“Green innovation and digital technology as drivers of hotel financial performance in Vietnam”

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GREEN INNOVATION AND DIGITAL TECHNOLOGY AS DRIVERS OF HOTEL FINANCIAL PERFORMANCE IN VIETNAM

Abstract

The growing pressure to operate sustainably has pushed many hotels in emerging markets, including Vietnam, to rethink how innovation and digital technology contribute to their financial performance. This study explores the extent to which a strategic focus on green innovation and the adoption of digital tools shape hotel financial outcomes, and whether these effects occur through the way environmental information is collected, managed, and used. Environmental leadership was also considered as a possible factor that might strengthen these relationships.

A survey of 243 hotel managers in major Vietnamese cities provided the empirical basis for the analysis. Using partial least squares structural equation modeling, the study finds that a clear strategic commitment to green innovation encourages hotels to engage more deeply in environmental information practices, particularly in proactive information gathering. This proactive behavior shows the strongest link with improved financial performance ($\beta = 0.444$, $p < 0.001$). By contrast, information transparency and formal reporting procedures produce weaker or inconsistent effects. The moderating influence of environmental leadership was not supported, implying that leadership and strategic orientation operate in parallel rather than amplifying one another.

These results suggest that hotels benefit most when they actively seek and use environmental intelligence, rather than relying solely on compliance-oriented reporting systems. Proactive green information management appears to be the critical mechanism through which sustainability-focused strategies translate into financial gains.

Keywords green innovation, digital technology, environmental information management, environmental leadership, financial performance, hotel industry, Vietnam

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INTRODUCTION

The global hospitality industry is undergoing a profound shift shaped by two powerful forces: the rapid advance of digital technologies and the growing urgency of environmental sustainability. In emerging markets such as Vietnam, where national development policies explicitly promote green growth, environmentally responsible practices are no longer optional. They have become a strategic requirement for maintaining competitiveness and ensuring long-term economic resilience (Gürlek & Tuna, 2018; Kuo et al., 2021; Momayez et al., 2023; Chen et al., 2006). Within this context, a hotel's green innovation strategic orientation (GISO) serves as a central driver, reflecting its commitment to integrating sustainability into its core value proposition and improving financial performance (Dias et al., 2021; Ding & Tseng, 2023; Sakshi et al., 2020).

Although a growing body of research suggests that firms with stronger green strategies often achieve better performance outcomes (Liu et al., 2024a; Rasheed et al., 2024; Sayfuddin, 2021), the mechanisms linking

strategic commitment to measurable financial gains remain insufficiently understood. Existing literature still provides limited insight into the "black box" that lies between strategic intent and tangible economic results (Janjua et al., 2024). This study proposes that the missing link may reside within a firm's internal routines, specifically its green information practices (GIP). Despite their theoretical relevance, the mediating roles of GIP dimensions (proactiveness, transparency, and formality) have received little empirical attention and remain largely unexplored in prior work.

A further complication concerns the conditional nature of strategic success. Implementing green strategies does not guarantee performance improvement unless supported by appropriate organizational contexts. One such contextual factor is environmental leadership, which may strengthen the translation of strategic orientation into concrete environmental practices. Although scholars have highlighted the potential influence of leadership commitment (Elshaer et al., 2022; Haile, 2024; Marfo et al., 2024; Chan et al., 2014; Singh et al., 2024; Mistry, 2025; Demir et al., 2025), empirical examinations of this moderating effect within an integrated framework remain scarce. This gap is particularly pronounced in emerging markets, where most existing evidence originates from developed economies (Ashaal et al., 2024; Arsawan et al., 2025; Wang et al., 2021), limiting the transferability of previous findings.

To address these shortcomings, the present study develops and tests a moderated-mediation model to capture the interplay among green innovation strategy, environmental information practices, leadership, and financial performance. The study seeks to clarify how green innovation strategies influence financial outcomes through internal information routines and whether leadership strengthens these pathways (Baquero, 2024b; Momayez et al., 2023; Zhang et al., 2019). Accordingly, we aim to answer the following central question: How do the mechanisms of a green innovation strategy contribute to financial performance, and what role does leadership play in this process within Vietnam's hotel industry?

1. LITERATURE REVIEW AND HYPOTHESES

1.1. Theoretical foundation

Understanding how an environmental strategic orientation translates into financial performance requires an integrative theoretical explanation that captures both firm-level resources and the internal processes through which these resources are mobilized. Prior sustainability research increasingly suggests that environmental strategies do not automatically generate financial benefits unless they are supported by effective organizational mechanisms and leadership conditions. To explain this transformation, scholars have drawn on complementary theoretical perspectives, including the Resource-Based View (RBV), the Knowledge-Based View (KBV), and the Stimulus–Organism–Response (S-O-R) framework.

From the perspective of the Resource-Based View, firms achieve sustainable competitive advantage when they possess strategic capabilities that are valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991). In this regard, green innovation strategic orientation can be conceptualized as a higher-order organizational capability that embeds environmental considerations into innovation activities, product development, and operational processes. Empirical evidence indicates that firms adopting strong green innovation strategies can enhance competitiveness through cost reductions, improved reputation, and differentiation advantages, ultimately supporting financial performance (Hussain et al., 2024; Xin & Wang, 2023). However, RBV alone offers limited insight into how such strategic orientations are enacted in daily organizational practices.

The Knowledge-Based View extends this explanation by emphasizing that knowledge is the firm's most critical strategic asset and that performance outcomes depend on how effectively knowledge is created, shared, and applied (Cheng, 2020; Ohmura & Matsuo, 2016). In the environmental domain, green information practices represent the routines through which firms collect, manage, and utilize environmental knowledge. These practices (such as

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proactively acquiring environmental intelligence, transparently communicating environmental performance, and formalizing information systems) enable organizations to convert environmental strategies into actionable knowledge that guides decision-making and supports innovation. Without such practices, green strategic orientation may remain symbolic rather than operational.

To further explain how strategic orientation influences outcomes, the Stimulus–Organism–Response framework provides a behavioral lens (Mehrabian & Russell, 1974). Within this framework, green innovation strategic orientation functions as an external stimulus that shapes internal organizational processes, while green information practices represent the organismic mechanisms through which the stimulus is interpreted and implemented. Financial performance then emerges as the response resulting from these internal transformations. This perspective highlights the importance of intermediate organizational processes rather than assuming a direct and automatic strategy–performance relationship.

Empirical research generally supports a positive but complex relationship between green strategic initiatives and firm performance (Liu et al., 2024a; Rasheed et al., 2024; Sayfuddin, 2021). Nevertheless, several gaps remain. First, much of the existing literature focuses on direct associations between environmental strategies and outcomes, offering limited insight into the internal mechanisms that convert strategic intentions into financial results. In particular, green information practices, especially their multidimensional components such as proactiveness, transparency, and formality, have not been examined in a systematic and integrated manner (Janjua et al., 2024). Second, most empirical evidence is drawn from developed economies, where institutional support systems and digital infrastructures are relatively mature. Far less is known about how these relationships operate in emerging markets such as Vietnam, where firms face distinct regulatory pressures, competitive dynamics, and technological constraints (Arsawan et al., 2025; Wang et al., 2021). Third, although leadership is widely recognized as critical for advancing sustainability initiatives, its moderating role in strengthening the translation of green strategic orientation into concrete information practices remains underexplored (Elshaer et al., 2022; Marfo et al., 2024).

In summary, prior literature suggests that green innovation strategic orientation can enhance financial performance, but the mechanisms and boundary conditions underlying this relationship remain insufficiently understood. There is a clear need for an integrative framework that explains how environmental strategic orientation is transformed into financial outcomes through internal green information practices and contingent leadership effects, particularly within emerging market contexts such as Vietnam.

1.2. Research objective and hypotheses

Drawing on the Resource-Based View, the Knowledge-Based View, and the Stimulus–Organism–Response framework, this study aims to examine how green innovation strategic orientation influences hotel financial performance through green information practices and how this process is contingent upon environmental leadership.

Green innovation strategic orientation reflects a firm's long-term alignment of environmental sustainability with innovation activities. From an RBV perspective, this orientation constitutes a valuable, rare, and difficult-to-imitate strategic capability that strengthens competitiveness and supports financial gains (Barney, 1991; Xin & Wang, 2023). Empirical evidence suggests that hotels adopting stronger green innovation strategies benefit from reduced operating costs, enhanced brand reputation, and improved pricing power (Ding & Tseng, 2023; Momayez et al., 2023).

Within the Stimulus–Organism–Response logic, green innovation strategic orientation acts as a stimulus that triggers internal organizational processes in the form of green information practices. A strong environmental orientation encourages proactive intelligence gathering, transparent disclosure of environmental performance, and the establishment of formalized information systems (Arsawan et al., 2023; Khaq et al., 2025).

From the Resource-Based and Knowledge-Based perspectives, green information practices function

as knowledge-driven capabilities that enable firms to transform environmental data into competitive advantage. Proactive information use enhances anticipation of risks and opportunities; transparency strengthens legitimacy and stakeholder trust; and formality ensures consistency, efficiency, and data reliability (Langgat et al., 2023; Nsiah et al., 2024).

Finally, environmental leadership is expected to reinforce the effectiveness with which green innovation strategic orientation is translated into green information practices. Leaders who actively promote environmental values shape organizational culture, allocate resources, and signal the strategic importance of sustainability initiatives (Marfo et al., 2024; Demir et al., 2025).

Accordingly, this study aims to examine how green innovation strategic orientation influences hotel financial performance through green information practices and whether this process is contingent upon environmental leadership.

The following hypotheses are proposed:

H1: Green innovation strategic orientation positively influences hotel financial performance.

H2a: Green innovation strategic orientation positively influences green information proactiveness.

H2b: Green innovation strategic orientation positively influences green information transparency.

H2c: Green innovation strategic orientation positively influences green information formality.

H3a: Green information proactiveness positively influences financial performance.

H3b: Green information transparency positively influences financial performance.

H3c: Green information formality positively influences financial performance.

H4a: Environmental leadership positively moderates the relationship between green innovation strategic orientation and green information proactiveness.

H4b: Environmental leadership positively moderates the relationship between green innovation strategic orientation and green information transparency.

H4c: Environmental leadership positively moderates the relationship between green innovation strategic orientation and green information formality.

Based on these arguments, this study proposes an integrated moderated-mediation framework, illustrated in Figure 1, in which green innovation strategic orientation influences financial performance through green information practices, with this indirect relationship contingent upon the level of environmental leadership.

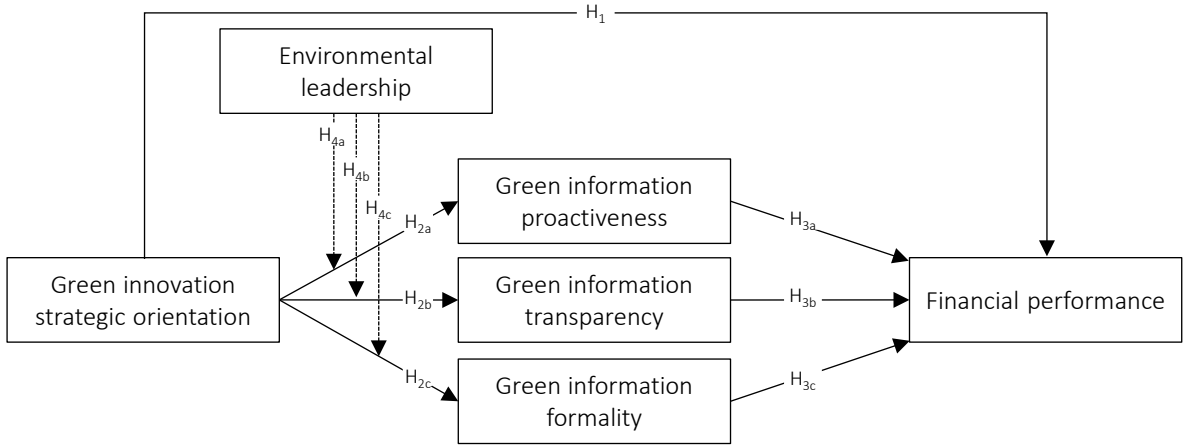

Figure 1. Research framework and hypotheses

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2. METHODOLOGY

2.1. Research design and procedure

This study adopted a quantitative, cross-sectional survey design to empirically examine the moderated-mediation model proposed in this study. A cross-sectional approach is appropriate for capturing perceptions, attitudes, and self-reported behaviors at a single point in time, thereby enabling systematic assessment of the relationships among green innovation strategic orientation, green information practices, environmental leadership, and financial performance (Creswell, 2014).

The questionnaire was developed using pre-validated measurement scales drawn from established literature. A translation and back-translation procedure was applied to ensure cultural and semantic equivalence within the Vietnamese context, following widely accepted guidelines for cross-cultural instrument development (Brislin, 1970). A pilot study involving academic experts and industry practitioners was then conducted to evaluate content validity and refine the clarity and flow of the survey items. Minor adjustments were made to improve readability and ensure that respondents could interpret the questions accurately.

After the pilot phase, the finalized questionnaire was distributed to the target sample over a predetermined period. Respondents were informed about confidentiality and the voluntary nature of participation. Upon completion of data collection, the survey responses were screened and cleaned to remove incomplete or invalid entries. The final dataset was analyzed using structural equation modeling, which provides a rigorous framework for evaluating both measurement properties and structural relationships specified in the research model (Hair et al., 2013).

2.2. Sampling, context, and data collection

The target population consisted of middle- to high-level managers working in three- to five-star hotels located in major urban centers of Vietnam, including Da Nang, Hanoi, and Ho Chi Minh City. These individuals were selected because they are closely involved in strategic decision-making related to sustainability and innovation, making them highly relevant. The Vietnamese context was chosen as this country represents a rapidly emerging economy where government policies actively promote both green growth and digital transformation. Within this environment, the hotel sector has become a key area of focus for national sustainability initiatives.

A purposive sampling strategy was employed to ensure that respondents possessed adequate knowledge and experience to provide meaningful insights into the constructs examined in the study (Creswell, 2014). Data collection occurred between May and July 2024 through a mixed-mode approach. An online survey was distributed via targeted email invitations and professional platforms such as LinkedIn, while printed questionnaires were disseminated during industry conferences and related events. This combination helped increase accessibility and reach a diverse pool of qualified participants.

To assess potential non-response bias, early and late respondents were compared on the principal study variables using independent-sample *t*-tests. No significant differences were detected, suggesting that non-response bias was not a concern. After removing incomplete or invalid questionnaires, a final usable sample of 243 responses was retained for analysis. The demographic and professional characteristics of the respondents are summarized in Table 1.

Table 1. Profile of survey respondents

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Female	163	67.1
	Male	78	32.1
	Other	2	0.8
Age	18–35 years old	122	50.2
	36–50 years old	109	44.9
	> 50 years old	8	3.3
	< 18 years old	4	1.2
Job position	Staff	107	44
	Middle Manager	100	41.2
	Senior Manager	36	14
Years of experience	More than 10 years	75	30.9
	4–6 years	63	25.9
	7–10 years	58	23.9
	1–3 years	37	15.2
	Less than 1 year	10	4.1

Table 1 (cont.). Profile of survey respondents

Characteristic	Category	Frequency (n)	Percentage (%)
Department	Other	104	42.8
	Food & Beverage	59	24.3
	Housekeeping	42	17.3
	Front office	38	15.6
	Total	243	100

2.3. Measures and instrument validation

The survey instrument was designed to be concise, including only items directly related to the constructs in the research model to reduce respondent fatigue. All constructs were measured using multi-item scales adopted from established studies to ensure conceptual clarity and psychometric reliability. Respondents rated all items on a five-point Likert scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree").

Table A1 in Appendix A shows variables, their definitions, items, and sources.

2.4. Ethical issues

This study followed established ethical standards throughout the research process. The questionnaire began with a clear introductory statement explaining the purpose of the study, emphasizing that participation was entirely voluntary, and assuring respondents that their identities and responses would remain confidential. No identifying information was collected at any stage of the survey. Before completing the questionnaire, all respondents provided informed consent, acknowledging their understanding of the study and their willingness to participate. The research design and procedures were reviewed and approved by the university's research ethics committee, ensuring that the study complied with institutional and professional guidelines for the ethical treatment of human participants.

2.5. Data analysis method

The data were analyzed using partial least squares structural equation modeling through the SmartPLS 4 software. This method was selected because it is suitable for examining complex models that include both mediation and moderation effects, and because it performs well with data that do not follow a normal distribution. Following the recommendations of Hair et al. (2013), a two-stage analytical process was applied.

The reliability and validity of all constructs were examined before testing the structural relationships. Internal consistency was assessed using Cronbach's alpha and composite reliability, with a minimum acceptable threshold of 0.70. Convergent validity was evaluated by ensuring that the average variance extracted for each construct exceeded 0.50. Discriminant validity was confirmed using both the Fornell–Larcker criterion and the heterotrait–monotrait ratio, which together verify that each construct is empirically distinct from others.

After the measurement model satisfied the necessary conditions, the structural model was evaluated to test the hypothesized relationships. This step involved examining the path coefficients and their statistical significance using a bootstrapping procedure with 5,000 resamples. The explanatory power of the model was assessed through the coefficient of determination (R^2) for each endogenous variable. Model fit was examined using the standardized root mean square residual. Mediation effects were established by assessing the significance of indirect paths obtained from the bootstrapping procedure, while moderation was tested by examining the significance of the interaction terms.

3. RESULTS

The partial least squares structural equation modeling results demonstrated strong explanatory power for all endogenous constructs. The model accounted for 75.6% of the variance in green information proactiveness, 73.2% in green information transparency, 73.8% in green information formality, and 68.3% in financial performance. These values indicate satisfactory predictive validity and support the adequacy of the model.

Environmental leadership had significant positive effects on all three dimensions of green information practices. It influenced green information proactiveness ($\beta = 0.499$, $t = 7.847$, $p < 0.001$), green

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information transparency (β = 0.509, t = 7.261, p < 0.001), and green information formality (β = 0.473, t = 5.985, p < 0.001). Green innovation strategic orientation also exerted strong positive effects on these three information dimensions: green information proactiveness (β = 0.385, t = 4.842, p < 0.001), green information transparency (β = 0.349, t = 4.043, p < 0.001), and green information formality (β = 0.435, t = 4.758, p < 0.001). These findings reinforce the idea that both leadership commitment and strategic orientation are central to the development of information-related environmental capabilities.

Regarding financial outcomes, only green information proactiveness demonstrated a statistically significant positive effect on financial performance (β = 0.444, t = 3.359, p = 0.001). Green information transparency (β = 0.148, t = 1.120, p = 0.263) and green information formality (β = 0.251, t = 1.935, p = 0.053) did not show meaningful or consistent significance. This suggests that active engagement with environmental intelligence yields stronger financial benefits than transparency or formalization alone.

The analysis of interaction terms showed no evidence of moderation. The interaction between environmental leadership and green innovation strategic orientation did not significantly predict green information proactiveness (β = −0.019, p = 0.359), green information transparency (β = −0.024, p = 0.312), green information formality (β = −0.001, p = 0.974), or financial performance (β = −0.012, p = 0.495). These results indicate that leadership does not strengthen or weaken the relationship between strategic orientation and information practices.

Mediation analysis revealed significant total indirect effects of environmental leadership (β = 0.415, t = 7.354, p < 0.001) and green innovation strategic orientation (β = 0.332, t = 4.661, p < 0.001) on financial performance through green information practices. However, only green information proactiveness functioned as a meaningful mediator. Green information transparency did not display a mediating influence, and green information formality showed only borderline significance. No moderated mediation effects were detected.

Overall, the results highlight that proactive environmental information management is the principal mechanism through which leadership and strategic orientation translate into financial performance. Transparency and formalization, while valuable, appear insufficient on their own to drive strong financial outcomes without proactive engagement.

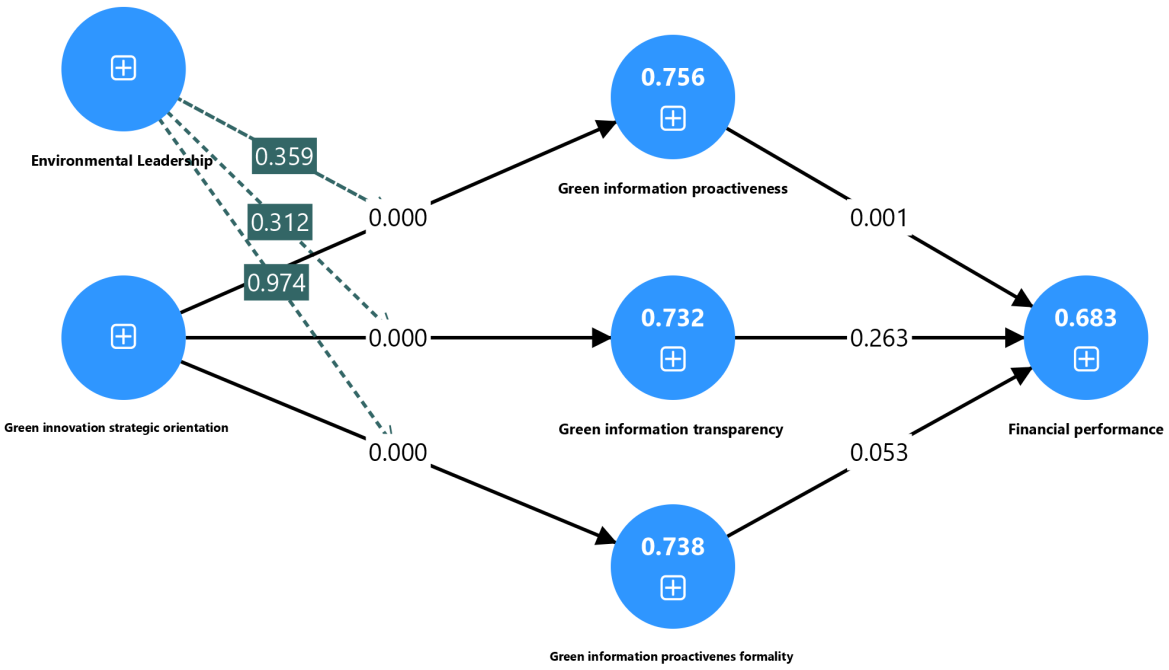

Figure 2. Graphical output

Table 2. Hypotheses testing summary

Hypothesis	Path	Effect Type	Path Coefficient (β)	T Statistics	P-Values	Decision
H1	GISO → FP	Direct	0.332	4.661	< 0.001	Supported
H2a	GISO → GIPR	Direct	0.385	4.842	< 0.001	Supported
H2b	GISO → GIT	Direct	0.349	4.043	< 0.001	Supported
H2c	GISO → GIF	Direct	0.435	4.758	< 0.001	Supported
H3a	GIPR → FP	Direct	0.444	3.359	0.001	Supported
H3b	GIT → FP	Direct	0.148	1.120	0.263	Not Supported
H3c	GIF → FP	Direct	0.251	1.935	0.053	Not Supported
H2–H3	GISO → GIPs → FP	Indirect	0.332	4.661	< 0.001	Supported
H4a	EL × GISO → GIPR	Moderation	–0.019	0.918	0.359	Not Supported
H4b	EL × GISO → GIT	Moderation	–0.024	1.010	0.312	Not Supported
H4c	EL × GISO → GIF	Moderation	–0.001	0.032	0.974	Not Supported

Note: GISO = Green innovation strategic orientation; GIPR = Green information proactiveness; GIT = Green information transparency; GIF = Green information formality; EL = Environmental leadership; FP = Financial performance.

Table 2 presents the summary of hypothesis testing results, including path coefficients, *t*-values, and significance levels. Figure 2 shows the graphic output.

The findings confirm that green innovation strategic orientation exerts a strong positive influence on financial performance, supporting the first hypothesis. This underscores the importance of a sustainability-focused innovation strategy as a core strategic capability within the hospitality industry. The result is consistent with the Resource-Based View, which argues that when hotels embed environmental principles into their innovation processes (whether through eco-friendly design, green product development, or environmentally oriented service innovation), they strengthen their stock of valuable, rare, difficult-to-imitate, and non-substitutable resources. As these environmental objectives become internalized, hotels can simultaneously enhance operational efficiency, differentiate their brand offerings, and open additional revenue opportunities.

The results also show that green innovation strategic orientation significantly predicts all three dimensions of green information practices (proactiveness, transparency, and formality), thus supporting hypotheses H2a through H2c. This outcome suggests that hotels with a clearly articulated environmental innovation strategy are more likely to invest in the systematic collection, dissemination, and utilization of environmental information. The finding reinforces the Knowledge-Based View by illustrating how strategic intent is transformed into performance outcomes through knowledge creation and knowledge application. Hotels in Vietnam that structure their operations around sustainability appear better positioned to implement formal reporting processes and deploy proactive information systems that support both decision-making and regulatory compliance.

Among the three information dimensions, green information proactiveness has the strongest positive effect on financial performance, supporting hypothesis H3a. In contrast, transparency and formality do not exhibit significant influences, offering limited support for hypotheses H3b and H3c. This outcome contributes to theoretical development. Interpreted through the Stimulus–Organism–Response lens, green innovation strategy and leadership represent external stimuli, green information practices serve as internal responses, and financial performance constitutes the behavioral outcome. Proactiveness reflects a dynamic and anticipatory response that enables hotels to prepare for evolving environmental regulations, emerging technologies, and changing customer expectations.

From a managerial standpoint, these findings highlight that proactive environmental intelligence (such as forecasting resource usage, monitoring sustainability trends, and adopting green technologies ahead of competitors) produces clearer financial benefits. In comparison, transparency and formality contribute primarily to legitimacy, accountability, and compliance but may not deliver immediate economic returns.

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In Vietnam's rapidly growing hospitality sector, where regulatory enforcement is still developing, hotels that move beyond formal compliance and integrate predictive environmental data into strategic decision-making gain both competitive and financial advantages.

The mediation findings further demonstrate that green innovation strategy influences financial performance largely through the pathways of green information practices, supporting the indirect relationships proposed in hypotheses H2 and H3. This offers empirical evidence for integrating the Resource-Based and Knowledge-Based perspectives: strategic orientation yields economic value when it is operationalized through information-driven knowledge processes. More precisely, green information proactiveness emerges as the key mediating mechanism that converts strategic sustainability commitments into tangible outcomes, reinforcing the idea that codified knowledge and proactive information use form durable competitive channels.

Consistent with expectations, environmental leadership does not significantly moderate the relationship between green innovation strategy and any dimension of green information practices, resulting in no support for hypotheses H4a through H4c. This suggests that leadership and strategy operate as independent, but mutually reinforcing, forces. In emerging markets such as Vietnam, leadership influence may exist primarily at symbolic or compliance levels, while strategic orientations are shaped largely by external institutional pressures. Under these conditions, strategy and leadership can both contribute to environmental information development, even if their interaction is not synergistic.

This nuance refines earlier studies conducted in developed economies, which reported strong moderation effects for green transformational leadership (Singh et al., 2024; Mistry, 2025). In resource-constrained contexts, structural and cultural barriers (such as limited empowerment, hierarchical decision processes, and weak data literacy) may reduce the extent to which leaders can influence data-driven environmental practices. A practical implication is that leadership development should not only focus on vision and values but also strengthen the knowledge infrastructures needed to convert strategic intentions into informed action.

4. DISCUSSION

This study examined how green innovation strategic orientation and digital technology implementation contribute to hotel financial performance through green information practices, with environmental leadership considered as a moderating factor. Grounded in the Resource-Based View, the Knowledge-Based View, and the Stimulus–Organism–Response framework, the findings extend the literature on value creation from sustainability-oriented strategies in emerging hospitality markets such as Vietnam (Mistry, 2025).

The results confirm that a sustainability-driven innovation strategy has a significant positive influence on financial performance, supporting the first hypothesis. This reinforces the argument that embedding environmental considerations into innovation generates valuable, rare, inimitable, and non-substitutable resources (Barney, 1991; Baquero, 2024a). Hotels that integrate sustainability into service and product innovation achieve operational efficiencies and brand differentiation, consistent with evidence that green-certified hotels enjoy higher profitability and cost savings through energy-efficient technologies. In Vietnam, where national policy promotes green growth and digital transformation, such strategies also strengthen legitimacy and open access to environmentally conscious markets (Mistry, 2025).

The study also shows that a sustainability-oriented innovation strategy significantly improves green information practices: proactiveness, transparency, and formality. This supports the Knowledge-Based View, which emphasizes that strategic intent translates into performance only when supported by knowledge creation and use (Ohmura & Matsuo, 2016). The findings align with prior research indicating that firms with strong environmental strategies develop formal information systems, enhance data tracking, and strengthen reporting precision (Jeong & Jang, 2010; Alyahia et al., 2024). Vietnamese hotels that prioritize sustainability appear better prepared to gather and

utilize environmental information for improvement and compliance.

Among the three information practices, only proactiveness significantly enhances financial performance. Transparency and formality do not produce meaningful effects. This offers an important theoretical refinement. Proactive environmental intelligence (anticipating regulatory changes, market expectations, and technological developments) acts as the behavioral link converting sustainability strategy into economic value (Jeong & Jang, 2010). Transparency and formalization are essential for compliance and legitimacy but typically do not generate short-term financial gains (Delmas & Burbano, 2011; Momayez et al., 2023). Hotels that engage in environmental forecasting, near-real-time tracking, and predictive analytics are better positioned to optimize operations and capture emerging opportunities, reaffirming research that innovation-oriented sustainability strengthens profitability (Liu et al., 2024a; Liu et al., 2024b).

The mediation results further show that the financial effects of sustainability-oriented innovation occur primarily through proactive information management. This provides empirical support for integrating the Resource-Based and Knowledge-Based perspectives: strategic assets create financial value when operationalized through information-based capabilities (Baquero, 2024a; Fatoki, 2021).

Contrary to expectations, environmental leadership does not moderate the relationship between sustainability strategy and information practices. This diverges from evidence in developed markets where leadership amplifies sustainability implementation (Singh et al., 2024; Mistry, 2025). In Vietnam, leadership and strategy appear to operate independently yet still contribute to environmental culture and awareness (Egri & Herman, 2000). Contextual constraints, such as hierarchical structures, limited resources, and less mature digital infrastructures, may restrict leaders' influence on technical information systems (Baquero, 2024a). Leadership in emerging markets may therefore be more symbolic than systemic. Future leadership development should focus not only on values and vision but also on strengthening knowledge infrastructures that support data-informed environmental decision-making.

Overall, this study advances theory by integrating strategic, informational, and behavioral perspectives on sustainability-driven performance. It reinforces the Resource-Based View by showing that strategic assets produce value only when supported by information capabilities. It strengthens the Knowledge-Based View by demonstrating that proactive environmental information practices mediate the link between strategic orientation and financial results (Jeong & Jang, 2010). It also provides empirical support for the Stimulus–Organism–Response paradigm, demonstrating how strategic and leadership stimuli shape information behaviors that lead to financial outcomes (Darvishmotevali & Altınay, 2022).

The findings provide several implications for hotel management. To generate financial returns, managers should prioritize proactive information practices rather than relying solely on compliance-based transparency. Investment in environmental intelligence systems, predictive analytics, and employee capabilities for environmental scanning is essential. Leadership development should expand beyond promoting environmental values to building structural enablers for data-informed decision processes. At the industry and policy level, governments and associations should support the adoption of digital sustainability platforms to strengthen the connection between environmental leadership and financial outcomes.

CONCLUSION AND LIMITATIONS

This study examined how a sustainability-oriented innovation strategy and environmental leadership shape financial performance in Vietnam's hotel industry through the development of green information practices. The findings from the structural equation modeling reveal that a sustainability-driven innovation strategy contributes meaningfully to financial outcomes, both directly and through the firm's information-related environmental routines. Of the three information prac-

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tices assessed, proactive engagement with environmental information consistently demonstrates the strongest influence on financial performance, while transparency and formalization show limited or inconsistent effects.

The absence of a moderating role for environmental leadership suggests that leadership commitment and strategic orientation function as independent, yet mutually reinforcing, drivers of sustainability practices rather than interacting variables. These results indicate that the most effective pathway from sustainability strategy to economic performance lies in the cultivation of forward-looking, information-based capabilities.

Overall, the study concludes that hotels seeking to enhance financial performance through sustainability should prioritize the development of proactive environmental intelligence systems. Such systems, supported by appropriate digital tools, enable hotels to anticipate environmental trends, respond to regulatory changes, and identify new opportunities for value creation. Compliance-oriented reporting remains important for legitimacy, but it is proactive information use that ultimately strengthens long-term competitiveness and profitability.

This study provides new insights into how sustainability-oriented innovation strategies create financial value through environmental information practices, yet several limitations should be noted.

First, the use of cross-sectional, self-reported data from hotel managers limits causal interpretation. Future papers could adopt longitudinal or multi-wave designs to observe how information practices evolve and how they influence financial outcomes over time.

Second, the sample includes only three- to five-star hotels in major Vietnamese cities. These hotels have greater resources than smaller or rural establishments, which may reduce generalizability. Comparative studies across hotel categories, regions, or countries would help clarify contextual influences on sustainability strategies.

Third, the analysis focused on internal information practices and did not consider external information flows, such as customer-driven environmental intelligence or supply chain collaboration. Integrating these dimensions may provide a more comprehensive understanding of environmental information ecosystems in hospitality.

Fourth, the absence of a moderating effect from environmental leadership may reflect contextual constraints such as hierarchical structures or limited decentralization. Future research could explore alternative leadership constructs (i.e., digital leadership, shared leadership, or middle-management influence) to capture more nuanced leadership pathways.

Fifth, although the study conceptually acknowledged digital technologies, it did not examine specific tools or platforms that enable environmental information management. Future investigations could evaluate how digital traceability systems, Internet of Things, or cloud-based analytics shape information quality and decision-making.

Finally, financial performance was measured using perceptual indicators rather than audited financial data. Future studies may combine subjective assessments with objective financial metrics to enhance validity.

Overall, these limitations offer opportunities for further research that integrates strategic orientation, information practices, digital systems, and leadership behavior, particularly in emerging markets undergoing rapid transformation.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Variables, items, and sources

Construct	Meaning	Items	Source
Green innovation strategic orientation	The items capture the extent to which the organization integrates environmental sustainability into its innovation efforts	Item 1: Our company is known to be environmentally friendly and to contribute to green projects. Item 2: We achieve consumer recognition because our company engages in different green activities. Item 3: The policies of the company promote green activities and we have made significant progress. Item 4: Our company values environmental welfare and is dedicated to developing green products. Item 5: We publicize the image and reputation of our company through the development of green projects.	Yuan (2011) and Baquero (2024b)
Green information proactiveness	The items assess the proactive acquisition and use of environmental information	Item 1: I desire to learn new practices concerning sustainability. Item 2: Innovative use of green information is encouraged in our operations. Item 3: I prioritize staying informed about the latest environmental initiatives. Item 4: I actively promote the sharing of green information with co-workers.	Kuo et al. (2021) and Khaq et al. (2025)
Green information transparency	The items reflect openness in communicating environmental performance	Item 1: I facilitate effective communication of our sustainability performance and results. Item 2: I openly share environmental performance information with relevant parties. Item 3: I facilitate openness about green activities to engender trust. Item 4: I ensure that information on environmentally friendly activities reaches employees and customers.	Jeong and Jang (2010)
Green information formality	The items measure the degree of structure and standardization in environmental information processes	Item 1: I apply official procedures to capture and use green information. Item 2: I follow standardized processes to evaluate sustainability efforts. Item 3: I am aligned with organizational policies on collecting environmental data. Item 4: Formal training plays a significant role in enhancing the credibility of green information use.	Garad and Khalifa (2024) and Jeong and Jang (2010)
Financial performance	The items evaluate financial outcomes as reported by managers	Item 1: Our hotel consistently achieves net profit targets. Item 2: Revenue growth continues to improve steadily compared with the previous year. Item 3: Operating costs are managed cost-effectively without compromising quality. Item 4: Return on investment is within or better than expected. Item 5: Cash flow remains adequate to sustain current operations.	Ding and Tseng (2023), Haile (2024), and Nathalia et al. (2024)
Environmental leadership	The items capture leaders' commitment to environmental values	Item 1: Top management consistently stresses the importance of environmental sustainability. Item 2: Leaders act as role models by implementing environmentally friendly practices. Item 3: Our leaders encourage participation in environmental programs and initiatives. Item 4: Environmental responsibility is included in leadership planning and decision-making. Item 5: Leaders motivate employees to participate in environmentally responsible behaviors.	Elshaer et al. (2022), Robertson and Barling (2013), and Egri and Herman (2000)