ICMEM

The 9th International Conference on Management in Emerging Markets

Sustainability Signals and Market Valuation: An Empirical Study of ESG Disclosure, Profitability, and Green Innovation in Indonesia's Energy and Manufacturing Sectors

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Abstract - *This study examines the influence of Environmental, Social, and Governance (ESG) disclosure, profitability, and green innovation on firm value, focusing on companies in the energy and manufacturing sectors listed on the Indonesia Stock Exchange during 2021–2023. Using 102 firm-year observations, multiple linear regression analysis reveals that profitability, measured by return on assets (ROA), has a significant positive impact on firm value, supporting the signaling and resource-based theories. However, ESG disclosure and green innovation do not exhibit significant effects, suggesting that sustainability practices in emerging markets are not yet fully reflected in investor valuation. The findings also indicate that all three variables, when assessed simultaneously, have a significant joint effect, explaining 14.6% of the variation in firm value (measured by price-to-book value). This research highlights the importance of profitability in determining firm valuation in developing markets while advocating for improved ESG reporting standards and investor awareness to enhance the role of sustainability in market-based valuation. Implications are discussed for companies, investors, regulators, and future researchers.*

Keywords - *ESG disclosure, profitability, green innovation, firm value, sustainability*

I. INTRODUCTION

In the evolving global financial ecosystem, corporate valuation is no longer solely determined by financial performance, but increasingly by how well a company aligns with sustainable development goals. This paradigm shift has elevated Environmental, Social, and Governance (ESG) disclosure, profitability, and green innovation as key strategic signals for companies. Investors now view sustainability signals as indicators of long-term value creation and effective risk management [1], [2]. ESG practices are believed to enhance firm value through increased stakeholder trust, easier access to capital, and stronger brand reputation [3].

Several previous studies have examined the relationship between ESG performance and firm value, yielding mixed results. For instance, [2] found that firms with strong ESG profiles tend to attract long-term investors and enjoy valuation premiums. Similarly, [4] stated that ESG transparency positively influences firm value in Asian markets. Meanwhile, profitability remains a classic determinant of firm value and often reflects the successful implementation of ESG strategies [5]. Green innovation encompassing the development of environmentally friendly technologies has also been identified as a competitive advantage that strengthens market positioning and enhances investor perception [6], [7].

However, gaps persist in the literature, particularly in emerging markets. Institutional structures, regulatory pressures, and stakeholder expectations differ from those in developed countries, rendering many findings less generalizable. Most prior studies have focused on firms in North America, Europe, or China [8], [9], while integrated research in Southeast Asia, particularly Indonesia, remains limited. Moreover, earlier research has typically evaluated ESG, green innovation, and profitability as separate variables, rather than within a combined analytical framework that captures their simultaneous and interrelated effects [10], [11].

This study aims to fill these gaps by empirically evaluating how ESG disclosure, profitability, and green innovation collectively influence firm value, using a case study of energy and manufacturing companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023. These sectors were selected due to their strategic role in driving the energy transition and national economic growth, as well as their exposure to high sustainability demands. Unlike previous research, this study considers green innovation not merely as an outcome of ESG initiatives, but as an active signal that can enhance market perceptions of corporate sustainability.

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The primary objective of this study is to assess the direct effects of ESG disclosure, profitability, and green innovation on firm value. This approach is expected to offer both theoretical and practical contributions helping companies design sustainability strategies, guiding investors in decision-making, and supporting regulators in developing policies that promote capital market sustainability in Indonesia and other emerging economies.

II. LITERATURE REVIEW

A. ESG Disclosure and Firm Value

Over the last ten years, the influence of Environmental, Social, and Governance (ESG) disclosure on firm value has become a focal point of research and practice. Transparent ESG reporting signifies a firm's dedication to sustainability, effective risk management, and sound corporate governance qualities that tend to attract socially conscious investors [2], [3]. Several empirical findings indicate that companies with more comprehensive ESG disclosures often benefit from increased stakeholder confidence, enhanced reputational assets, and improved access to capital markets [4]. Collectively, these factors contribute positively to the valuation of the firm.

However, the strength of this relationship may vary across contexts. In emerging markets, regulatory frameworks and stakeholder pressure for ESG reporting are still developing, potentially weakening the signaling power of ESG disclosures [9]. Nevertheless, evidence from Asian capital markets suggests that sustainability leadership is rewarded with valuation premiums.

H1: ESG disclosure has a positive effect on firm value.

B. Profitability and Firm Value

Profitability, commonly measured by Return on Assets (ROA), reflects a firm's efficiency in generating earnings from its assets and remains a fundamental determinant of firm value. Higher profitability enhances internal financing capacity, investor confidence, and strategic flexibility, all of which support increased firm value [5]. Studies in both developed and emerging markets have found a strong positive relationship between profitability and market performance [13].

Moreover, more profitable firms are typically better positioned to invest in long-term sustainability strategies, including ESG initiatives and innovation, ultimately improving investor perceptions of corporate value.

H2: Profitability has a positive effect on firm value.

C. Green Innovation and Firm Value

Green innovation involves creating products, operational methods, or business strategies that are designed to minimize environmental impact. It has become a strategic necessity for companies responding to climate risks and shifting consumer preferences. Empirical findings suggest that green innovation enhances corporate reputation, operational efficiency, and long-term competitiveness [6]. Furthermore, it serves as a signal of visionary leadership and environmental responsiveness, potentially influencing investor perceptions and increasing firm value [7].

In high-emission sectors such as energy and manufacturing, green innovation is not merely a compliance tool, but a value-creation mechanism. Therefore, firms that proactively invest in green technologies are more likely to gain market appreciation.

H3: Green innovation has a positive effect on firm value.

This study empirically investigates the three factors ESG disclosure, profitability, and green innovation in the context of energy and manufacturing firms listed on the Indonesia Stock Exchange (IDX) during the 2021–2023 period. These sectors are under significant sustainability pressures and provide a fitting context to examine the impact of sustainability signals on firm value in emerging markets.

D. Simultaneous Influence of ESG Disclosure, Profitability, and Green Innovation on Firm Value

In an increasingly competitive and sustainability-driven business landscape, companies can no longer rely solely on financial performance to boost market value. ESG disclosure, profitability, and green innovation are now recognized as three complementary strategic components that drive sustainable firm value [11]. When managed simultaneously, these factors represent a comprehensive blend of economic efficiency, social responsibility, and technological excellence.

[10] emphasized that an integrated approach combining environmental sustainability (ESG and green innovation) with traditional financial indicators (such as ROA) has a stronger influence on investor perception and firm valuation. A study by [12] in emerging markets revealed that the synergy between green innovation and profitability enhances the credibility of a firm's ESG efforts, significantly increasing firm value. Investors tend to favor companies that maintain financial performance while innovating sustainably, viewing them as more adaptable and viable for long-term investment.

In the energy and manufacturing sectors the focus of this study the combination of solid profitability, ESG transparency, and green technology investment serves as a strategic signal closely monitored by stakeholders, especially in the context of the global transition to a low-carbon economy [14]. Therefore, simultaneously evaluating these three factors provides a more comprehensive understanding of how

companies create value both in the short and long term.

H4: ESG disclosure, profitability, and green innovation simultaneously have a significant effect on firm value.

E. Theoretical Framework

This study combines four well-established lenses to explain how ESG disclosure, profitability, and green innovation translate into firm value in an emerging-market context

Table I Summary of Theoretical Frameworks

Theory	Core Idea	Key Implication
Signalling Theory	Firms send costly, verifiable cues to reduce informatio n asymmetry.	ROA, ESG scores, and eco-patent news act as value signals.
Resource-Based View (RBV)	Unique, in-house resources drive sustainable advantage.	Persistent profits and green R&D embody valuable, rare capabilities.
Stakeholder Theory	Addressing stakeholder demands sustains performance.	Credible ESG reporting secures licence to operate and future cash flows.
Institutional/Legi timacy Theory	Conformity to social norms garners legitimacy and resources.	In weakly regulated markets, voluntary ESG narratives may be discounted.

Hypothesis:

H1: High-quality ESG disclosure positively influences firm value.

H2: Greater profitability (ROA) positively influences firm value.

H3: Stronger green innovation positively influences firm value.

H4: ESG disclosure, profitability, and green innovation jointly enhance firm value.

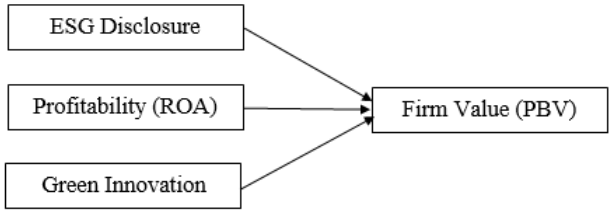

Figure 1 Theoretical Framework

III. METHODOLOGY

This study employs a quantitative explanatory design to analyse how Environmental, Social, and Governance (ESG) disclosure, profitability, and green innovation influence firm value. The initial population consisted of 556 energy and manufacturing companies listed on the Indonesia Stock Exchange (IDX) between 2019 and 2023. Purposive sampling was applied in four successive steps:

1. The company published at least one Sustainability Report (SR) during 2019–2023;
2. It issued an SR every year within that period;
3. The SR followed the Global Reporting Initiative (GRI) Index; and
4. Complete financial data were available.

This screening produced 34 firms that satisfied all criteria. To maintain comparability of post-pandemic financial and market conditions, the quantitative analysis focuses on the three most recent reporting years (2021–2023), yielding 102 firm-year observations (34 companies × 3 years).

The dependent variable, firm value, is proxied by the price-to-book value (PBV) ratio. Independent variables comprise (i) ESG disclosure, measured with a 34-item GRI-aligned content index; (ii) profitability, captured by return on assets (ROA = net income ÷ total assets); and (iii) green innovation, proxied by a frequency-weighted count of environmentally friendly initiatives. All data were sourced from audited Annual Reports and Sustainability Reports downloaded from each issuer's official website, eliminating the need for questionnaire instruments.

The analysis proceeded through descriptive statistics, classical assumption tests (normality, multicollinearity, heteroscedasticity), and multiple linear regression to evaluate partial effects (t-tests) and joint effects (F-test), with the coefficient of determination (R^2) indicating the model's explanatory power. All statistical procedures were executed using IBM SPSS Statistics 26.

IV. FINDINGS AND DISCUSSION

A. Descriptive Statistical Analysis

To gain a general understanding of each research variable, a descriptive statistical approach was

employed. Based on calculations from 102 observations of companies in the energy and manufacturing sectors listed on the Indonesia Stock Exchange (IDX) during the 2021–2023 period, the average value of ESG disclosure was recorded at 0.5962, with a minimum of 0.06 and a maximum of 0.95. This indicates that the level of ESG disclosure among the sample companies varies considerably and generally falls within the medium range, suggesting that while most companies have implemented sustainability reporting, it is not yet optimal.

Firm value, as measured by the Price to Book Value (PBV), had an average of 1.5432, with a minimum of 0.53 and a maximum of 10.57, and a standard deviation of 1.67420. This reflects a relatively high level of market valuation fluctuation among companies, indicating differences in investor perceptions regarding the prospects and risks of individual companies within these sectors.

Profitability, proxied by Return on Assets (ROA), had an average value of 0.0751, with a standard deviation of 0.09232, and a range from -0.28 to 0.45. The negative minimum value indicates that some companies incurred losses during the observation period. Meanwhile, the relatively high maximum ROA suggests that certain companies were highly efficient in managing their assets to generate profits.

The green innovation variable showed an average value of 0.7605, with a minimum of 0.14 and a maximum of 1.00, and a standard deviation of 0.15977. This suggests that the majority of companies have implemented environmentally friendly innovations to a relatively high degree, although there are still companies whose contributions remain relatively low.

Overall, the descriptive analysis results highlight significant variation in sustainability practices, financial performance, and market valuation among energy and manufacturing companies in Indonesia. This variation serves as a critical foundation for further hypothesis testing using inferential analysis.

B. Classical Assumption Testing

Prior to conducting multiple linear regression analysis, classical assumption tests were performed to ensure the data met the requirements of the Ordinary Least Squares (OLS) estimation model.

Table II Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Standard Deviation
ESG Disclosure	102	0.06	0.95	0.5962	0.25356
Firm Value (PBV)	102	0.53	10.57	1.5432	1.67420
Profitability (ROA)	102	-0.28	0.45	0.0751	0.09232
Green Innovation	102	0.14	1.00	0.7605	0.15977

Normality Test

The normality of the unstandardized residuals was assessed using the One-Sample Kolmogorov–Smirnov Test. The obtained significance level was 0.118, exceeding the 0.05 threshold, which implies that the residuals follow a normal distribution. This result indicates that the regression model does not encounter problems related to normality.

Heteroscedasticity Test

Heteroscedasticity was tested using the Glejser method, with the absolute residuals as the dependent variable. The regression results showed that all independent variables had significance values greater than 0.05 (ROA = 0.709; Green Innovation = 0.218; ESG Disclosure = 0.628). Therefore, it can be concluded that there is no indication of heteroscedasticity in the model.

Multicollinearity Test

Multicollinearity was assessed using the Variance Inflation Factor (VIF). All variables had VIF values below 10. (Profitability VIF = 1.135; Green Innovation VIF = 1.101; ESG Disclosure VIF = 1.052), indicating that there is no multicollinearity among the independent variables.

Table III Classical Assumption Tests

Type of Test	Test Result	Conclusion
Normality	Kolmogorov–Smirnov Sig. = 0.118	Residuals are normally distributed
Heteroscedasticity	Sig. ROA = 0.709; Green Innovation = 0.218; ESG = 0.628 (Glejser method)	No heteroscedasticity detected
Multicollinearity	VIF ROA = 1.135; Green Innovation = 1.101; ESG = 1.052	No multicollinearity detected

C. Multiple Linear Regression Analysis Results

The results of the multiple linear regression analysis showed a coefficient of determination (R Square) of 0.146, indicating that ESG disclosure, profitability (ROA), and green innovation collectively explain 14.6% of the variation in firm value. Although this is a moderate level, it remains relevant considering that firm value is also influenced by numerous external factors beyond this model.

Table IV Multiple Linear Regression Results

Independent Variable	B	Std. Error	Beta	t	Sig.	VIF
(Constant)	0.412	0.823	—	0.501	0.617	—
Profitability (ROA)	6.146	1.803	0.339	3.408	0.001	1.135

Green Innovation	1.272	1.026	0.121	1.240	0.218	1.101
ESG Disclosure	-0.500	0.632	-0.076	-0.792	0.431	1.052

The F-test results showed a significance value of 0.001 ($p < 0.05$), indicating that, collectively, the three independent variables have a significant effect on firm value. Thus, hypothesis H4, which posits that ESG disclosure, profitability, and green innovation simultaneously affect firm value, is accepted.

Table V F-Test And Coefficient Of Determination

Test	Value
F Statistic	5.605
Sig. (p-value)	0.001
R	0.383
R Square (R^2)	0.146
Adjusted R Square	0.120
Standard Error of Estimate	1.57025

Individually, only the profitability variable (ROA) had a significant effect on firm value, with a significance level of 0.001 ($p < 0.05$) and a positive regression coefficient of 6.146. This supports hypothesis H2, which suggests that profitability positively influences firm value. Meanwhile, green innovation showed a positive but not significant effect ($p = 0.218$), and ESG disclosure had a negative and insignificant effect ($p = 0.431$). Therefore, hypotheses H1 and H3 are not supported in this study.

D. Discussion

The findings indicate that profitability (ROA) has a significant influence on firm value. This result aligns with signaling theory and previous studies such as [5] and [13], which state that profitability is a fundamental indicator reflecting a company's efficiency and growth potential. A high ROA demonstrates a firm's ability to generate profits from its assets, ultimately boosting investor confidence and market valuation.

Green innovation, although showing a positive relationship, did not significantly affect firm value. While green innovation is believed to enhance reputation and competitive advantage, in the context of emerging markets like Indonesia, investor appreciation for sustainable innovation practices appears to be limited. This is consistent with findings from [6], which suggest that the effectiveness of green innovation in influencing firm value depends on market awareness and available regulatory incentives. In the energy and manufacturing sectors, green innovation may still be in its early stages, with long-term impacts not yet reflected during the observation period.

The most striking finding is that ESG disclosure exhibited a negative and insignificant effect on firm value. This contrasts with most studies in developed countries, such as [2] and [4], which have found a positive relationship between ESG transparency and firm valuation. Four rational explanations may account for this outcome:

1. *Prevalence of weak signals*
   ESG reporting in Indonesia remains voluntary and is rarely subject to external assurance. Investors therefore struggle to distinguish genuinely sustainable firms from those engaging in mere green-washing. When the signal lacks credibility, the market responds by applying a valuation discount [15].
2. *Short-term compliance costs outweigh long-term benefits.*
   Adopting the GRI framework and implementing sustainability initiatives require financial resources, time, and process changes. During the early adoption phase, these costs depress profitability; given that most domestic investors are short-term oriented, the higher costs are translated directly into lower valuations [16].
3. *Retail investors' focus on financial metrics.*
   Ownership on the IDX is dominated by retail investors who concentrate on quarterly earnings. Liu [17] find that in retail-heavy markets, ESG information exerts weak or even negative effects on stock returns because non-financial data are perceived as "not immediately monetisable.".
4. *Institutional misalignment and minimal regulatory pressure.*
   Legitimacy theory posits that the benefits of ESG disclosure arise only when there is strong normative or coercive pressure. In Indonesia, ESG reporting standards are not yet mandatory; consequently, the market incentive to reward sustainability information is low [18]

Overall, these findings confirm that profitability remains the primary driver of firm value in emerging markets, whereas the valuation impact of ESG and green innovation will materialise only when (i) ESG reports are accompanied by independent assurance, (ii) regulators enforce mandatory standards and penalties for green-washing, and (iii) investor literacy on sustainability is enhanced. Future research should extend the observation window and introduce moderating variables such as foreign ownership or analyst coverage to identify the point at which ESG and green-innovation signals are translated into valuation premia.

V. CONCLUSION

This research aimed to assess the impact of ESG disclosure, profitability, and green innovation on firm value among companies in the energy and manufacturing sectors listed on the Indonesia Stock Exchange between 2021 and 2023. Using multiple linear regression analysis on a dataset comprising 102

observations, the findings indicate that profitability represented by Return on Assets (ROA) exerts a significant and positive influence on firm value. These results align with the signaling theory and the resource-based perspective, suggesting that a company's capacity to generate profits demonstrates its operational efficiency and bolsters investor trust. In contrast, ESG disclosure and green innovation did not exhibit a significant impact on firm value. Although theoretically regarded as positive investment signals, these results indicate that in emerging markets such as Indonesia, sustainability considerations may not yet be fully integrated into market valuation practices. This could be attributed to the lack of standardized ESG reporting and varying levels of market awareness regarding non-financial performance.

Despite this, the three variables together significantly influence firm value, with the model explaining 14.6% of the variation in the Price to Book Value (PBV). This highlights the importance of integrating financial performance with sustainability strategies in shaping investor perceptions, even though the individual impacts of ESG and green innovation require further development within the local institutional environment.

In light of these findings, several recommendations are proposed. For companies, maintaining and enhancing profitability remains essential as the core driver of firm value. Nonetheless, firms are encouraged to improve the quality and consistency of ESG disclosures and expand the implementation of green innovations, as market expectations toward sustainability are likely to increase over time. For investors, these results underscore the importance of profitability in evaluating corporate fundamentals, while also recognizing the potential long-term benefits of sustainability performance, particularly amid the global shift toward a green economy. For regulators, it is imperative to strengthen ESG-related policy frameworks and standardize ESG reporting at the national level to improve transparency and credibility of non-financial information. Such efforts are critical to positioning ESG practices as strategic imperatives rather than mere symbolic compliance. Lastly, future researchers are advised to explore the role of mediating or moderating variables that may better explain the relationship between ESG, green innovation, and firm value. Employing panel data methodologies is also recommended to capture temporal dynamics and provide deeper insights over time.

Several limitations temper these findings. First, the three-year window may be too short to capture the lagged market benefits of ESG initiatives and green innovation. Second, the sample is confined to energy and manufacturing firms, limiting generalisability to other sectors. Third, the ESG and green-innovation metrics rely on content analysis; despite high intercoder reliability, some subjectivity is unavoidable. Fourth, macroeconomic conditions and corporate-governance quality were not explicitly modelled, and potential endogeneity between firm value and sustainability signals cannot be fully ruled out. Future research should extend the time horizon, include additional industries, incorporate further control variables, and apply dynamic-panel or instrumental-variable techniques to mitigate endogeneity and provide a more holistic understanding of how sustainability initiatives translate into market value.

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