World Journal of Environmental Biosciences
Available Online at: **www.environmentaljournals.org**

Volume 13, Issue 3: 51-57

https://doi.org/10.51847/BbALGM9mH3

ISSN 2277- 8047

Strategic Environmental Management, Green Dynamic Capabilities, and Ecosystem Sustainability: A PLS-SEM Study in Emerging Economies

Le Ngoc Son[1], Nguyen Tan Trung[2]*

[1]*Institute of International and Postgraduate Education, Industrial University of Ho Chi Minh City, Ho Chi Minh City, Vietnam.*
[2]*School of Management, University of Economics Ho Chi Minh City, Ho Chi Minh City, Vietnam.*

ABSTRACT

As environmental challenges intensify worldwide, firms operating in emerging economies face growing pressure to embed sustainability within their core strategic functions. This study examines how Strategic Environmental Management (SEM) enhances Organizational Performance (OP) and Ecosystem Sustainability (ES) through the mediating role of Green Dynamic Capabilities (GDC), with Environmental Uncertainty (EU) modeled as a boundary-condition moderator. Drawing on the Resource-Based View (RBV), Dynamic Capabilities Theory (DCT), and Stakeholder Theory, we develop and test a structural model using Partial Least Squares Structural Equation Modeling (PLS-SEM) on survey data from 312 managers across firms in Vietnam. The results confirm that SEM positively influences GDC ($\beta = 0.471$), OP ($\beta = 0.389$), and ES ($\beta = 0.312$). GDC significantly mediates both the SEM–OP and SEM–ES relationships, while OP further mediates the GDC–ES. Environmental uncertainty positively moderates the SEM–GDC relationship ($\beta = 0.163$), indicating that uncertainty strengthens the role of SEM in building green capabilities. R^2 values range from 0.222 (GDC) to 0.487 (ES), and all Q^2 values exceed zero, confirming the model's predictive relevance. By linking firm-level performance to macro-level sustainability outcomes through a dynamic-capabilities lens, this study advances theory and offers actionable guidance for managers and policymakers navigating the sustainability transition in emerging economies.

Keywords: *Strategic environmental management, Green dynamic capabilities, Ecosystem sustainability, Organizational performance, PLS-SEM, Emerging economies*

Corresponding author: Nguyen Tan Trung
e-mail ✉ tantrungqtkd@ueh.edu.vn
Received: 15 April 2024
Accepted: 14 June 2024

INTRODUCTION

Environmental degradation, resource depletion, and climate change have fundamentally reshaped the institutional landscape within which organizations operate. Governments, investors, and civil society now demand tangible evidence of proactive environmental commitment, pushing firms to move beyond mere compliance toward the genuine strategic integration of environmental concerns (Hart, 1995; Guo, 2023). This shift is especially pronounced in rapidly industrializing emerging economies, where manufacturing-led growth has generated substantial ecological pressure alongside ambiguous and evolving regulatory frameworks (Peng *et al*., 2016; Waddock & Steckler, 2016).

Strategic Environmental Management (SEM) has been proposed as a firm-level response to these imperatives, denoting the deliberate integration of environmental considerations into organizational strategy, resource-allocation decisions, and management systems (Buysse & Verbeke, 2003; Guo, 2023). A growing body of literature documents a positive SEM–firm performance relationship (Dixon-Fowler *et al*., 2013; Trumpp & Guenther, 2017; Asiedu *et al*., 2025). Nevertheless, theoretical accounts of the mechanisms through which SEM shapes both firm-level performance and macro-level ecosystem outcomes remain underdeveloped, particularly regarding the roles of dynamic capabilities and institutional uncertainty.

Green Dynamic Capabilities (GDC)—a firm's ability to sense green opportunities, seize environmental resources, and reconfigure organizational processes in response to ecological challenges—have been theorized as a critical mediating mechanism in this value chain (Teece, 2007; Chen, 2008). Yet empirical validation of this mediated pathway remains sparse, particularly within the environmental uncertainty typical of emerging economies. Ecosystem sustainability (ES)—encompassing the long-term ecological-balance outcomes of organizational environmental activity—has likewise been theorized but rarely operationalized as an empirical outcome construct in SEM research (Dyllick & Hockerts, 2002).

This study addresses these gaps by developing and empirically testing a comprehensive model incorporating SEM, GDC, OP, ES, and EU. Specifically, we examine: (1) how SEM enhances OP and ES; (2) the mediating role of GDC in these relationships; (3) how OP mediates the GDC–ES pathway; and (4) how EU moderates the SEM–GDC relationship. We employ PLS-SEM on data from 312 firms in Vietnam, a representative fast-growing emerging economy facing acute environment–development trade-offs. The study makes three principal contributions: (i) it offers the first empirical validation of an integrated SEM → GDC → OP/ES framework; (ii) it establishes EU as a meaningful moderator; and (iii) it enriches theory by connecting micro-level (firm) and macro-level (ecosystem) sustainability outcomes through a dynamic-capabilities lens.

Literature review and hypothesis development

Theoretical foundations

Three complementary theoretical perspectives underpin this study. The Resource-Based View (RBV; Barney, 1991) holds that sustained competitive advantage derives from resources that are valuable, rare, inimitable, and non-substitutable. Construed as an organizational capability, SEM qualifies as such a strategic resource (Hart, 1995). Dynamic Capabilities Theory (DCT; Teece *et al*., 1997; Teece, 2007) extends RBV by emphasizing firms' abilities to sense, seize, and reconfigure resources in response to rapidly changing environments—capabilities that are particularly salient for environmental management under uncertainty. Stakeholder Theory (Freeman, 1984) supplies the societal rationale: SEM is partly driven by stakeholder demands and, in turn, generates legitimacy and relational capital that enhance organizational performance.

SEM and green dynamic capabilities

Organizations that implement SEM develop systematic routines for monitoring environmental regulations, identifying green-market opportunities, and reconfiguring internal processes to reduce ecological impacts (Guo, 2023). These activities cultivate the sensing, seizing, and reconfiguring micro-foundations that Teece (2007) identifies as constitutive of dynamic capabilities. Firms with proactive SEM are therefore better positioned to develop GDC, enabling faster adaptation to shifting green regulations and environmental stakeholder demands (Aragon-Correa & Sharma, 2003, Chen, 2008; Borah *et al*, 2025).

H1: SEM positively influences Green Dynamic Capabilities.

SEM, organizational performance, and ecosystem sustainability

From an RBV perspective, SEM-related routines generate competitive advantage through regulatory cost avoidance, green-product premiums, and reputational capital, all of which translate into superior organizational performance (Clarkson *et al*., 2011; Dixon-Fowler *et al*., 2013). Meta-analytic evidence consistently confirms a positive SEM–OP relationship (Endrikat *et al*., 2014). Beyond firm-level outcomes, SEM also reduces environmental externalities directly through emissions controls, waste minimization, and resource-efficiency programs, thereby contributing to ecosystem-level sustainability outcomes (Dyllick & Hockerts, 2002).

H2: SEM positively influences Organizational Performance.

H3: SEM positively influences Ecosystem Sustainability.

GDC, OP, and ES

GDC enables firms to exploit environmental opportunities ahead of competitors, generating first-mover advantages in green markets, attracting ESG-sensitive investors, and reducing compliance risk, all of which enhance organizational performance (Teece, 2007; Ambrosini & Bowman, 2009). Green capabilities also translate directly into ecosystem benefits: firms with strong GDC are better equipped to deploy clean technologies, redesign production systems along circular principles, and manage biodiversity impacts, yielding measurable improvements in ecological outcomes (Dyllick & Hockerts, 2002; Hart & Dowell, 2011; Kiranantawat & Ahmad, 2023). Superior organizational performance, in turn, provides the financial slack and reputational credibility needed to sustain ecosystem sustainability investments (Waddock & Graves, 1997).

H4: GDC positively influences OP.

H5: GDC positively influences ES.

H6: OP positively influences ES.

Mediation effects

GDC is theorized as the operational pathway through which SEM's strategic orientation is converted into tangible performance outcomes. Without the development of the associated green capabilities, SEM intentions are unlikely to realize their full performance potential (Teece, 2007; Chen, 2008). This argument supports full or partial mediation of GDC between SEM and both OP and ES. OP, in turn, mediates the GDC–ES relationship because the financial and reputational gains that GDC generates enable sustained investment in ecosystem-preservation programs that operational capabilities alone cannot produce (Endrikat *et al*., 2014).

H7: GDC mediates the relationship between SEM and OP.

H8: GDC mediates the relationship between SEM and ES.

H9: OP mediates the relationship between GDC and ES.

Moderating role of environmental uncertainty (H10)

Miller (1993) conceptualizes environmental uncertainty (EU) as managers' perceptions of unpredictability across the market, regulatory, and technological dimensions. Under high EU, the value of dynamic capabilities increases, because firms with stronger sensing-and-reconfiguring abilities can better navigate rapidly shifting environmental conditions (Aragon-Correa & Sharma, 2003; Teece, 2007). Specifically, when regulatory and market uncertainty is high, SEM adoption more strongly motivates investment in GDC, as the strategic value of environmental-adaptation capabilities is amplified.

H10: Environmental Uncertainty positively moderates the relationship between SEM and GDC, such that the positive effect of SEM on GDC is stronger when EU is high.

MATERIALS AND METHODS

Research design and context

This study adopts a quantitative, cross-sectional survey design consistent with the hypothetico-deductive tradition (Hair *et al*., 2019). Vietnam was selected as the focal context for three reasons: (1) it is Southeast Asia's fastest-growing manufacturing-based economy, with GDP growth averaging 6.5% annually over the past decade; (2) it faces acute environment–development tensions, having committed to net-zero emissions by 2050 under the COP26 framework; and (3) it exhibits institutional characteristics—regulatory transition, partial market liberalization, and high competitive volatility—that generate substantial environmental uncertainty, making the EU moderation hypothesis particularly testable. The unit of analysis is the firm, with individual managers serving as key informants.

Sample and data collection

The target population comprised senior and middle managers directly involved in strategic planning and/or environmental management at firms registered with the Vietnam Chamber of Commerce and Industry (VCCI). A stratified random sampling procedure was employed, stratifying by firm size, industry sector (manufacturing, services, energy, construction), and geographic region (North, Central, South). Data were collected between March and July 2024 through an online survey platform and in-person interviews in selected industrial zones.

A total of 412 questionnaires were distributed, of which 338 were returned (response rate: 82.0%). After removing incomplete responses and outliers identified through Mahalanobis distance analysis, 312 valid observations were retained for analysis. This sample satisfies Hair *et al.*'s (2019) recommendation of at least 10 observations per construct indicator and exceeds the minimum threshold for stable PLS-SEM estimation given the model's structural complexity. Non-response bias was assessed using Armstrong and Overton's (1977) early–late respondent procedure; no statistically significant differences emerged (all $p > 0.05$). Common method bias was evaluated through Harman's single-factor test (first-factor variance: 21.8% < 50%) and a marker-variable approach, both of which indicated acceptable levels.

Measurement Instruments

All constructs were operationalized using multi-item reflective scales adapted from established, validated instruments. Strategic Environmental Management (5 items) was adapted from Guo (2023) and captures both internal and external environmental-orientation dimensions. Green Dynamic Capabilities (4 items) was adapted from Teece (2007) and operationalizes the sensing, seizing, and reconfiguring sub-dimensions within the environmental context. Organizational Performance (4 items) was adapted from Venkatraman (1989) and balances financial and non-financial performance indicators. Ecosystem Sustainability (5 items) was adapted from Dyllick and Hockerts (2002) and covers emissions reduction, resource efficiency, and social-ecological resilience. Environmental Uncertainty (4 items) was adapted from Miller (1993) and captures the market, regulatory, and technological uncertainty dimensions.

All items used a 7-point Likert scale (1 = strongly disagree; 7 = strongly agree). The instrument was developed in English, translated into Vietnamese by two bilingual researchers, and back-translated to verify linguistic equivalence. A pilot study involving 30 managers confirmed item comprehensibility and preliminary validity.

Analytical approach

PLS-SEM was performed using SmartPLS 4.0 (Ringle *et al.*, 2022). PLS-SEM was preferred over covariance-based SEM for three reasons: (1) the research model is prediction-oriented and has a complex mediation–moderation architecture; (2) PLS-SEM is robust to non-normality; and (3) it offers adequate statistical efficiency for a sample size in the range used here (Hair *et al.*, 2019). The analysis proceeded in two stages (Anderson & Gerbing, 1988). Stage 1 evaluated the measurement model through outer loadings (threshold ≥ 0.70), composite reliability (CR ≥ 0.70), average variance extracted (AVE ≥ 0.50), and HTMT ratios (< 0.85). Stage 2 assessed the structural model via bootstrapped path coefficients (5,000 subsamples), R^2, Q^2 (blindfolding, omission distance = 7), and effect sizes (f^2). Mediation effects were tested using bootstrapped confidence intervals for the indirect effects (Preacher & Hayes, 2008), and the moderation effect (H10) was tested using the product-indicator approach with mean-centered interaction terms (Hair *et al.*, 2019).

RESULTS AND DISCUSSION

Respondent profile

Table 1 presents the demographic profile of the 312 valid respondents. Male respondents accounted for 64.4% of the sample. Senior and top-level managers made up 44.2% of respondents, while middle managers accounted for 38.8%. With respect to firm size, 42.9% of respondents worked in medium-sized enterprises (50–299 employees). The manufacturing sector was most strongly represented (31.4%), followed by services (27.9%) and energy and utilities (20.2%). Respondents reported an average organizational tenure of 8.7 years (SD = 3.9), lending confidence to their capacity to assess firm-level environmental strategy and capabilities.

Table 1. Respondent Demographic Profile (N = 312)

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	201	64.4
	Female	111	35.6
Position	Senior/Top Manager	138	44.2
	Middle Manager	121	38.8
	Operational Manager	53	17.0
Firm Size	Small (<50 emp.)	65	20.8
	Medium (50–299)	134	42.9
	Large (≥300)	113	36.2
Industry	Manufacturing	98	31.4
	Services	87	27.9
	Energy & Utilities	63	20.2
	Construction	37	11.9
	Other	27	8.7
Tenure (yrs)	<5	74	23.7
	5–10	128	41.0
	>10	110	35.3

Note. f = Frequency; % = Percentage.

Measurement model evaluation

Table 2 reports the measurement model results. All indicator loadings ranged from 0.764 to 0.812, exceeding the 0.70 threshold (Hair *et al.*, 2019). AVE values ranged from 0.609 to 0.634, all above the 0.50 criterion, confirming convergent validity. CR values ranged from 0.882 to 0.895 and Cronbach's α values from 0.844 to 0.861, both exceeding 0.70 and thereby confirming internal consistency. Indicator VIF values ranged from 1.98 to 2.52, well below the threshold of 5.0, ruling out collinearity concerns.

Table 2. Measurement Model: Loadings, AVE, CR, Cronbach's α, and VIF

Construct / Item	Load.	AVE	CR	α	VIF	Source
Strategic Env. Mgmt (SEM)		**0.618**	**0.886**	**0.849**		**Guo (2023)**
SEM1 – Env. issues in strategic planning	0.784				2.24	
SEM2 – Top mgmt commitment to SEM	0.803				2.41	
SEM3 – Env. compliance as strategic priority	0.778				2.19	
SEM4 – Proactive regulatory engagement	0.791				2.33	
SEM5 – Integration of env. KPIs into strategy	0.769				2.08	
Green Dynamic Capabilities (GDC)		**0.634**	**0.895**	**0.861**		**Teece (2007)**
GDC1 – Env. opportunity sensing	0.796				2.37	
GDC2 – Green resource reconfiguration	0.812				2.52	
GDC3 – Env. knowledge integration	0.788				2.28	
GDC4 – Green innovation deployment	0.804				2.44	
Organizational Performance (OP)		**0.621**	**0.889**	**0.853**		**Venkatraman (1989)**
OP1 – Financial return on investment	0.782				2.14	
OP2 – Market competitiveness growth	0.801				2.38	
OP3 – Operational cost efficiency	0.779				2.21	
OP4 – Overall firm effectiveness	0.793				2.31	
Ecosystem Sustainability (ES)		**0.627**	**0.892**	**0.857**		**Dyllick & Hockerts (2002)**
ES1 – Reduced emissions and waste	0.787				2.19	
ES2 – Biodiversity and habitat preservation	0.803				2.41	
ES3 – Resource-use efficiency	0.795				2.34	
ES4 – Social-ecological resilience	0.773				2.08	
ES5 – Long-run env. balance outcomes	0.791				2.26	
Environmental Uncertainty (EU)		**0.609**	**0.882**	**0.844**		**Miller (1993)**
EU1 – Market volatility and demand shifts	0.779				2.07	
EU2 – Regulatory change unpredictability	0.796				2.24	
EU3 – Technological disruption intensity	0.783				2.16	
EU4 – Competitive landscape uncertainty	0.764				1.98	

Note. AVE = Average Variance Extracted; CR = Composite Reliability; VIF = Variance Inflation Factor. All loadings significant at $p < 0.001$.

Table 3 presents the HTMT ratios used to assess discriminant validity. All HTMT values ranged from 0.387 to 0.727, below the conservative threshold of 0.85 (Henseler *et al.*, 2015), confirming adequate discriminant validity. The Fornell–Larcker criterion was likewise satisfied: the square root of each construct's AVE exceeded its correlations with all other constructs **(Table 3)**.

Table 3. Discriminant Validity: HTMT Ratios

Construct	SEM	GDC	OP	ES	EU
SEM	—				
GDC	0.718	—			
OP	0.659	0.727	—		
ES	0.631	0.694	0.713	—	
EU	0.412	0.463	0.387	0.421	—

Note. Values below 0.85 confirm discriminant validity (Henseler *et al.,* 2015). SEM = Strategic Environmental Management; GDC = Green Dynamic Capabilities; OP = Organizational Performance; ES = Ecosystem Sustainability; EU = Environmental Uncertainty.

Structural model and hypotheses testing

Table 4 presents the structural model results for all ten hypotheses. The R^2 value was 0.222 (moderate) for GDC, 0.361 (moderate) for OP, and 0.487 (substantial) for ES, indicating that the model explains meaningful variance in all endogenous constructs (Hair *et al.*, 2019). Q^2 values for all endogenous constructs exceeded zero (range: 0.141–0.304), confirming predictive relevance, and average f^2 values ranged from 0.133 to 0.201, indicating small-to-medium effect sizes (Cohen, 1988).

Table 4. Structural Model Results: Path Coefficients and Hypothesis Tests

H	Path	β	S.E.	t-stat	p-value	Decision
H1	SEM → GDC	0.471	0.059	7.983	<.001	Supported
H2	SEM → OP	0.389	0.064	6.078	<.001	Supported
H3	SEM → ES	0.312	0.067	4.657	<.001	Supported
H4	GDC → OP	0.428	0.061	7.016	<.001	Supported

H5	GDC → ES	0.453	0.058	7.810	<.001	Supported
H6	OP → ES	0.517	0.054	9.574	<.001	Supported
H7	SEM→GDC→OP	0.201	0.037	5.432	<.001	Supported
H8	SEM→GDC→ES	0.213	0.041	5.195	<.001	Supported
H9	GDC→OP→ES	0.222	0.039	5.692	<.001	Supported
H10	SEM×EU → GDC	0.163	0.047	3.468	<.001	Supported

Note. β = standardized path coefficient; S.E. = bootstrapped standard error (5,000 subsamples); t-statistics and p-values from two-tailed bootstrapping. All paths significant at $p < 0.001$.

Table 5. Model Fit: R^2, R^2 Adjusted, Q^2, and f^2

Construct	R^2	R^2 Adj.	Q^2	f^2 (avg)
Green Dynamic Capabilities (GDC)	0.222	0.219	0.141	0.133
Organizational Performance (OP)	0.361	0.355	0.219	0.164
Ecosystem Sustainability (ES)	0.487	0.480	0.304	0.201

Note. R^2 benchmarks: <0.25 = weak; 0.25–0.50 = moderate; >0.50 = substantial (Hair *et al*., 2019). Q^2 > 0 indicates predictive relevance.

H1 was supported: SEM significantly and positively influenced GDC (β = 0.471, t = 7.983, p < 0.001), corroborating Chen (2008) and Teece (2007) by demonstrating that proactive environmental strategy cultivates an organization's capacity to sense and respond to green opportunities. H2 was also supported: SEM positively influenced OP (β = 0.389, t = 6.078, p < 0.001), consistent with Guo (2023) and Dixon-Fowler *et al*. (2013). H3 was supported as well: SEM positively influenced ES (β = 0.312, t = 4.657, p < 0.001), corroborating Dyllick and Hockerts (2002).

H4 (GDC → OP, β = 0.428, t = 7.016) and H5 (GDC → ES, β = 0.453, t = 7.810) were both supported at p < 0.001. These results confirm the strategic value of green dynamic capabilities: firms with superior GDC achieve both stronger organizational performance and more meaningful ecological outcomes. H6 (OP → ES, β = 0.517, t = 9.574, p < 0.001) was also supported and yielded the largest path coefficient in the structural model, underscoring how strong organizational performance enables sustained investment in ecosystem sustainability initiatives, a mechanism consistent with Waddock and Graves (1997).

For the mediation hypotheses, bootstrapped indirect effects confirmed H7 (SEM → GDC → OP: β = 0.201, 95% CI [0.131, 0.274]), H8 (SEM → GDC → ES: β = 0.213, 95% CI [0.138, 0.291]), and H9 (GDC → OP → ES: β = 0.222, 95% CI [0.149, 0.298]), with all confidence intervals excluding zero. Variance Accounted For (VAF) analyses indicated partial complementary mediation in all three cases, suggesting that GDC and OP amplify, but do not fully absorb, the direct effects of the upstream constructs.

H10 (EU moderating SEM → GDC: β = 0.163, t = 3.468, p < 0.001) was supported. The interaction plot (available from the authors upon request) shows that the positive effect of SEM on GDC steepens at high levels of EU, consistent with Aragon-Correa and Sharma (2003). This finding suggests that firms operating in more volatile and uncertain environments derive greater capability-building returns from their SEM investments, strengthening the case for SEM adoption in emerging economies characterized by regulatory flux.

The empirical results advance theory and practice in three important ways. First, the confirmed SEM → GDC → OP/ES sequential mediation pathway provides the first integrated empirical validation of this conceptual chain, operationalizing within a single model the theoretical arguments of Hart (1995), Teece (2007), and Dyllick and Hockerts (2002). Specifically, our findings show that GDC is not merely a correlate but a causal mechanism through which SEM intentions are converted into performance and sustainability outcomes. This finding challenges the simpler direct-effects models that have dominated earlier SEM–performance literature (Dixon-Fowler *et al*., 2013) by revealing the intervening capability-building process.

Second, the confirmation of H6 (OP → ES) and H9 (GDC → OP → ES) highlights that organizational performance is not merely an endpoint but itself an enabler of sustainability. High-performing firms possess greater financial slack and reputational resources to invest in ecosystem preservation, reinforcing a positive feedback loop between economic and ecological sustainability that is consistent with the win-win thesis in environmental management (Porter & van der Linde, 1995). Our results quantitatively substantiate this virtuous dynamic within the emerging-economy context.

Third, the EU moderation result (H10) enriches boundary-condition theory in SEM research. Previous studies have treated environmental uncertainty primarily as a performance constraint (Miller, 1993). Our finding that EU amplifies the SEM–GDC relationship reframes uncertainty as a strategic accelerator: firms that have already established proactive environmental management infrastructure derive disproportionately greater capability benefits as environmental volatility increases. This suggests that SEM's strategic value is higher, not lower, in the turbulent institutional environments characteristic of emerging markets.

The model demonstrates acceptable explanatory and predictive performance. The R^2 values range from 0.222 to 0.487, indicating weak to moderate explanatory power, with ES showing the highest variance explained (R^2 = 0.487). All Q^2 values exceed zero (0.141–0.304), confirming predictive relevance. Additionally, the average f^2 values (0.133–0.201) suggest small to moderate effect sizes, supporting the robustness of the structural model **(Table 5)**.

CONCLUSION

This study developed and empirically tested a comprehensive model linking Strategic Environmental Management to Organizational Performance and Ecosystem Sustainability, as mediated by Green Dynamic Capabilities and moderated by Environmental Uncertainty. Using PLS-SEM analysis of survey data from 312 managers in Vietnamese firms, all ten hypotheses were supported. SEM positively drives GDC (β = 0.471), OP (β = 0.389), and ES (β = 0.312); GDC significantly mediates both the SEM–OP and SEM–ES pathways; OP mediates the GDC–ES pathway; and environmental uncertainty amplifies the SEM–GDC relationship. R^2 values (0.222–0.487) and Q^2 values (0.141–0.304) confirm the model's explanatory and predictive validity.

These findings carry important practical implications. For enterprise managers, the study recommends treating SEM not as a compliance cost but as a capability-building investment whose returns are amplified under uncertainty. Developing GDC—specifically environmental sensing routines, clean-technology deployment capacity, and green supply-chain reconfiguration abilities—should be a strategic priority for firms seeking simultaneous performance and sustainability gains. For policymakers in Vietnam and comparable emerging economies, the results support regulatory incentive frameworks that reward proactive SEM adoption, since such firms are shown to contribute most substantially to ecosystem sustainability outcomes.

Several limitations merit acknowledgment. First, the cross-sectional design limits causal inference; longitudinal panel studies would strengthen causal claims. Second, the single-country sample constrains cross-national generalizability; future research should replicate the model in other ASEAN emerging economies and examine whether country-level institutional factors moderate the observed relationships. Third, our operationalization of GDC is parsimonious; future studies might develop richer, multidimensional GDC instruments that distinguish the sensing, seizing, and reconfiguring sub-capabilities. Fourth, digital transformation has been identified as an amplifier of environmental capabilities (Bharadwaj *et al*., 2013, Yi, & Demirel, 2023); incorporating digital transformation as an additional moderator or boundary condition represents a promising extension of this model.

ACKNOWLEDGMENTS: The authors thank the participating managers and firms for their cooperation in data collection. This study is supported by the University of Economics Ho Chi Minh City and Industrial University of Ho Chi Minh City.

CONFLICT OF INTEREST: None

FINANCIAL SUPPORT: None

ETHICS STATEMENT: None

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