THE IMPACT OF ENVIRONMENTAL INFORMATION DISCLOSURE ON GREEN INNOVATION IN VIETNAMESE LISTED COMPANIES

Assoc.Prof.PhD. Nguyen Thi Hoa Hong* - Dang Truong Thinh*

Abstract: ***This study investigates the impact of Environmental Information Disclosure (EID) on green innovation among Vietnamese listed companies from 2009 to 2023. Using Ordinary Least Squares (OLS) regression, the results reveal a significant positive relationship between EID and green innovation. The findings suggest that environmental transparency serves as a strategic tool for fostering sustainability-oriented innovation, even in the context of limited regulatory enforcement in emerging markets.***

• Keywords: *environmental information disclosure, green innovation, listed companies, Vietnam.*

Date of receipt: 05th Nov., 2024
Date of delivery revision: 08th Nov., 2024
Date of receipt revision: 02nd Jan., 2025
Date of approval: 10th Mar., 2025
DOI: https://doi.org/10.71374/jfar.v25.i3.19

1. Introduction

In the context of intensifying environmental challenges and increasing demands for sustainable development, corporate transparency and environmental accountability have become critical pillars of responsible business practices. Among various policy tools, Environmental Information Disclosure (EID) has emerged as a key mechanism that enhances communication with stakeholders, reduces information asymmetry, and creates external pressure for firms to adopt more sustainable strategies. At the same time, green innovation, defined as the development and application of environmentally friendly technologies, processes, and products, has gained prominence as a strategic response that not only reduces ecological harm but also enhances firms' long-term competitiveness. Empirical research has increasingly supported a positive link between environmental disclosure and green innovation. In the case of China, studies have shown that EID can significantly stimulate firms' green patenting activities, particularly when disclosures are made in a transparent and positive tone. The sentiment embedded in such disclosures, whether optimistic or cautious, affects stakeholder perceptions, financing conditions, and ultimately, firms' willingness to invest in green technologies (Hu et al., 2023; Lu & Li, 2023). Moreover, the implementation of institutional frameworks like the Pollution Information Transparency Index (PITI) has helped reinforce the signaling function of EID, especially among high-polluting firms (Ding et al., 2022). These findings suggest that EID functions not only as a form of compliance, but also as a strategic signal of environmental commitment that can mobilize valuable innovation resources.

Despite these insights, limited empirical attention has been given to other emerging markets, particularly Vietnam, where environmental disclosure and green innovation are increasingly important yet under examined. Vietnam has experienced rapid economic growth in recent years, accompanied by rising environmental concerns. Recognizing the need for improved corporate environmental responsibility, the Vietnamese government has issued regulatory guidelines to strengthen disclosure practices. Notably, Circular No. 96/2020/TT-BTC, issued by the Ministry of Finance, requires listed companies to publish environmental, social, and governance (ESG) information in accordance with Appendix IV, marking an important step toward institutionalizing EID in Vietnam's capital market. However, the actual implementation of ESG reporting remains uneven across firms, and little is known about how such disclosure affects firms' green innovation performance in practice. This study seeks to address this gap by investigating the impact of environmental information disclosure on green innovation in Vietnamese listed companies to provide empirical evidence on the EID-green innovation nexus in the context of an emerging market with evolving institutional infrastructure.

The contributions of this research are twofold. First, it enriches the literature by extending the scope of analysis to Vietnam, a country with limited existing empirical evidence in this domain. Unlike China, where structured disclosure initiatives like PITI have been implemented, Vietnam's ESG disclosure regime is still developing, offering a distinct context for comparative insights. Second, the study provides policy-relevant

** Foreign Trade University; email: hongnth@ftu.edu.vn*

recommendations that may support the development of a more robust environmental governance system in Vietnam, and help listed companies leverage EID as a strategic driver of innovation and sustainability. The remainder of this paper is structured as follows. Section 2 reviews the relevant literature and develops the research hypotheses. Section 3 outlines the research methodology, including data sources, variable definitions, and model specification. Section 4 presents the empirical results and discussion. Finally, Section 5 concludes the study with key findings and offers actionable recommendations for corporate managers and policymakers.

2. Literature review and hypothesis development

Environmental Information Disclosure (EID) has become an increasingly important component of corporate sustainability strategies. Beyond complying with regulations, EID enables firms to signal environmental responsibility, build stakeholder trust, and potentially drive green innovation (Lu & Li, 2023). In the context of intensifying climate risks and growing expectations for corporate transparency, understanding the relationship between EID and green innovation has become vital, especially for firms operating in emerging markets. The theoretical foundation connecting EID and green innovation is rooted in signaling theory, stakeholder theory, and the resource-based view (RBV). From a signaling perspective, firms use EID to convey credible environmental commitments, especially under conditions of information asymmetry (Spence, 1973). The disclosure of environmental efforts can improve external perceptions of transparency and environmental responsibility, thereby reducing perceived risks and enhancing stakeholder support. This support is particularly important for innovation activities that are costly, long-term, and uncertain characteristics that are typical of green innovation.

Building on this, stakeholder theory posits that firms which respond effectively to environmental concerns of their stakeholders gain legitimacy and access to essential resources (Freeman, 2010). EID serves as a mechanism to align corporate behavior with the expectations of regulators, investors, customers, and the public. By providing timely and verifiable environmental information, companies can strengthen their relationships with these stakeholders, which in turn facilitates the adoption of sustainable innovation strategies (Surroca et al., 2010; Du & Yu, 2021). The resource-based view adds another layer by highlighting the importance of valuable, rare, and inimitable resources in sustaining competitive advantage (Wernerfelt, 1984). High-quality EID can serve as a channel through which firms attract these resources, including green finance, policy support, and reputational capital. Lu & Li (2023) provide evidence that EID helps firms reduce financing constraints and enhances innovation outcomes. Their study shows that companies with stronger environmental disclosure performance, particularly those undergoing digital transformation, exhibit significantly higher levels of green patenting.

In addition to the content of disclosure, recent research has examined the tone and structure of EID. Hu et al. (2024) emphasize that the sentiment embedded in environmental disclosure, particularly the use of positive tone, plays a critical role in influencing stakeholder expectations and resource allocation. Their study finds that a net positive tone, along with tone dispersion (how sentiment is distributed throughout the report), enhances the signaling power of EID and has a significant positive impact on green innovation. The effect is especially strong under the presence of institutional pressures such as government supervision and media attention. These findings are supported by other studies in China, where mechanisms like the Pollution Information Transparency Index (PITI) have been shown to foster green innovation through increased disclosure quality and institutional engagement (Xiang et al., 2020; Zhang et al., 2022). Detailed and readable EID helps reduce uncertainty around innovation investments, lowers the cost of external financing, and increases firms' capacity to implement environmentally friendly technologies (Luo et al., 2019; Liu et al., 2023). Furthermore, optimistic disclosures are more likely to mobilize stakeholder support and signal confidence in future environmental performance (Arena et al., 2015).

While these results are compelling, most of the current evidence stems from China, where environmental regulations and disclosure mechanisms are relatively well established. In contrast, Vietnam represents an emerging market context where EID is still evolving. Although the Ministry of Finance issued Circular No. 96/2020/TT-BTC, requiring listed companies to disclose ESG information (including environmental metrics), the actual implementation remains fragmented and lacks a unified enforcement framework. This regulatory gap raises important questions about the effectiveness of EID as a driver of green innovation in Vietnam. Addressing this gap, the study seeks to explore the relationship between EID and green innovation among Vietnamese listed companies. Building on established theoretical

frameworks and recent empirical insights, we propose the following hypothesis:

Hypothesis 1: Environmental Information Disclosure (EID) is positively associated with green innovation in Vietnamese listed companies.

3. Research methodology

3.1. Data and sampling

This study uses panel data from firms listed on the Hanoi Stock Exchange (HNX) and Ho Chi Minh City Stock Exchange (HOSE) during the period 2009-2023. To ensure relevance to environmental activities, firms in banking, finance, and other non-manufacturing sectors are excluded. Companies without accessible or complete annual reports are also removed. The final sample includes 531 listed firms, generating 7,965 firm-year observations, and provides a solid basis to examine the relationship between environmental information disclosure and green innovation in the Vietnamese context.

3.2. Empirical model and research method

To examine the influence of environmental information disclosure on green innovation among Vietnamese listed companies, this study employs a quantitative panel data regression approach. The empirical model (1) is specified as follows:

$$(1)\quad GI_{it} = \alpha_0 + \alpha_1 EID_{i,t-1} + \alpha_2 SIZE_{i,t-1} + \alpha_3 LEV_{i,t-1} + \alpha_4 LIQ_{i,t-1} + \alpha_5 AGE_{i,t-1} + \alpha_6 BIG4_{i,t-1} + \alpha_7 CAPEX_{i,t-1} + \alpha_8 MTB_{i,t-1} + \varepsilon_{it}$$

In this equation, GI_{it} represents the level of green innovation for firm *i* in year *t*. The variable of interest, $EID_{i,t-1}$, measures the quality or intensity of environmental information disclosure, lagged by one year to address potential endogeneity and temporal causality. A positive and statistically significant coefficient α_1 would suggest that firms disclosing more environmental information are more likely to engage in green innovation in subsequent periods.

The model incorporates several firm-level control variables commonly used in the environmental disclosure literature. Firm size ($SIZE_{i,t-1}$) is proxied by the natural logarithm of total assets, while financial leverage ($LEV_{i,t-1}$) is captured by the debt-to-asset ratio. Liquidity ($LIQ_{i,t-1}$) is measured by the current ratio, and firm age ($AGE_{i,t-1}$) is the logarithm of the number of years since incorporation. Audit quality ($BIG4_{i,t-1}$) is a binary variable equal to 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, EY, or KPMG), and 0 otherwise. Capital expenditure ($CAPEX_{i,t-1}$) is measured as the ratio of capital investment to total assets. Market-to-book value ($MTB_{i,t-1}$) is used to capture growth opportunities and market valuation relative to book equity.

All explanatory variables are lagged by one period to mitigate potential reverse causality and reduce simultaneity bias. The model is estimated using the Pooled Ordinary Least Squares (OLS) method, with year and industry fixed effects included to control for time-specific shocks and sectoral heterogeneity, respectively. This estimation approach provides a robust framework for assessing whether environmental transparency leads to higher levels of green innovation, particularly within the context of an emerging market like Vietnam, where disclosure practices are still evolving.

In addition, the two key variables of interest: green innovation and environmental information disclosure, are measured using content analysis of corporate reports to adapt to the Vietnamese context.

**** Green Innovation (GI)***

The green innovation index in this study is constructed by averaging firm-level scores across 25 predetermined indicators, following the methodology adapted from Hong et al. (2024). These indicators span four core dimensions of environmentally oriented innovation: green products, green processes, green marketing, and green R&D investment. Data are manually extracted from publicly available sources such as firms' annual reports and official press releases. Each indicator is assessed using a binary scoring system: a value of 1 is assigned if the firm discloses relevant qualitative information, and 0 if no such disclosure is found. The final GI score for each firm-year reflects the extent of green innovation activities disclosed and ranges from 0 to 1.

**** Environmental Information Disclosure (EID)***

Environmental information disclosure (EID) is assessed using a scoring system based on content analysis of annual reports and sustainability disclosures. This framework builds on the GRI 300 series and is aligned with Appendix IV of Circular No. 96/2020/TT-BTC issued by the Vietnamese Ministry of Finance. The EID score comprises 12 disclosure criteria grouped into six main environmental dimensions: materials, emissions, waste, energy, water, and environmental compliance. Each criterion is evaluated as either disclosed (scored 1) or not disclosed (scored 0). The overall EID index for each firm-year is calculated as the average of the 12 binary indicators, resulting in a continuous variable ranging from 0 to 1 that reflects the extent and quality of environmental reporting. The data for EID are manually collected from firm annual reports, ESG reports, and other publicly available disclosures.

4. Findings and discussion

Table 1 presents the descriptive statistics for all variables in the model (1), used in the model examining the relationship between environmental information disclosure (EID) and green innovation (GI) among 7,965 firm-year observations.

Table 1: Descriptive Statistics of all variables in Eq.(1)

Variable	Obs	Mean	Std. Dev.	Min	Max
GI	7965	0.163	0.369	0	1
EID	7965	0.074	0.137	0	0.667
SIZE	7965	11.791	0.696	9.109	14.274
LEV	7965	0.213	0.194	0.001	0.890
LIQ	7965	2.399	3.747	0.002	68.080
AGE	7965	1.323	0.320	0	2.127
BIG4	7965	0.231	0.422	0	1
ROA	7965	0.070	0.085	-0.625	0.839
CAPEX	7965	0.053	0.078	0	0.863
MTB	7965	1.345	1.521	-9.450	38.660

Source: Authors calculated from Stata 16

The dependent variable GI has a mean of 0.163, indicating that about 16.3% of firms engage in green innovation activities, with considerable variation across the sample. The key independent variable EID has a mean of 0.074 and ranges up to 0.667, suggesting that while most firms disclose a relatively low level of environmental information, a few demonstrate significantly higher disclosure intensity. This variation allows for an effective assessment of EID's potential influence on green innovation. The control variables reflect diverse firm characteristics. On average, firms are of moderate size and age, with varied levels of leverage, liquidity, and capital expenditure. About 23.1% are audited by Big 4 firms, and profitability (ROA) shows wide dispersion. These variables are included to account for differences in firm structure, financial health, and external credibility that may influence green innovation outcomes.

Next, table 2 presents the correlation matrix among all variables in the model (1), with green innovation (GI) as the dependent variable and environmental information disclosure (EID) as the main independent variable.

Table 2: Correlation matrix among variables in Eq.(1)

	GI	EID	SIZE	LEV	LIQ	AGE	BIG4	ROA	CAPEX	MTB
GI	1.000									
EID	0.138	1.000								
SIZE	-0.051	0.144	1.000							
LEV	-0.074	-0.011	0.405	1.000						
LIQ	0.023	0.076	-0.185	-0.298	1.000					
AGE	0.035	0.232	0.139	0.059	0.004	1.000				
BIG4	0.065	0.051	0.451	0.083	-0.054	0.051	1.000			
ROA	-0.035	-0.027	-0.018	-0.001	0.003	0.028	-0.029	1.000		
CAPEX	-0.011	0.004	0.004	0.016	0.014	0.006	0.016	0.150	1.000	
MTB	-0.014	-0.006	-0.041	0.002	-0.003	0.003	-0.020	0.321	0.091	1.000

Source: Authors calculated from Stata 16

The correlation between GI and EID is 0.138, indicating a weak but positive relationship. This result provides initial support for the hypothesis that firms with higher levels of environmental disclosure are more likely to engage in green innovation activities. Although the correlation is not strong, it is in the expected direction and justifies further investigation through regression analysis. Regarding the control variables, their correlations with GI are generally low, suggesting weak direct linear associations. Importantly, the correlations among EID and the control variables are also modest, with the highest being 0.451 between SIZE and BIG4. All other correlations are well below commonly accepted multicollinearity thresholds 0.5, indicating that multicollinearity is not a serious concern in the model.

Finally, the study employed the OLS method for Model (1) to explore the impact of Environmental Information Disclosure (EID) on green innovation among Vietnamese listed companies during the period 2009-2023. The regression results are shown in Table 3 below.

Table 3: Regression results on the impact of environmental information disclosure on green innovation in Vietnamese listed companies from 2009 to 2023

Variables	Coefficient	t-statistics
EID	0.357***	11.5
SIZE	-0.003***	-1.58
LEV	-0.140***	-6.13
LIQ	-0.0004	-0.38
AGE	0.014	1.08
BIG4	0.060***	6.11
ROA	-0.125**	-2.44
CAPEX	-0.036	-0.64
MTB	-0.0007	-0.23
Constant	0.181***	7.79
Number of observations	7965	7965
R^2	0.172	

Source: Authors calculated from Stata 16

As can be seen from Table 3, the model (1) explains approximately 17.2% of the variation in green innovation ($R^2 = 0.172$), which is a reasonable explanatory power for firm-level panel data in sustainability research. Most notably, the coefficient for EID is 0.357 and is statistically significant at the 1% level (t = 11.5), indicating a strong and positive relationship between EID and green innovation. This suggests that companies with better environmental disclosure practices are more likely to implement environmentally innovative activities. Other significant variables include SIZE, LEV, ROA which have negative coefficients (-0.003; -0.140; 0.125), and BIG4, which has a positive impact (0.060, t = 6.11).

These findings indicate that larger size, higher financial leverage and profitability discourage green innovation, while companies audited by major international firms tend to engage more in sustainable innovation.

These results provide strong support for Hypothesis 1, which proposed a positive association between EID and green innovation. The significant and positive impact of EID confirms that transparency in environmental matters plays a key role in driving green innovation initiatives within Vietnamese firms. This relationship is in line with several empirical studies, such as those by Lu and Li (2023), who found that high levels of environmental disclosure, especially in digitally transforming firms, enhance green patenting. The findings are also consistent with Hu et al. (2024), who highlight the role of tone and readability in environmental disclosure as influential factors in securing stakeholder support for innovation.

In the Vietnamese context, where regulatory enforcement on environmental disclosure remains inconsistent, the strong positive effect of EID on green innovation highlights the strategic role of voluntary transparency. Rather than responding passively to weak regulations, many firms appear to treat EID as a proactive tool to build trust, attract resources, and differentiate themselves in an increasingly sustainability-conscious market. This behavior reflects an adaptive application of signaling and stakeholder theories, where disclosure is less about compliance and more about securing informal legitimacy and long-term benefits. The findings suggest that in emerging markets like Vietnam, where institutional frameworks are still developing, firms can still leverage disclosure to overcome uncertainty and resource constraints commonly associated with green innovation. This not only validates the broader relevance of international theories but also emphasizes the importance of fostering voluntary, market-driven sustainability practices alongside formal policy reforms.

5. Conclusion and Recommendations

This study investigates the relationship between Environmental Information Disclosure (EID) and green innovation among Vietnamese listed companies from 2009 to 2023. Using the OLS regression method, the findings reveal a statistically significant and positive impact of EID on green innovation, suggesting that environmental transparency serves as a strategic asset that enhances firms' innovation capacity. Despite the relatively underdeveloped regulatory environment in Vietnam, the results show that firms that voluntarily engage in environmental disclosure are more likely to pursue sustainable innovation practices. These findings validate the relevance of signaling theory, stakeholder theory, and the resource-based view in an emerging market context.

Based on the study's findings, several practical recommendations are proposed to support the development of green innovation through environmental disclosure in Vietnam. Firms should recognize environmental information disclosure as a strategic channel to support green innovation, not merely a reporting obligation. By enhancing the transparency, relevance, and usability of their disclosures, companies can improve stakeholder engagement, access to funding, and competitiveness in sustainability-driven markets. Rather than focusing solely on meeting minimum regulatory requirements, firms are encouraged to invest in the quality and credibility of their disclosures, including third-party assurance and stakeholder-targeted communication. At the same time, policymakers should prioritize not only expanding ESG disclosure requirements but also improving enforcement and institutional support. This may include developing standardized reporting guidelines, incorporating ESG performance into regulatory assessments, and offering technical assistance to firms, particularly in less regulated sectors.

However, this study has certain limitations. It focuses solely on listed companies, which may not represent the broader business landscape in Vietnam, particularly smaller or unlisted firms. Additionally, green innovation is measured using a scoring method based on disclosed content, which may not fully capture the depth or quality of firms' actual innovation activities. Future research could adopt broader samples and more diverse indicators to enhance the robustness of findings.

References:

Arena, C., Bozzolan, S., & Michelon, G. (2015). Environmental reporting: Transparency to stakeholders or stakeholder manipulation? An analysis of disclosure tone and the role of the board of directors. Corporate Social Responsibility and Environmental Management, 22(6), 346-361. https://doi.org/10.1002/csr.1350.

Ding, J., Lu, Z., & Yu, C. H. (2022). Environmental information disclosure and firms' green innovation: Evidence from China. International Review of Economics & Finance, 81, 147-159. https://doi.org/10.1016/j.iref.2022.05.007.

Du, S., & Yu, K. (2021). Do corporate social responsibility reports convey value relevant information? Evidence from report readability and tone. Journal of Business Ethics, 172(2), 253-274. https://doi.org/10.1007/s10551-020-04496-3.

Freeman, R. E. (2010). Strategic management: A stakeholder approach. Cambridge university press.

Hu, S., Zhang, C., Ji, Y., & Zhang, C. (2024). Does environmental information disclosure tone affect corporate green innovation in China? Based on the institutional perspective. Environment, Development and Sustainability, 26(5), 12239-12282. https://doi.org/10.1007/s10668-023-03782-0.

Liu, J. Y., Zhang, Y. J., & Cho, C. H. (2023). Corporate environmental information disclosure and green innovation: The moderating effect of CEO visibility. Corporate Social Responsibility and Environmental Management, 30(6), 3020-3042. https://doi.org/10.1002/csr.2535.

Lu, Z., & Li, H. (2023). Does environmental information disclosure affect green innovation?. Economic Analysis and Policy, 80, 47-59. https://doi.org/10.1016/j.eap.2023.07.011.

Luo, W., Guo, X., Zhong, S., et al. (2019). Environmental information disclosure quality, media attention and debt financing costs: Evidence from Chinese heavy polluting listed companies. Journal of Cleaner Production, 231, 268-277. https://doi.org/10.1016/j.jclepro.2019.05.237.

Spense, M. (1973). Job market signaling. Quarterly Journal of Economics, 87(3), 355-374. https://doi.org/10.2307/1882010.

Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. Strategic management journal, 31(5), 463-490. https://doi.org/10.1002/smj.820.

Wernerfelt, B. (1984). A resource-based view of the firm. Strategic Management Journal, 5(2), 171-180. https://doi.org/10.1002/smj.4250050207.

Xiang, X., Liu, C., Yang, M., et al. (2020). Confession or justification: The effects of environmental disclosure on corporate green innovation in China. Corporate Social Responsibility and Environmental Management, 27(6), 2735-2750. https://doi.org/10.1002/csr.1998.

Zhang, J., Lei, X., Su, T., et al. (2022). The effect of a list: How firms on key pollution supervisory list disclose environmental information? Finance Research Letters, 47, 102614. https://doi.org/10.1016/j.frl.2021.102614.