

How Environmental, Social, and Governance Reporting Drives Innovation Capability and Firm Value in Indonesia

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Abstract

This research extends the resource-based explanation of firm value by analyzing innovation capability as both a key driver of Tobin's Q and as an effect of environmental, social, and governance (ESG) disclosures. Using panel data from 82 listed firms on the Indonesia Stock Exchange over a decade (820 observations), we employed fixed-effects regression based on Chow and Hausman tests. The analysis proceeded in two stages: first, examining how the three ESG disclosure pillars influence innovation capability, and second, how innovation capability impacts firm value, controlling for size, age, leverage, and board size. The findings reveal that only social disclosure significantly enhances innovation capability, while environmental and governance disclosures do not show notable effects. Moreover, increased innovation capability leads to a substantial and significant improvement in firm value. While firm size and board size positively affect value, firm age has a negative impact. The evidence points to an asymmetry: whereas social disclosure supports capability-building, innovation capability itself is a strong channel through which market value is realized, and this mechanism in Indonesia relies mainly on the social aspect of ESG, rather than environmental or governance disclosure volume. This work refines the resource-based perspective for developing economies and offers targeted insights for business leaders and policymakers about which ESG areas most effectively foster strategic advantage.

Keywords: innovation capability; ESG disclosure; firm value; corporate governance; panel data

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Introduction

In emerging markets, capital market valuations are shifting from focusing solely on balance-sheet metrics to valuing firms' internal strategic capabilities, with innovation capability playing a central role. Companies listed on the Indonesia Stock Exchange (IDX) are directly impacted by this transition, particularly as they adapt to expanding sustainability disclosure requirements since the implementation of POJK No. 51/2017 (POJK, 2017). This raises an important question: does ESG disclosure truly foster the internal capacities that enhance market value, or is it mainly a matter of regulatory compliance?

Currently, two main research streams tackle this topic separately. One treats innovation

capability as directly increasing firm value, reinforcing the RBV (Resource-Based View) perspective where R&D investment signals differentiation and long-term growth (Li et al., 2022; Yang & Wang, 2025). The other explores ESG disclosure as a catalyst for innovation, suggesting greater transparency eases financing constraints and reduces agency costs, helping unlock R&D resources (Ban, 2023; Mbanyele, 2022; Ruan et al., 2024). Few studies link these lines within a unified framework, and fewer still examine the separate ESG pillars to identify which (if any) effectively spur innovation capability. The closest is Xu & Zhu, (2024) who demonstrate in China that innovation mediates the relationship between ESG and performance, but distinct institutional differences in Indonesia, such as in funding, analyst engagement, and regulatory enforcement, demand localized research.

To address this, we use a ten-year fixed-effects panel of IDX-listed firms to test whether each ESG pillar predicts innovation capability, and whether innovation capability, in turn, raises firm value. This study's novelty lies in analyzing ESG dimensions separately, connecting the disclosure to capability and capability to value links within a single panel setting, and including key firm characteristics as controls throughout.

For policymakers, these results clarify which disclosure requirements under POJK No. 51/2017 actually support capability development. For managers, the evidence reframes R&D spending as an investment in market value rather than merely a cost, and highlights that not all disclosure types equally facilitate this process, (OJK, 2023). Investors gain a more granular assessment tool through a pillar wise understanding of the disclosure innovation value link.

Literature Review and Hypothesis Development

Three main theories underpin this analysis. Signaling Theory Spence (2002) views disclosure as intentionally costly information that bridges the information gap between managers and the market, provided it cannot be easily mimicked by less credible firms. The Resource-Based View Barney (1991) conceptualizes ESG disclosures and innovation capability as intangible assets, assigning disclosure to bolster reputation and human capital, while innovation capability fulfilling the VRIN (valuable, rare, inimitable, non-substitutable) criteria, translates these resources into a lasting competitive edge. Agency Theory Jensen & Meckling (1976) explains how governance quality can determine whether R&D survives short-term pressure, noting that effective board oversight is crucial for sustaining long-term innovation.

Environmental Disclosure and Innovation Capability

Environmental disclosures involve details on energy, emissions, water, and waste per GRI standards. Previous studies Ruan et al. (2024); L. Xu & Niu (2026) demonstrate that such transparency can drive green innovation, contingent upon the disclosures being substantive rather than simply procedural. As Cai et al. (2023) note, disclosure quality not quantity is what triggers innovative responses. However, in Indonesia's relatively recent disclosure environment, where item counts reflect coverage but not depth, the connection between environmental reporting and innovation may not be observable in a limited panel timeframe.

H1: Environmental disclosure has a positive effect on innovation capability.

Social Disclosure and Innovation Capability

Social disclosures relate to labor practices, health and safety, and community engagement, based on GRI criteria. The pathway here is through human capital enhancement. Ban (2023) finds that substantive CSR disclosure lessens interpretation costs for analysts and reduces financing barriers, thus boosting R&D and patenting activity. Mbanyele (2022) argues that social disclosure can mitigate managerial short-termism and redirect resources towards higher quality innovation. Especially in Indonesia's labor intensive context, robust social disclosures likely strengthen the absorptive capacity necessary for innovation.

H2: Social disclosure has a positive effect on innovation capability.

Governance Disclosure and Innovation Capability

Governance disclosures address board composition, nomination processes, conflict of interest management, and anti-corruption policies (GRI series). Evidence from Park (2021) and Cheng et al. (2026) suggests that robust governance oversight fosters innovation by preserving long-term R&D against short-term priorities. However, in countries where such reporting is new and compliance driven, as in Indonesia, governance disclosures may reflect administrative conformity more than genuine oversight, a factor that could impede innovation Jatmiko et al. (2025).

H3: Governance disclosure has a positive effect on innovation capability.

Innovation Capability and Firm Value

Innovation capability denotes a firm's capacity to mobilize and deploy knowledge resources to generate novel products, processes, or organizational configurations that translate into competitive advantage. Among publicly listed companies in Indonesia, the construct is most commonly operationalized through R&D intensity (the ratio of R&D expenditure to total sales) as this measure captures both the scale of knowledge investment and its relative priority within the firm's resource allocation (Harymawan & Nismara, 2020; Li et al. (2023). Empirically, R&D intensity associates positively with Tobin's Q across multiple economies and time periods. Li et al. (2023) demonstrate that innovation capability improves both the quantity and quality of firm output, which subsequently raises firm value through improved competitive positioning and analyst coverage. Yang & Wang (2025) confirm that innovation efficiency driven by resource reallocation toward knowledge-intensive activities contributes to higher market valuations. Wang et al. (2025) show that green technology innovation mediates the relationship between sustainability practices and corporate value, while Zhao & Wang (2025) document a direct pathway from ESG-induced innovation to corporate value. Xu & Zhu (2024) provide particularly direct evidence, demonstrating that innovation capability significantly mediates the ESG-financial performance relationship in a large-sample panel study. In Indonesia specifically, the value relevance of innovation is conditioned by several institutional features. Information asymmetry between firms and minority investors exceeds developed-market levels, rendering credible non-financial signals, including R&D disclosure, especially valuable in reducing investor uncertainty. Simultaneously, constrained access to external financing limits many firms' capacity to sustain R&D investment, implying that firms demonstrating consistent innovation commitment are rewarded with disproportionately positive market responses.

Hypothesis development also draws on the latest literature concerning control variables. Access to resources and economies of scale, as reflected in firm size, tend to be positively linked to market

valuation through risk diversification and higher stock liquidity (Lee et al. 2024; Aydoğmuş et al. 2022). In emerging markets, firm age frequently relates negatively to market value, as investors favor entities with exponential growth potential and agile organizational structures over established firms encumbered by bureaucratic rigidity (Pramesti et al. 2024; Khanchel et al. 2023). Leverage captures capital structure. Although trade-off theory anticipates a positive effect via the tax shield, Indonesian capital market evidence often reports insignificance or a negative effect, consistent with perceptions of bankruptcy risk and debt agency costs (Junius et al. 2020; Zhang et al. 2023). Board size operates as a monitoring mechanism that curbs managerial opportunism and strengthens reporting credibility, thereby bolstering investor confidence (Chen et al. 2023; Delegkos et al. 2025).

H4: Innovation capability contributes positively to firm value.

The model further includes firm-level controls. Firm size generally predicts value positively (Lee et al. 2024; Aydoğmuş et al. 2022), while age is often linked to lower value in emerging markets (Pramesti et al. 2024; Khanchel et al. 2023). Leverage often has little impact in Indonesia (Junius et al. 2020; Zhang et al. 2023), while board size can enhance monitoring and disclosure credibility (Chen et al. 2023; Delegkos et al. 2025).

Methods

Causal relationships among constructs were examined through a quantitative explanatory design within a balanced panel framework covering 2016–2025. The population comprised companies listed on the Indonesia Stock Exchange (IDX). Purposive sampling was applied under four criteria: (1) firms remained continuously listed throughout the ten-year observation period; (2) complete annual reports and sustainability reports were publicly accessible for all observation years; (3) all required financial, market-capitalization, and innovation indicators were verifiable through the Refinitiv Eikon/DataStream database or official IDX publications; and (4) ESG disclosure scores, covering environmental, social, and governance dimensions were obtainable from the ESGI dataset. Firms failing any single criterion were excluded to preserve data integrity. This screening process reduced the population to 82 companies, producing 820 firm-year observations (82 firms × 10 years). Operational variable definitions appear in the following table:

Table 1. Definitions of Operational Research Variables

Variable	Simbol	Measurement	Reference
Dependent variables			
Firm Value	FV	Tobin's Q, the ratio of the sum of market capitalization and total liabilities to total assets	Lee et al., 2024; Ruan et al., 2024
Mediating variables			
Innovation Capability	IC	R&D Intensity = R&D expenditure / total sales	Özkan, 2022; Harymawan & Nismara, 2020
Independent variables			
Environmental Disclosure	ED	Number of environmental disclosures	Xu & Zhu, 2024; Li et al., 2023; C. Xu et al., 2023
Social Disclosure	SD	Number of social disclosures	Xu & Zhu, 2024; Li et al., 2023; C. Xu et al., 2023

Variable	Simbol	Measurement	Reference
Governance Disclosure	GD	Number of governance disclosures	Xu & Zhu, 2024; Li et al., 2023; C. Xu et al., 2023
Control variables			
Firm Size	FS	The natural logarithm of total assets	Xu & Zhu, 2024; Yusra et al., 2017; Rahman et al., 2023
Firm Age	FA	The number of years since incorporation (IPO)	Xu & Zhu, 2024; Yusra et al., 2017; Rahman et al., 2023
Leverage	LEV	The ratio of total debt to total assets	Xu & Zhu, 2024; Yusra et al., 2017; Rahman et al., 2023
Board Size	BS	The number of board members	Wang et al., 2025; Xu & Zhu, 2024; Yusra et al., 2017

Source: Processed data (2026)

Two main equations were estimated. First, antecedents of innovation capability:

$$\text{Model 1: } KI_{it} = \alpha + \beta_1 ED_{it} + \beta_2 SD_{it} + \beta_3 GD_{it} + \varepsilon_{it}$$

Second, the effect of innovation capability on firm value, with controls:

$$\text{Model 2: } FV_{it} = \beta_0 + \beta_1 CI_{it} + \beta_2 FS_{it} + \beta_3 FA_{it} + \beta_4 LEV_{it} + \beta_5 BS_{it} + \varepsilon_{it}$$

Estimation was performed using STATA 19. Prior to estimation, the Chow test compared the Common Effects Model against the Fixed Effects Model, and the Hausman test examined consistency between Fixed Effects and Random Effects estimators, thereby guiding model selection (Yusra et al., 2019). Specification results indicated that the Fixed Effects Model best accommodates unobserved firm-level heterogeneity. Hypotheses were tested through partial t-tests at the 5% significance level, interpreting coefficients by direction and magnitude.

Results and Discussion

Model Selection

The sample structure, 820 observations covering 82 companies listed on the IDX over ten years displayed sufficient cross-sectional and temporal variation for fixed-effects estimation. The Chow test yielded $\text{Prob} > F = 0.0000$, rejecting the null hypothesis that common effects adequately represent the data and confirming significant firm-specific unobserved heterogeneity. The subsequent Hausman test produced $\text{Prob} > \chi^2 = 0.0000$, rejecting the null hypothesis that random effects estimates are consistent. Unobserved firm-level characteristics, plausibly including managerial innovation orientation, ownership concentration, and firm-specific technological endowments are therefore correlated with the regressors, rendering random effects estimates biased. On this basis, the Fixed Effects Model was adopted as the valid specification for all subsequent estimation.

Table 2. Results of the Panel Data Regression Model Selection

Testing	Prob	Result	Conclusion
Uji Chow	0.0000	Prob < 0.05	FEM
Uji Hausman	0.0000	Prob < 0.05	FEM

Source: Processed data (2026)

Main Regression Results

Model 1 estimation: ESG Disclosure and Innovation Capability

Table 3 presents fixed-effects regression for Model 1. The model is overall significant ($F(3, 735) = 21.46$, $p < 0.001$), though with a modest within- R^2 (0.0805), consistent with the low mean and high variance of innovation capability in the sample.

Table 3. Result of Fixed-Effects Regression: ESG Disclosure and Innovation Capability

Variabel	Research model 1 $KI_{it} = \alpha + \beta_1 ED_{it} + \beta_2 SD_{it} + \beta_3 GD_{it} + \varepsilon_{it}$	Conclusion
Environmental Disclosure	0.0000432 [1.41]	H1 rejected
Social Disclosure	0.0000934*** [2.87]	H2 supported
Governance Disclosure	-0.0000155 [-0.56]	H3 rejected
Observasi	820	
R-squared	0.0805	

Source: Processed data (2026)

Among the ESG pillars, only social disclosure significantly and positively relates to innovation capability, supporting the idea, consistent with Ban (2023) and Mbanyele (2022), that in Indonesia's labor-heavy corporate landscape, social reporting enhances workforce stability and knowledge retention (absorptive capacity), which in turn supports sustained R&D investment. Thus, H2 is supported. Environmental disclosure, while positive, does not reach significance ($p = 0.159$), so H1 is rejected. This may be due to either the relatively short ten-year panel being insufficient to observe the typically longer lagged effects, or the GRI-based measurement capturing coverage but not quality, diluting the actual impact of substantive environmental strategies. Governance disclosure has a negative but insignificant association ($p = 0.578$), in line with findings Jatmiko et al. (2025) suggesting that compliance-oriented governance, rather than strategic oversight, might impede innovation decisions by adding bureaucratic complexity, particularly in less mature regulatory environments like Indonesia's.

Model 2 estimation: Innovation Capability and Firm Value

Table 4 presents the fixed-effects regression results. The overall model is statistically significant ($F = 14.46$, $p < 0.001$) with a within- R^2 of 0.1368, indicating that approximately 13.68% of within-firm variation in firm value is explained by the included regressors after controlling for time-invariant firm fixed effects. This R^2 level is consistent with prior panel studies of innovation and firm value, where a substantial proportion of variance is explained by firm fixed effects rather than time-varying regressors (Li et al. 2023; Tang, 2022).

Table 4. Results of the Panel Data Regression Estimation

Variabel	Research model 2: $FV_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \beta_2 FS_{i,t} + \beta_2 FS_{i,t} + \beta_3 FA_{i,t} + \beta_4 LEV_{i,t} + \beta_5 BS_{i,t} + \varepsilon$
_cons	1.163997* [1.68]
Innovation Capability	25.36611**

	[2.83]
Firm Size	0.0966993***
	[6.50]
Firm Age	-0.1576754***
	[-4.35]
Leverage	-0.505537
	[-0.68]
Board Size	0.2077363***
	[4.22]
Observasi	820
R-squared	0.1368

Source: Processed data (2026)

Informative patterns also emerge among the control variables. A significant positive effect of Firm Size (FS) ($\beta = 0.097$; $t = 6.50$) suggests that larger asset bases strengthen market confidence through liquidity, risk diversification, and easier financing access, in line with Lee et al. (2024) and Aydoğmuş et al. (2022). By contrast, Firm Age (FA) carries a significant negative coefficient ($\beta = -0.158$; $t = -4.35$). This negative relationship is consistent with the emerging market pattern documented by Pramesti et al. (2024) and Khanchel et al. (2023). Older companies listed on the IDX tend to carry legacy operational infrastructure, higher employee tenure costs, and organizational cultures resistant to technological change, factors that increase adaptation costs when market conditions shift. Unlike developed market evidence, where firm age is frequently associated with reputation effects and stable cash flows that attract valuation premiums, the Indonesian capital market context appears to reward organizational dynamism and growth optionality over historical longevity. A direct practical implication follows: older firms seeking to restore market valuation must demonstrate credible innovation capability to counteract the age-related discount imposed by investors.

Firm value is not significantly affected by Leverage (LEV) ($\beta = -0.506$; $t = -0.68$). This null result is consistent with pecking order theory predictions for emerging capital markets, where investors prioritize assessment of operational cash flow quality and innovation capacity over debt structure composition (Junius et al. 2020; Zhang et al. 2023). Among companies listed in Indonesia, debt financing structures are treated as largely neutral by the market under stable liquidity conditions, neither systematically rewarded through tax shield pricing nor penalized through bankruptcy risk discounting. This contrasts with developed market evidence where leverage effects are more consistently detected, suggesting that the relatively underdeveloped Indonesian credit market reduces investor sensitivity to capital structure variations unless acute liquidity pressures become observable. Board size exerts a positive and statistically significant effect on firm value ($\beta = 0.208$; $t = 4.22$; $p < 0.001$). A larger Board of Commissioners provides broader functional expertise, stronger oversight capacity, and more diverse monitoring perspectives. Conditions that reduce managerial opportunism and improve the credibility of strategic disclosures to external investors.

This result is consistent with Chen et al. (2023) and Delegkos et al. (2025), who document that governance mechanisms narrowing information asymmetry between management and shareholders translate into measurable market valuation improvements. In Indonesia's two-tier governance system, Commissioner board size reflects the depth of supervisory resources available to the firm, and the market prices this governance capacity positively, an interpretation aligned with Agency Theory's prediction that effective monitoring raises firm value by reducing managerial discretion costs.

Collectively, these findings indicate that innovation capability constitutes the primary strategic determinant of firm value growth among Indonesian listed companies, operating above and beyond the structural characteristics of size, age, leverage, and governance. The results validate both the Resource-Based View, which predicts that VRIN-satisfying innovation capabilities generate sustained competitive advantage priced by markets and Signaling Theory, which predicts that credible R&D commitments reduce investor uncertainty and lower required returns. These theoretical validations in a transitioning Southeast Asian economy extend prior evidence concentrated in Chinese, European, and global samples to a market characterized by distinct informational, institutional, and governance conditions.

In summary, the results reveal that while only social disclosure meaningfully enhances innovation capability, once such capability is built, it plays a crucial role in increasing firm value. This implies that for Indonesian listed firms, social aspects of ESG are currently the primary disclosure lever for developing innovation that is recognized and rewarded by the market. In contrast, environmental and governance disclosure, at least as currently structured and measured, do not yet drive capability development.

Conclusions

The study investigated the interplay among ESG disclosures, innovation capability, and firm value over a decade in 82 IDX-listed Indonesian firms. The analysis delivers three core insights. First, social disclosure is the only ESG pillar that robustly predicts innovation capability, supporting a human-capital channel in Indonesia's labor intensive landscape. Environmental and governance disclosures do not significantly impact innovation capability, possibly because reporting remains broad but not deeply substantive, given the relatively young regulatory environment. Second, once innovation capability is established, it serves as the strongest determinant of firm value, underscoring that markets reward R&D intensity as a strategic signal.

These findings refine the resource-based framework by identifying which ESG domains actually drive capability-building and highlight for managers the importance of focusing on high-quality, meaningful social disclosures as a pathway to greater innovation and value creation. Investors benefit from a more detailed tool for screening, while policymakers are alerted that compliance-oriented regulation alone may not foster the innovation outcomes they seek.

This research relies on GRI item counts, which primarily measure disclosure breadth and not the underlying quality or substantive commitment, possibly underestimating true links between innovation and environmental/governance reporting. The use of R&D intensity as a proxy captures input but not direct innovation outcomes such as patents or new products, a limitation shared with earlier Indonesian studies. The ten-year duration may still be insufficient to observe slower-moving environmental innovation cycles, indicating the need for longer or more sophisticated analyses in future work. While fixed-effects help address endogeneity tied to time-invariant unobserved characteristics, further research should leverage instrumental variables for more robust causal inference. Expanding the study to other industries and integrating patent-based innovation measures is recommended as Indonesian ESG and innovation ecosystems evolve.

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