

“Green strategy and firm performance: The mediating role of competitive advantage in emerging economy SMEs”

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ARTICLE INFO	Dzu Pham Dinh, Tri Cao Minh and Ho Tran Quoc Hai (2026). Green strategy and firm performance: The mediating role of competitive advantage in emerging economy SMEs. <i>Innovative Marketing</i> , 22(4), 100–117. doi: 10.21511/im.22(4).2026.07
DOI	http://dx.doi.org/10.21511/im.22(4).2026.07
RELEASED ON	Thursday, 29 October 2026
RECEIVED ON	Sunday, 12 April 2026
ACCEPTED ON	Wednesday, 30 September 2026
LICENSE	 This work is licensed under a Creative Commons Attribution 4.0 International License
JOURNAL	"Innovative Marketing "
ISSN PRINT	1814-2427
ISSN ONLINE	1816-6326
PUBLISHER	LLC “Consulting Publishing Company “Business Perspectives”
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

52



NUMBER OF FIGURES

2



NUMBER OF TABLES

6

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BUSINESS PERSPECTIVES



LLC "CPC "Business Perspectives"
Hryhorii Skovoroda lane, 10,
Sumy, 40022, Ukraine
www.businessperspectives.org

Type of the article: Research Article

Received on: 12th of April, 2026

Accepted on: 30th of September, 2026

Published on: 29th of October, 2026

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Conflict of interest statement:

Author(s) reported no conflict of interest

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GREEN STRATEGY AND FIRM PERFORMANCE: THE MEDIATING ROLE OF COMPETITIVE ADVANTAGE IN EMERGING ECONOMY SMEs

Abstract

Sustainability transitions are a strategic imperative for SMEs in emerging economies, where institutional and resource constraints limit the direct translation of environmental strategies into performance outcomes. This study explores how green marketing and eco-innovation are associated with business performance through competitive advantage. Data were collected through a quantitative cross-sectional survey, yielding 474 valid questionnaires from owners, managers, and specialists of Vietnamese SMEs in the consumer goods sector. Environmental regulation strengthens the green marketing–competitive advantage relationship, and customer green awareness and market dynamics positively moderate the competitive advantage–performance relationship. The findings showed positive associations of eco-innovation ($\beta = .597$, $p < .001$) and green marketing ($\beta = .230$, $p < .001$) with competitive advantage, which was positively associated with business performance ($\beta = .461$, $p < .001$). The corresponding indirect effects through competitive advantage were significant ($\beta = .275$ and $.106$, respectively; both $p < .001$), while environmental regulation ($\beta = .164$), customer green awareness ($\beta = .083$), and market dynamics ($\beta = .091$) showed positive moderating effects. The cross-sectional design, non-probability sampling, and industry-specific focus may limit this study's scope and generalizability in broader contexts. This study advances the sustainability and strategic management literature by providing a mechanism-based account of how environmental strategy, when extended from the Natural Resource-Based View and translated into competitive positioning, generates economic gains for SMEs in resource-constrained emerging economies.

Keywords

green marketing, eco-innovation, competitive advantage, SMEs, Vietnamese consumer goods industry

JEL Classification

M31, L26, L25

INTRODUCTION

Sustainable development has become a structural driver of competitiveness across sectors, especially in fast-moving consumer goods (FMCG) where high production volumes and packaging place severe burdens on the environment. Regulatory frameworks, such as Extended Producer Responsibility (EPR), require firms to redesign products and supply chains in response to mounting waste management pressures (Lacang et al., 2025). In this institutional space, eco-innovation (e.g., recyclable packaging, waste recovery systems) is adopted as a proactive strategy, enabling firms to address environmental problems without compromising efficiency.

The Resource-Based View (RBV) and Natural Resource-Based View (NRBV) suggest that sustained competitive advantage arises from valuability, rarity, inimitability and organization, including environmentally-oriented capabilities such as pollution prevention and product stewardship (Barney, 1991; Hart, 1995). Yet, possessing capabilities

does not guarantee superior performance; technological initiatives generate economic returns in consumer markets only when recognized and valued by relevant stakeholders.

However, these perspectives rest on the unwarranted assumption that environmental capabilities directly translate into superior performance, leaving the value of environmental strategies, particularly for SMEs operating under resource constraints and weak institutional support, remains inadequately theorized.

Several research gaps exist within the increasing literature on green strategies. First, they mostly consider large firms in developed economies where the RBV assumption of resource availability is more likely to be valid, and yet, SMEs in emerging economies such as Vietnam or Sub-Saharan Africa suffer from financial, technological, and institutional resource constraints. Second, internal green capabilities, including green capital, human resources, and leadership practices, can improve environmental performance (Jamil et al., 2025). However, their economic contribution may be limited when firms operate under inconsistent regulations and weak institutional support, where regulatory pressure tends to be largely symbolic unless accompanied by substantive institutional reform (Abbas & Liu, 2022). Third, prior studies have reported positive relationships between green marketing, eco-innovation, competitive advantage, and firm performance. However, the mechanism by which environmental strategies are translated into firm-level economic value remains insufficiently specified. While green marketing and eco-innovation may support sustainable performance, their effects are more likely to materialize when they are embedded in a clear competitive position.

Furthermore, eco-innovation research has disproportionately emphasized internal environmental and operational outcomes, neglecting market value capture (Khaw et al., 2024). In FMCG markets, where perceptions and trust govern purchasing, the pathway from eco-innovation to competitive advantage remains underexplored. Although CSR investment has been associated with eco-innovation in developing economies (Villegas et al., 2023), it remains unclear how SMEs turn CSR-supported eco-innovation into a sustainable competitive advantage, leaving the exact role of green marketing undiscovered under conditions of heterogeneous consumer green awareness.

To address these gaps, this study examines the potential mediating role of competitive advantage in linking green marketing and eco-innovation with firm performance among Vietnamese consumer goods SMEs.

1. LITERATURE REVIEW AND HYPOTHESES

The review is organized around three linked questions. First, how can green marketing and eco-innovation be understood as firm-level strategic capabilities? Second, why might competitive advantage provide a relationship between these practices and business performance? Third, under what institutional and market conditions should these relationships be stronger or weaker? This sequence aligns the review directly with the study purpose and avoids treating the theoretical perspectives as parallel labels without an explanatory role.

1.1. Theoretical foundations

According to the RBV, achieving sustained competitive advantage requires firms to possess re-

sources and capabilities that (a) are valuable, (b) are rare, are (c) inimitable, and (d) are organized to create value (Barney, 1991). In this VRIO analysis, eco-innovation and green marketing are conceived as strategic capabilities constituting a complex bundle of skills and accumulated knowledge rather than as discrete, standalone operational practices. Once embedded in organizational routines, these capabilities may build up differentiated positioning and superior performance (Oduro, 2022).

Extending the RBV, the NRBV suggests that “environmentally-oriented capabilities such as pollution prevention, product stewardship, and sustainable development” could create long-lasting competitive advantages (Hart, 1995), which resonates with the logic of eco-innovation. Through integrated NRBV-based capabilities, reduced environmental

impact, and improved operational efficiency, firms can translate eco-innovation into distinct competitive advantages (Belyamani et al., 2025).

Stakeholder Theory posits that a firm's legitimacy and sustained performance are contingent upon meeting the expectations of key stakeholders: customers, regulators, and society at large. Here, green marketing functions as a strategy framework that reinforces firms' credibility and signals CSR commitment and innovation (Muchtazar et al., 2021; Villegas et al., 2023).

While RBV and NRBV explain how internal environmental capabilities underpin competitive advantage, Stakeholder Theory clarifies how external recognition and legitimacy jointly impact value appropriation. In this way, competitive advantage bridges internal capability development and external stakeholder validation. This framework yields greater explanatory power by elucidating how eco-innovation and green marketing jointly shape the performance implications of eco-friendly initiatives. Also, it considers competitive advantages as the pivotal mechanism through which environmental capabilities create and deliver strategic value to stakeholders.

Green marketing encompasses activities, including product design, communication, and product/service distribution, aimed at satisfying consumer needs while reducing negative environmental impacts. In the FMCG sector, with a fast purchase cycle and information asymmetry, green marketing serves as an information channel that enhances consumer awareness and trust in firms' sustainability efforts (Alkhatib et al., 2023).

Recent studies revealed that green marketing should not be limited to the traditional 4Ps marketing mix but rather be expanded to others, such as information transparency, customer education, and internal marketing. Elshaer et al. (2025b) argued that internal green marketing spreads a green culture within the organization, thereby improving the quality of implementation of external marketing activities.

Regarding tools for green marketing, some studies emphasize the central role of green packaging and green advertising used in the FMCG sector. Wong

et al. (2019) believed that green packaging not only improves a brand's image but also contributes to the creation of competitive advantages via product differentiation. Heightened environmental concern and consumer purchase intention have elevated Green Perceived Value (GPV), which in turn indirectly shapes purchasing behavior through green marketing signals (Lopes et al., 2024).

These studies evidently indicate that, for SMEs in the FMCG sector, green marketing functions not merely as a communication activity but as a strategic mechanism that shapes market perception and creates a demand-side foundation for competitive differentiation.

In emerging economies, growing consumer awareness of environmental issues has elevated green marketing from a communication function to a core competitive strategy. Based on Stakeholder Theory, investing in green product development and green communication could facilitate businesses to meet environmental expectations, thereby establishing legitimacy and reinforcing market positioning (Papadas et al., 2019). Also, for SMEs in the consumer goods industry, green marketing allows for distinguished sustainability to gain customer trust and loyalty. This explains consumers' willingness to pay a price premium for products with verifiable green attributes, giving SMEs access to high-value-added market segments (Wong et al., 2019). According to the RBV, brand equity and customer relationships constitute inimitable intangible assets underpinning sustained competitive advantages.

Eco-innovation refers to the development of products/services, processes, and business models that mitigate negative environmental impacts across the product lifecycle while maintaining or enhancing economic efficiency. From the Resource-based View (RBV), eco-innovation is a valuable, inimitable, and irreplaceable strategic capability, conferring sustainable competency upon firms (Ahmed et al., 2021; Oduro, 2024).

For the FMCG industry, there are two main forms of eco-innovation clearly distinguished by research: green process innovation and green product innovation. The former focuses on optimizing the supply chain, waste management, and im-

proving recyclability, which is considered a more practical and feasible form of innovation for resource-limited SMEs (Cahyadi, 2020; Brouwer et al., 2026). Meanwhile, the latter is often performed through improved packaging, the use of biomaterials, or designs geared towards a circular economy (Klimczuk-Kochańska & Marczevska, 2024).

Emerging economies' SMEs face significant financial and technological barriers, making the concept of cost-efficient eco-innovation an essential adaptation strategy. Abbas and Liu (2022) indicated that eco-innovation economically helps businesses meet environmental requirements while sustaining competitiveness, even within underdeveloped or weakly institutionalized environments.

Eco-innovation, encompassing improvements in products, processes, and management practices, aimed at minimizing negative environmental impacts, turns into a key driver of strengthened business performance and competitiveness. According to the NRBV, businesses with eco-innovative capabilities can utilize resources efficiently, reduce production costs, and limit emissions, thereby yielding both economic and environmental performance gains (Fernando et al., 2019a). Beyond those benefits, eco-innovation helps SMEs meet higher environmental standards in the global supply chain and international trade integration. Applying clean technologies and sustainable production solutions assists businesses in overcoming technical barriers and enhancing their adaptability to market fluctuations (Li et al., 2017). According to the RBV, these capabilities are difficult to replicate and will create a sustainable competitive advantage for businesses. This suggests that eco-innovation and competitive advantage are not automatically related, but dependent on how capabilities are strategically deployed and integrated into market positioning.

A critical theoretical gap persists: the existing literature, focused predominantly on operational and environmental outcomes, has yet to adequately theorize how eco-innovation is translated into competitive positioning and market value appropriation, particularly for SMEs in consumer-facing industries such as the FMCG industry, where stakeholder perception is decisive.

Competitive advantage is a well-established antecedent of business performance, enabling market expansion, cost efficiency, and customer loyalty (Chen, 2008; Ar, 2012). Recent work in the SME context further confirms that competitive advantage derived from sustainable capabilities and superior product characteristics leads to superior performance outcomes (Tolossa et al., 2024; Achmad & Wiratmadja, 2025; Puspaningrum, 2020).

1.2. The moderating roles

Escalating global pressures on sustainability standards or environmental regulations have emerged as crucial institutional factors that shape organizational behaviors and development strategies. Prior research highlights that compliance with these regulatory frameworks compels enterprises to internalize environmental management as a core competency, which not only legitimizes their operations but also ensures long-term viability (Sadiq et al., 2025; Xing et al., 2019). As a result, green marketing adoption extends beyond communication; it represents a proactive response that fulfills legal obligations while cultivating a competitive advantage.

Stringent environmental regulation drives firms to treat green marketing as a core systemic commitment rather than a peripheral communication exercise (Vehbi et al., 2025), thus amplifying its strategic value. Moreover, regulatory compliance elevates the strategic credibility of green marketing, deters competitors with lower standards, and facilitates brand differentiation grounded in verifiable environmental performance (Karra, 2021). These environmental regulations suggest a greater impact of green marketing practices on businesses' competitive advantage.

Customer Green Awareness reflects the extent to which customers understand, consider, and respond to environmental issues. As firms increasingly compete on sustainable value propositions, the success of green strategies depends strongly on the degree to which customers recognize and appreciate the environmental value created by businesses (Senan et al., 2025). Cheng and Chen (2025) further demonstrated that green awareness is a decisive determinant of competitive advantage.

tage. Customers with high environmental awareness discern genuine sustainability commitments from superficial green claims, rewarding authentic firms with repeat purchases and customer loyalty, thereby generating superior performance. Conversely, low consumer environmental awareness weakens the performance returns from green investments, diminishing the advantage-business performance relationship. As a result, the customer green awareness is theorized as an appropriate moderator of the relationship between competitive advantage and business performance of SMEs.

Market Dynamics, like technology and market competition, reflect unpredictable customer demand and force SMEs to adapt to market changes, further highlighting the significance of competitive advantage. Besides, in a volatile environment, businesses possessing flexibility- and sustainability-based competitive advantages will demonstrate greater adaptability and responsiveness to market changes (Vehbi et al., 2025). Sadiq et al. (2025) also found that when the market changes, green competitive advantages will enable firms to capitalize on new opportunities more promptly than competitors, as their sustainable development values align with market expectations in a fast-moving market. Consistent with these findings, Abbas and Hassan (2017) proposed that market dynamics act as a catalyst amplifying the significant value of a business's differentiated advantage.

Taken together, the reviewed literature converges on three points. First, the Resource-Based View, the Natural Resource-Based View, and Stakeholder Theory jointly indicate that green marketing and eco-innovation function as strategic capabilities whose economic value is realized primarily through the competitive positioning they generate, rather than through a direct relationship to performance. Second, institutional and market conditions — environmental regulation, customer green awareness, and market dynamics — are repeatedly identified as boundary conditions that strengthen or weaken these relationships, yet they have rarely been examined together within a single model built for SMEs. Third, despite this accumulating evidence, the mechanism linking environmental strategy to firm-level economic outcomes remains underspecified for SMEs in emerging economies, where resource and institutional

constraints depart from the assumptions typical of large-firm, developed-economy studies.

Building on this landscape, this study aims to examine how green marketing and eco-innovation influence the business performance of Vietnamese consumer-goods SMEs through the mediating role of competitive advantage, and to identify the boundary conditions under which this mediated relationship is strengthened. Specifically, the study tests whether environmental regulation strengthens the relationship between green marketing and competitive advantage, and whether customer green awareness and market dynamics strengthen the relationship between competitive advantage and business performance.

Based on the theoretical and empirical evidence reviewed above, this study proposes the following hypotheses:

- H1: Green marketing has a positive and direct impact on the competitive advantage of SMEs in the consumer goods industry.*
- H2: Eco-innovation has a positive impact on the competitive advantage of SMEs in the consumer goods industry.*
- H3: Competitive advantage has a positive impact on the business performance of SMEs.*
- H4: Environmental regulation positively moderates the relationship between green marketing and the competitive advantage of SMEs.*
- H5a: Customer green awareness positively moderates the relationship between competitive advantage and business performance of SMEs.*
- H5b: Market dynamics positively moderate the relationship between competitive advantage and business performance of SMEs.*
- H6a: Competitive advantage mediates the relationship between green marketing and business performance.*
- H6b: Competitive advantage mediates the relationship between eco-innovation and business performance.*

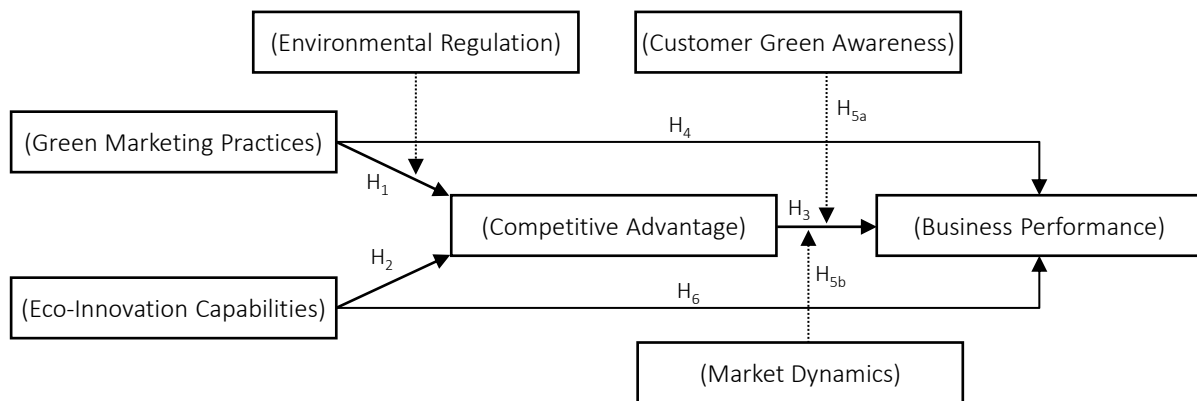


Figure 1. Conceptual framework

The hypothesized relationships are integrated into a single conceptual model in which competitive advantage mediates the effects of green marketing and eco-innovation on business performance, environmental regulation moderates the green marketing–competitive advantage path, and customer green awareness and market dynamics moderate the competitive advantage–business performance path.

Figure 1 presents the conceptual framework synthesizing the hypothesized relationships.

2. METHOD

The study adopts a quantitative cross-sectional approach to analyze the intervariable relationships specified in the proposed model. The design allows for simultaneous testing of direct effects, mediating variables, and evaluation of the effects of moderators within the same structural model (Hair et al., 2019; Saunders et al., 2019).

2.1. Sample and data collection

The survey subjects of this study comprise business owners, managers, and specialists working in small and medium-sized enterprises (SMEs) operating in Vietnam's consumer-goods sector. These individuals were selected because they are directly responsible for developing and implementing green marketing strategies, addressing eco-innovation issues, and evaluating business performance within their organizations. This focus on SME decision-makers is consistent with prior research on sustainable development in emerging

economies (Zhu et al., 2012; Bos-Brouwers, 2010).

Fifty SMEs operating in Vietnam's consumer-goods sector were selected to form the organizational sampling frame. The study deliberately concentrated on relatively established SMEs rather than micro-enterprises, so that respondents would be drawn from firms with identifiable managerial structures and sufficient operating scale to meaningfully evaluate green marketing, eco-innovation, competitive advantage, and business performance. Participating firms were therefore screened to have total capital of approximately VND 20–100 billion and more than 100 employees. These criteria are reported as study-specific sample-screening conditions rather than as a restatement of a single statutory SME threshold, since formal SME classifications may vary across business sectors and indicators.

The sample selection employed a non-probability sampling method combining purposive and convenience sampling, an approach commonly used in SME-related studies given the practical limitations of obtaining a complete sampling frame for this population (Etikan et al., 2016). The sample size was determined in accordance with the recommendations of Hair et al. (2019), which specify a minimum of 5 to 10 observations per independent variable in PLS-SEM analysis.

Eligible respondents were primarily managers and company leaders holding positions equivalent to department head or above, together with professional specialists whose functional responsibilities in sustainability- or innovation-related areas. Besides, all respondents were required to have at

least five years of working experience in the consumer-goods sector. These requirements were applied because the questionnaire asked respondents to assess organization-level practices and outcomes, including environmental marketing activities, eco-innovation, competitive positioning, and business performance, and respondents with insufficient sector experience were considered less likely to possess the information needed to evaluate these issues. Screening questions on managerial position and years of experience were applied before a questionnaire was treated as eligible for the final analytical sample. Among the valid respondents, 45% were owners or senior managers, 40% were middle managers involved in strategic decision-making, and 15% were professional specialists.

A total of 550 questionnaires were distributed across 50 participating SMEs, with the number distributed to individual firms varying according to the availability of eligible respondents. After screening, 474 usable questionnaires were retained, with each participating firm contributing between 5 and 10 valid responses. This distribution strategy intentionally allowed more than one qualified respondent per firm, since knowledge of environmental strategy and competitive outcomes is often dispersed across managerial functions; the approach therefore sought informed organizational assessments from several eligible managers rather than restricting each enterprise to a single respondent. Questionnaire administration combined direct, in-person distribution with online distribution to improve access to eligible managers, while maintaining identical questionnaire content and screening conditions across both modes.

Questionnaire quality was assessed prior to analysis in SmartPLS3. Responses exhibiting a clear straight-lining pattern, defined in this study as assigning an identical score across all substantive Likert-scale items, were excluded, as this pattern was taken to indicate that the respondent had not meaningfully differentiated among the constructs being assessed. Questionnaires were also excluded where the screening conditions were violated, particularly where the respondent's organizational position fell below the required managerial level or where reported working experience in the consumer-goods sector was less than five years. These

screening rules were applied solely to protect the informational quality of the final sample; no differential statistical weighting was assigned to the remaining questionnaires based on respondent position or tenure.

After collection and screening, 474 usable questionnaires were retained for analysis, equivalent to 86.2% of the 550 questionnaires distributed. The final dataset therefore represents 474 qualified managerial responses drawn from 50 participating SMEs, rather than 474 separate enterprises. The respondent constitutes the unit of observation in the PLS-SEM analysis, while the enterprise provides the organizational context for the reported perceptions. Because several respondents could originate from the same enterprise, this design improved access to multiple managerial perspectives but also produced a nested respondent-within-firm structure, a feature that is explicitly addressed among the study's limitations and should be borne in mind when interpreting the generalizability of the results.

2.2. Measurement development

All substantive constructs were specified as reflective and measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), a format retained consistently across constructs to provide a uniform response task and reduce complexity for managerial respondents. The questionnaire was adapted from prior literature to fit the Vietnamese consumer-goods SME context, translated into Vietnamese, and modified by the research team to preserve semantic and conceptual equivalence – particularly for terms related to environmental practices and competitive positioning. Table 1 reports each item's origin or supporting literature; this label is used deliberately, as a cited study is identified as the source of an item only when its wording or validated scale was genuinely adapted from that source, without implying that every reference supplied an identical validated measure.

Nine items (GM5, EI5, CA5, BP1–BP3, ER3, CGA3, and MD3) were developed specifically for this study to cover dimensions not fully represented in the available item pool, and were administered within the same five-point Likert instrument as

the literature-based items. No formal expert-panel or pilot-validation protocol was documented for these items; their measurement quality was instead evaluated empirically through the reliability, convergent-validity, and discriminant-validity assessments reported in the Results section. The overall measurement strategy should balance continuity with established literature and contextual relevance, and while satisfactory statistical performance offers evidence of consistent indicator behavior, it does not substitute for formal content

validation. This limitation regarding the study-developed items is acknowledged transparently and identified as a direction for future scale refinement (Churchill, 1979; Brislin, 1980).

2.3. Data analysis technique

After screening and cleaning, the data were analyzed using PLS-SEM. This method is suitable for research models with complex structures, predictive orientation, and medium sample sizes (Hair

Table 1. Variables and constructs of items

Item code	Descriptions	Adopted/adapted from sources
Green Marketing		
GM	GM1: Our company uses environmentally friendly packaging	Wong et al. (2019)
	GM2: Our company uses green advertising to show our commitment to the environment	Alkhatib et al. (2023)
	GM3: Our company clearly provides information about the environmental features of our products	Papadas et al. (2019)
	GM4: Our company helps customers understand sustainable consumption	Lopes et al. (2024)
	GM5: Our company sets prices that reflect the environmental value of our products	Developed by this study
Eco-Innovation		
EI	EI1: Our company improves production processes to save resources and reduce emissions	Abbas and Liu (2022)
	EI2: Our company uses bio-based or recycled materials in new products	Klimczuk-Kochańska and Marczewska (2024)
	EI3: Our company uses clean energy in its operations	Ahmed et al. (2021)
	EI4: Our company maximizes the reuse of by-products in production	Brouwer et al. (2026)
	EI5: Our company invests in research and development to reduce emissions	Developed by this study
Competitive Advantage		
CA	CA1: Our company differentiates itself from competitors through a strong green brand	Chen (2008)
	CA2: Our products provide superior environmental value to customers	Chen (2008), Maziriri (2020)
	CA3: Our company develops sustainable capabilities that are difficult for competitors to imitate	Barney (1991), Hart (1995)
	CA4: Our company builds strong customer loyalty through its environmental commitment	Puspaningrum (2020)
	CA5: Our company leads the market in a specific segment with sustainable green products	Developed by this study
Business Performance		
BP	BP1: Our company's revenue has grown steadily over the past three years	Developed by this study
	BP2: Our company's profit is higher than the industry average	Developed by this study
	BP3: Our company has continuously increased its market share in recent years	Developed by this study
	BP4: Our company optimizes costs to improve overall business performance	Ar (2012), Tolossa et al. (2024)
Environmental Regulation		
ER	ER1: Legal regulations require our company to apply green standards	Sadiq et al. (2025)
	ER2: Extended producer responsibility (EPR) policies create pressure on our company	Lacang et al. (2025)
	ER3: Government tax or fee incentives encourage our company to adopt green practices	Developed by this study
	ER4: Export environmental standards are strict	Xing et al. (2019)
Customer Green Awareness		
CGA	CGA1: Our customers are willing to pay a higher price for green products	Senan et al. (2025)
	CGA2: Our customers are able to distinguish between truly green products and "greenwashing."	Cheng and Chen (2025)
	CGA3: Our customers actively seek information about sustainable products	Developed by this study
Market Dynamics		
MD	MD1: Customer demand for green products changes rapidly	Vehbi et al. (2025)
	MD2: Green innovation creates strong competitive pressure in the fast-moving consumer goods industry	Abbas and Hassan (2017)
	MD3: Green technologies in the industry change continuously	Developed by this study

et al., 2017; Henseler et al., 2009). The analysis process includes the following steps: (1) evaluating the measurement model for reliability and convergent and discriminant validity; (2) evaluating the structural model; and (3) testing moderating effects through the interaction of variables.

To test for the moderating effects, interaction terms based on the product indicator approach were computed in SmartPLS. All predictor variables were mean-centered before the computation of the interaction terms to mitigate multicollinearity. Adopting the guidelines of Hair et al. (2019), effects for moderation were assessed through bootstrapping with 5,000 resamples.

2.4. Common method bias

To assess potential common method bias, we examined full collinearity Variance Inflation Factors (VIFs). All VIFs were below the commonly suggested 3.3 prevalence threshold, suggesting that common method bias is not likely to threaten the validity of the results. In addition to the full collinearity analysis, Harman's single-factor test indicates that the first factor accounted for under 50% of the total variance, suggesting that common method variance is unlikely to bias our results.

3. RESULTS

The final structural model includes the direct green marketing→business performance and eco-innovation→business performance paths required for mediation classification. The results are reported in the sequence of measurement-model assessment, discriminant validity and collinearity, structural relationships, moderation, and mediation. Statistical inference is based on 5,000 bootstrap resamples.

Across the seven substantive reflective constructs, outer loading coefficients > .765. According to Table 2, Cronbach's Alpha coefficients ranged from .827 to .896, Composite Reliability ranged from .894 to .923, and Average Variance Extracted (AVE) ranged from .689 to .742. Interaction terms were created for moderation analysis and are therefore not interpreted as substantive reflective constructs in the reliability and convergent-validity assessment.

According to Hair et al (2019), outer loading coefficients ≥ 0.708 indicate sufficient reliability. All observed variables exceed this threshold, confirming that all variables are significant and reliable.

According to Table 2, the Cronbach's Alpha coeffi-

Table 2. Cronbach's Alpha coefficients, Rho_A, Composite Reliabilities, and Average Variances Extracted

Variables	Loading range	Cronbach's Alpha	Rho_A	Composite Reliability (CR)	Average Variance Extracted (AVE)
BP	.807 – .850	0.850	0.854	0.899	0.690
CA	.818 – .842	0.889	0.889	0.918	0.692
CGA	.831 – .901	0.827	0.873	0.894	0.739
EI	.809 – .852	0.888	0.889	0.917	0.690
ER	.765 – .903	0.855	0.984	0.898	0.689
GM	.800 – .871	0.896	0.914	0.923	0.705
MD	.826 – .881	0.828	0.848	0.896	0.742

Table 3. Fornell-Larcker criterion

Variables	BP	CA	CAXCGA	CAXMD	CGA	EI	ER	GM	GMxER	MD
BP	0.831									
CA	0.511	0.832								
CAXCGA	0.077	−0.019	1.000							
CAXMD	0.122	0.029	−0.070	1.000						
CGA	0.097	−0.006	0.015	0.053	0.860					
EI	0.360	0.615	−0.018	0.083	−0.041	0.831				
ER	0.069	0.124	−0.063	−0.034	0.026	0.077	0.830			
GM	0.156	0.272	−0.010	0.124	0.041	0.081	−0.024	0.840		
GMxER	0.064	0.132	0.029	0.063	0.037	−0.047	−0.044	−0.022	1.000	
MD	0.147	−0.035	0.051	0.071	−0.011	−0.038	−0.058	−0.069	0.008	0.861

Table 4. Heterotrait-Monotrait ratio (HTMT)

Variables	BP	CA	CAXCGA	CAXMD	CGA	EI	ER	GM	GMxER	MD
BP										
CA	0.587									
CAXCGA	0.083	0.026								
CAXMD	0.132	0.031	0.070							
CGA	0.114	0.045	0.027	0.061						
EI	0.412	0.691	0.019	0.087	0.079					
ER	0.089	0.129	0.078	0.049	0.068	0.084				
GM	0.171	0.295	0.024	0.137	0.049	0.090	0.043			
GMxER	0.069	0.141	0.029	0.063	0.045	0.051	0.046	0.030		
MD	0.171	0.070	0.055	0.080	0.021	0.051	0.082	0.081	0.027	

cients are > 0.7 ; the CRs are > 0.7 ; and the Average Variance Extracted (AVE) is > 0.5 , confirming the convergent validity.

Based on the results in Tables 3 and 4, discriminant validity is assessed. According to the Fornell-Larcker criterion, the square root of the AVE for each construct is greater than the inter-construct correlations between the corresponding constructs (Table 3), supporting the discriminant validity.

As depicted in Table 4, all HTMT values fall below the recommended threshold of 0.90, confirming the absence of discriminant validity issues among the constructs. Together with the previous results based on the Fornell-Larcker criterion, the measurements demonstrate adequate discriminant validity.

Table 5 shows that all VIF values are less than 3.3, indicating that multicollinearity is not a concern in the model.

Table 6 reports the bootstrapped estimates for the structural paths. The hypothesized direct and moderating relationships (*H1–H5b*) were statis-

tically supported, whereas the additional direct $GM \rightarrow BP$ and $EI \rightarrow BP$ paths retained for mediation assessment were not statistically significant.

Green marketing was positively associated with competitive advantage ($\beta = .230$, $SE = .035$, $t = 6.623$, $p < .001$), supporting *H1*. Eco-innovation showed a substantially larger association with competitive advantage ($\beta = .597$, $SE = .028$, $t = 21.084$, $p < .001$), supporting *H2*. Competitive advantage was positively associated with business performance ($\beta = .461$, $SE = .046$, $t = 9.985$, $p < .001$), supporting *H3*. The corresponding f^2 values were .098 for $GM \rightarrow CA$, .655 for $EI \rightarrow CA$, and .178 for $CA \rightarrow BP$.

The moderation results were statistically significant but modest in incremental magnitude. According to Cohen (1988), a value below 0.02 is considered to have minimal or no impact; a value of 0.02 indicates a minor impact, with a value of 0.15 indicating a medium impact and a value of 0.35 indicating a strong impact. ER strengthened the $GM-CA$ relationship ($\beta = .164$, $p < .001$; $f^2 = .053$), supporting *H4*. With standardized scores, the estimated GM slope increases from approximately .066 at one standard deviation below the

Table 5. Inner VIF values

Variables	BP	CA	CAXCGA	CAXMD	CGA	EI	ER	GM	GMxER	MD
BP										
CA	1.003									
CAXCGA	1.009									
CAXMD	1.015									
CGA	1.004									
EI		1.015								
ER		1.009								
GM		1.008								
GMxER		1.004								
MD	1.010									

Table 6. Mean, STDEV, t-values, p-values, f²

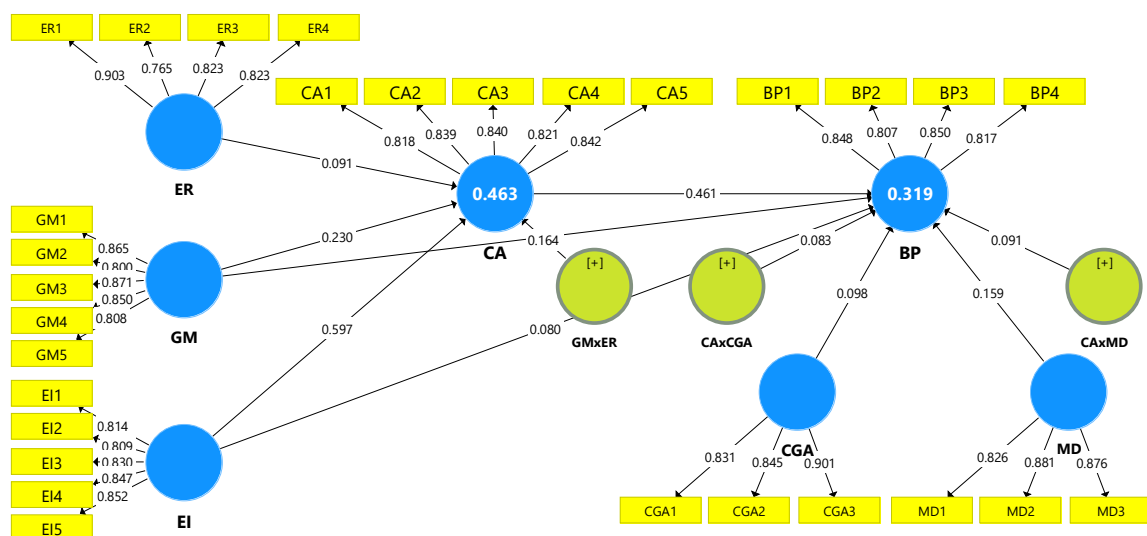
Path	Beta (β)	SE	t-statistics (O/STDEV)	p-values	95% bootstrap CI	f ²
CA $\rightarrow$ BP	.461	.046	9.985	<.001	[.369, .547]	.178
CA $\times$ CGA $\rightarrow$ BP	.083	.036	2.307	.021	[.007, .147]	.010
CA $\times$ MD $\rightarrow$ BP	.091	.036	2.482	.013	[.016, .159]	.011
CGA $\rightarrow$ BP	.098	.039	2.538	.011	[.019, .174]	.014
EI $\rightarrow$ BP	.080	.049	1.627	.104	[-.015, .178]	.006
EI $\rightarrow$ CA	.597	.028	21.084	<.001	[.539, .652]	.655
ER $\rightarrow$ CA	.091	.034	2.685	.007	[.035, .156]	.015
GM $\rightarrow$ BP	.024	.040	.587	.557	[-.053, .104]	.001
GM $\rightarrow$ CA	.230	.035	6.623	<.001	[.162, .299]	.098
GM $\times$ ER $\rightarrow$ CA	.164	.035	4.674	<.001	[.089, .224]	.053
MD $\rightarrow$ BP	.159	.037	4.258	<.001	[.092, .233]	.036

mean of ER to .394 at one standard deviation above the mean. CGA strengthened the CA–BP relationship ($\beta = .083$, $p = .021$; $f^2 = .010$), supporting *H5a*, while market dynamics did likewise ($\beta = .091$, $p = .013$; $f^2 = .011$), supporting *H5b*. The corresponding estimated CA slopes increase from approximately .378 to .544 across low versus high CGA and from .370 to .552 across low versus high market dynamics. These conditional slopes are descriptive interpretations of the standardized interaction coefficients; the small f^2 values indicate that the moderators qualify, rather than dominate, the focal relationships.

The mediation analysis directly addresses the mechanism proposed in the study. The direct association between GM and BP was not statistically significant ($\beta = .024$, $p = .557$; 95% CI [-.053, .104]), whereas the specific indirect effect through com-

petitive advantage was positive and significant ($\beta = .106$, $SE = .020$, $t = 5.271$, $p < .001$; 95% CI [.069, .148]). The total effect was also significant ($\beta = .130$, $p = .002$). This pattern is consistent with indirect-only mediation and supports *H6a*. EI showed the same pattern: its direct association with BP was not significant ($\beta = .080$, $p = .104$; 95% CI [-.015, .178]), whereas the specific indirect effect through CA was significant ($\beta = .275$, $SE = .031$, $t = 8.748$, $p < .001$; 95% CI [.214, .337]). The total effect was significant ($\beta = .355$, $p < .001$), supporting *H6b* and an indirect-only mediation pattern.

The structural results reveal a clear pattern of effects, summarized in Figure 2. EI shows the strongest association with CA ($\beta = .597$), followed by GM ($\beta = .230$), while CA is substantially associated with BP ($\beta = .461$). The direct paths from GM ($\beta = .024$) and eco-innovation ($\beta = .080$) to BP are

**Figure 2.** Diagram of SEM results

small and non-significant, whereas both specific indirect effects through CA are statistically supported, with bootstrap confidence intervals excluding zero, confirming an indirect-only mediation pattern. Moderation effects, though positive, are considerably smaller than the main effects: ER strengthens the GM–CA relationship ($\beta = .164$), while CGA ($\beta = .083$) and market dynamics ($\beta = .091$) strengthen the CA–BP relationship. The model explains 46.3% of the variance in competitive advantage and 31.9% of the variance in business performance, positioning competitive advantage as the principal strategic bridge in the model, with regulatory and market conditions serving as qualifying rather than dominant influences.

4. DISCUSSION

The findings support the mediating role of competitive advantage in the relationship between environmental strategies and business performance through which environmental strategies can generate economic value, thereby providing a mechanism-based explanation of the capability–performance pathway for resource-constrained SMEs. This resonates with the wider sustainability transition literature, which indicates that if environmental initiatives are not aligned with value capture, they are unlikely to be sustainable in the long term. It also demonstrates that environmental strategies enhance firm performance only when they cultivate competitive advantages.

Research findings from Vietnamese SMEs reveal that green strategies, including eco-innovation and green marketing, do not directly drive business performance, but operate indirectly through competitive advantage. Accordingly, environmental efforts yield economic value only when integrated into operational systems and aligned with a company's overarching competitive strategy, rather than through superficial implementation and communication. Prior work on green product innovation and sustainability-oriented capabilities similarly links environmental innovation with competitiveness (Ar, 2012; Dangelico et al., 2017; Oduro, 2024). At the same time, the positive green marketing–competitive advantage path is consistent with studies that frame green marketing as a

strategic orientation rather than merely promotional activity (Papadas et al., 2019; Maziriri, 2020; Alhemimah et al., 2025).

These findings diverge from studies conducted in developed economies, where green strategies have been found to directly and powerfully impact business performance (Elshaer et al., 2025b). The differences may reflect characteristics of the Vietnamese emerging-economy context, where SMEs face resource constraints, uneven regulatory compliance, and limited but growing consumer green awareness. Therefore, green initiatives must serve as primary drivers for businesses to cultivate complete and enduring competitive advantages to attain their desired outcomes.

The study significantly concludes that eco-innovation is centrally shaping SMEs' competitive advantage, which further validates the earlier arguments that eco-innovation drives businesses to resource efficiency, cost reduction, and enhanced environmental performance (Oduro, 2024; Brouwer et al., 2026). The research also enriches the academic literature by demonstrating that eco-innovation among Vietnamese SMEs need not entail large-scale or complicated technological investment; rather, incremental improvements like in process optimization, clean energy use, by-products reutilization, and emissions reduction, can generate meaningful competitive advantages when implemented systematically. This aligns with the argument of Ahmed et al. (2021): eco-innovation in emerging economies is adaptive and gradual. Despite its nature, such innovation remains crucial in enhancing firm-level competitiveness.

The research results confirm competitive advantage's strong impact on business performance, as shown by the largest index compared to other relationships in the model, being an essential mediator between green strategies and business performance. The role of green initiatives is well-clarified, such as ecological innovation and green marketing, regulated by environmental compliance factors. They will not automatically improve performance unless generating specific economic benefits, such as reduced production costs, improved product quality, or expanded market accessibility to gain a competitive advantage. This conclusion resonates with findings for SMEs,

showing that business performance is only enhanced when green practices exert a synergy effect through their seamless integration into the overall production system and a firm's overarching competitive strategy (Maziriri, 2020; Muchtazar et al., 2021).

Green marketing exerts a significant but comparatively modest effect on competitive advantage compared to eco-innovation within the model. This finding aligns with Chen et al. (2024), who reported comparable effect magnitudes for green marketing in similar industry contexts. It can be concluded that green marketing is a core supporter that helps businesses convey environmental values and technical innovations to customers and stakeholders, rather than independently generating competitive advantage. This conclusion certainly mitigates existing price sensitivity and cautions about environmental claims to Vietnamese consumers. Green marketing is only effective on a foundation of measurable and verifiable technical enhancements. In the absence of a substantive ecological innovation, green marketing activities may increase the risk of greenwashing, thereby severely jeopardizing customer trust and undermining a firm's long-term sustainability and competitive advantage.

The green marketing-competitive advantage relationship is positively regulated by environmental regulation, while the competitive advantage-performance relationship is amplified by customer green awareness and market dynamics. Despite a lesser magnitude of influence compared to ecological innovation, these factors are still advanced in optimizing the efficacy of competitive advantage. Regarding environmental regulations, the findings align with M. Porter's extended hypothesis, noting that well-designed regulations can promote innovation and enhance businesses' competitiveness (Doran & Ryan, 2012). Prior research also shows that environmental regulations can urge businesses to review and optimize their production systems, thus creating sustainable economic benefits (Brécard & Chiroleu-Assouline, 2025).

The customer green awareness and market dynamics collectively prove that competitive advantage only generates business performance when customers can recognize and correctly assess the

value of environmental improvements, and when the level of competition and market volatility is sufficient to create continuous innovation pressure on businesses. This conclusion is consistent with research findings on green consumer behavior in emerging economies, where environmental awareness is uneven and still developing (La Ragine & Risitano, 2026).

Overall, our results show that eco-innovation fundamentally helps SMEs in Vietnam improve both environmental performance and business efficiency through sustainable competitive advantages. This forces SME managers to prioritize allocating resources to systemic and long-term innovation solutions, rather than emphasizing short-term communication or regulatory compliance activities. Also, policymakers should develop environmental regulatory frameworks that foster innovation and facilitate SMEs' access to appropriate technological solutions, thereby promoting the transition to green and sustainable production models. These findings contribute to the sustainability-performance discourse by arguing that environmental strategies adopted by SMEs are not automatically value-generative, and may fail to produce value from the local competitive positioning mechanisms through which they are enacted. This local mechanism-based consideration offers a more nuanced understanding of the sustainability-performance initiatives within resource-constrained and weakly institutionalized contexts.

This study contributes to the sustainability and strategic management literature in several ways. First, it extends the Resource-Based View (RBV) (Barney, 1991) and the Natural Resource-Based View (NRBV) (Hart, 1995) by showing that environmentally oriented capabilities do not promise direct payoffs in terms of firm performance; they must be transformed into competitive advantage. The indirect-only mediation pattern indicates that green strategies function as capability-building mechanisms whose economic value is realized through competitive positioning, thus providing a mechanism-based extension of RBV and NRBV.

Second, the study extends eco-innovation research by prioritising value appropriation over operational and environmental outcomes. While previous work focuses on efficiency gains and

compliance (Oduro, 2024; Brouwer et al., 2026), this study shows that eco-innovation is economically relevant if captured by competitive positioning. This also helps explain contradictions in the sustainability–performance relationship in previous studies.

Third, by focusing on SMEs in developing economies, we show important boundary conditions for sustainability theories. In resource-constrained and institutionally evolving contexts, the findings suggest that the relationship between environmental strategies and business performance operates indirectly through competitive advan-

tage, while environmental regulation, customer green awareness, and market dynamics condition specific relationships within this mechanism. In doing so, this study builds on prior work by demonstrating how the effectiveness of environmental capabilities leads to operational outcomes that depend on contextual factors such as institutional pressures, market forces, and stakeholder resource mobilization (Abbas & Liu, 2022; Oduro, 2024). These contributions also provide important insights into how sustainability-related strategies can be implemented within resource-constrained contexts, supporting the wider sustainability transition literature.

CONCLUSION

This study aimed to examine the relationships among green marketing, eco-innovation, competitive advantage, and business performance in Vietnamese consumer-goods SMEs, including the mediating role of competitive advantage and three contextual moderators, highlighting the structural conditions under which green initiatives yield economic value for Vietnamese SMEs.

The results affirm the primacy of eco-innovation in forming sustainable competitive advantages, improving resource efficiency, reducing costs, and preventing long-term environmental risks while also enhancing firms' capacity to comply with stringent technical and environmental standards. Competitive advantage is both a direct and decisive determinant of business performance and critically mediates green strategies and performance outcomes. Green marketing and eco-innovation, when reinforced by a regulatory framework of environmental compliance, yield economic and environmental value when combined with substantive technical and operational improvements. Environmental regulation strengthens the green marketing–competitive advantage relationship, whereas customer green awareness and market dynamics strengthen the competitive advantage–business performance relationship.

From a governance standpoint, the research suggests that developing supportive policy mechanisms that enable SMEs to pursue green initiatives sustainably necessitates an alignment between ecological innovation and long-term economic efficiency. Our findings indicate that embedding environmental responsibility into competitive strategy forms a viable route to sustainable development in emerging economies. Sustainability-led competitiveness is not a universal prescription. Rather, it is constituted through the strategic alignment of environmental capabilities with competitive positioning within specific market contexts.

For managers, green strategies should not be viewed as symbolic or compliance acts that overlook a systematic process of eco-innovation that delivers resource efficiency, which improves cost structure, differentiation, or resilience. Incremental process improvements or adaptive innovations suffice to build sustainable competitive advantage if they are strategically aligned. Green marketing should be a value communication tool underpinned by verifiable environmental gains. Without meaningful operational delivery, it risks damaging credibility and lowering long-term competitiveness.

For policymakers, the results stress the importance of constructing regulatory frameworks that induce capability formation instead of compliance. Supporting SMEs through access to technology, financial incentives, and innovative orientation is critical to their conversion of sustainability investments into competitive advantage and measurable performance gains.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

This study is subject to several limitations. First, the data utilized in the study were collected using a cross-sectional design, which may not fully reflect the dynamic changes in green strategies and business performance over time. Second, the traditional non-probability sampling method may have limitations in the comprehensive coverage of all SMEs in Vietnam. Third, this study focuses solely on the consumer goods industry, so the results may differ when applied to other manufacturing or service industries.

Given these limitations, future research is recommended to expand the data to a time series or design a longitudinal study to assess the long-term impact of green strategies. Cross-industry comparisons with other developing countries are needed to improve the generalizability of the research model. Future research could incorporate additional constructs, such as digital transformation, organizational culture, and governance capabilities, to comprehensively explain sustainable competitiveness.

The use of perceptual measures for performance may entail subjective bias. Future studies may also harness objective indicators of financial performance to boost causal inference.

AUTHOR CONTRIBUTIONS

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Investigation: Tri Cao Minh.

Methodology: Dzu Pham Dinh.

Project administration: Hai Ho Tran Quoc.

Resources: Tri Cao Minh.

Software: Dzu Pham Dinh.

Supervision: Dzu Pham Dinh, Tri Cao Minh.

Validation: Tri Cao Minh.

Visualization: Hai Ho Tran Quoc.

Writing – original draft: Dzu Pham Dinh.

Writing – review & editing: Dzu Pham Dinh, Tri Cao Minh, Hai Ho Tran Quoc.

ACKNOWLEDGMENTS

This article was developed from a university-level scientific research project conducted in 2026 at Ho Chi Minh City University of Law.

FUNDING

This work was supported by Ho Chi Minh City University of Law through a university-level scientific research project conducted in 2026 under Contract No. 09/HĐ-ĐHL.

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