external factors that can influence company value. The results of the simultaneous influence test yielded an F-statistic of 11.680 with p = 0.000, indicating that the regression model as a whole is significant, meaning that the combination of independent variables can explain the variability in firm value simultaneously.

The results of testing the effect of Green Innovation (GI) on Firm Value (FV) with the mediation of Financial Performance (FP) are presented in Table 6.

Table 6.
Mediation Test Results.

Variable	**Coef.**	**SE**	**t**	**p**
GI -> FP -> FV	0.209	0.068	3.068	0.002

The effect of Green Innovation (GI) on Firm Value (FV) is indirect through the mediating path of Financial Performance (FP).

GI → FP → FV: A significant mediation path (coefficient 0.209; p = 0.002) indicates that Financial Performance effectively mediates the influence of Green Innovation on Firm Value. Green Innovation positively impacts a company's financial performance, and this improvement in financial performance ultimately contributes to an increase in Firm Value.

5. Discussion

The results of the study indicate that Green Innovation has a positive effect on firm value, suggesting that non-financial companies that implement environmentally friendly innovations receive a positive response from the market. This finding confirms that Green Innovation is not only beneficial for the environment but also supports the creation of economic value. Theoretically, these results are consistent with the Resource-Based View Barney [22], which supports the notion that green innovation is a scarce and difficult-to-imitate strategic resource, thereby creating a competitive advantage and improving market performance. These results align with the research by Xie et al. [23], which shows that green innovation improves financial performance and reputation, and Chen et al. [35], which emphasizes its contribution to competitive advantage. These findings enrich the sustainability literature in developing countries like Indonesia, with implications that Green Innovation is a profitable and rational business strategy, not merely a moral responsibility.

This study shows that Green Innovation has a positive effect on Financial Performance. Although the average GI level is still moderate (0.4318), its positive impact on FP (5.9138) indicates that even green innovations implemented on a relatively small scale can provide significant economic benefits. This proves that even the limited application of GI can improve financial performance through cost efficiency, additional revenue, and enhanced corporate image [36]. GI promotes the efficient use of raw materials, the processing of waste into valuable products, and strengthens the company's

brand positioning as an environmentally responsible entity. This aligns with Stakeholder Theory [19] which states that companies that meet the environmental expectations of stakeholders (consumers, investors, regulators) will receive support in the form of loyalty, market preference, and better access to financing [35, 37]. These findings are supported by previous research such as Xie et al. [23] which showed a positive correlation between GI and Return on Assets (ROA), and Asni and Agustia [17] who also stated that GI has a positive influence on FP. Thus, the results of this study confirm that Green Innovation is not only an environmental strategy but also a strategic investment that has a tangible impact on achieving the company's financial goals.

The results of the study indicate that financial performance has a positive effect on firm value. The better a company's financial performance, the higher its firm value. From the perspective of signaling theory, [38] companies with good financial performance send positive signals to investors about promising future growth prospects. This finding is supported by previous studies, such as Sitohang and Wulandari [39] who found that Return on Assets (ROA) and Net Profit Margin (NPM) have a positive effect on FV in the manufacturing sector, who showed that financial indicators such as net profit and return on equity have a significant impact on a company's market value. The theoretical support from Signaling Theory reinforces these findings, indicating that good financial performance sends positive signals to the market, making Financial Performance the primary driver of Firm Value.

The test results show that Financial Performance can mediate the effect of Green Innovation on Firm Value. This finding indicates that green innovation adopted by companies does not directly increase Firm Value but has an impact through an increase in Financial Performance first. This finding can be explained using the Resource-Based View (RBV) theory, which states that a company's competitive advantage can be achieved through the utilization of valuable, rare, difficult-to-imitate, and non-substitutable resources [22]. In this context, Green Innovation functions as a strategic capability that drives efficiency, operational excellence, and product innovation, ultimately contributing to improved financial performance. Ultimately, this strong financial performance will enhance investors' perception of firm value, thereby positively impacting firm value. This finding is supported by research conducted Asni and Agustia [17] which found that financial performance, measured through Return on Assets (ROA) and Return on Equity (ROE), significantly mediates the relationship between Green Innovation and firm value in ASEAN countries.

The results of the study indicate that Green Accounting strengthens the influence of Green Innovation on Financial Performance. These findings suggest that companies that not only implement green innovations but also systematically record and report their environmental activities through Green Accounting will achieve more optimal financial outcomes. The Resource-Based View (RBV) theory emphasizes how companies utilize existing resources to achieve sustainable competitive advantage [15]. The results of this study imply that companies seeking to optimize the impact of Green Innovation need to systematically record and report their environmental activities through Green Accounting. Without a reporting system that can accurately quantify environmental benefits, companies may fail to account for the economic value of the green innovations they have implemented.

6. Conclusion

Research on the relationship between Green Innovation and firm value still shows mixed results, especially in the context of developing countries with market structures and regulations that are not yet fully mature. Previous studies have mostly focused on the direct impact of Green Innovation on firm value, with little attention paid to the role of environmental accounting and its relationship to the overall creation of economic value for companies. This study aims to address this gap by examining the role of green accounting and financial performance in bridging the influence of green innovation on firm value in non-financial companies in Indonesia.

This study confirms that green innovation directly improves financial performance and subsequently has a positive impact on firm value. Furthermore, this study shows that green accounting plays an important role as a factor that strengthens the relationship between green innovation and financial performance. Transparency in documenting and reporting environmental activities enables companies to gain market and investor trust, and underscores that sustainability practices are not merely symbolic. In other words, a robust environmental accounting system can optimize the economic outcomes of green innovation and serve as a critical element in a company's sustainability strategy.

These findings support the Resource-Based View (RBV) theory perspective, which emphasizes the importance of utilizing existing resources to achieve sustainable competitive advantage. This study also expands our understanding of the relevance of Signaling Theory and the Resource-Based View in explaining how sustainability practices, when managed strategically, can create economic value. Additionally, the research findings imply that investors should be more selective in choosing companies that not only excel financially but also demonstrate a commitment to green innovation and environmental transparency through Green Accounting practices.

This study is an empirical investigation that integrates the roles of Green Innovation, Financial Performance, Environmental Performance, and Green Accounting into a single structural model, specifically for non-financial companies in the Indonesian capital market. However, this study has several limitations, such as limited sector coverage and an observation period that is insufficient to reflect long-term trends. Further research could explore the long-term impact of Green Innovation on company performance, both in financial and environmental aspects. This would provide deeper insights into the sustainability and cumulative effects of green innovation.

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