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Green Marketing Drives Sustainability Via Innovation in Heritage Enterprises

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Abstract

This study examines the strategic role of green marketing in promoting business sustainability through the mediating effect of green innovation, utilizing Puing Tenane, a cultural heritage enterprise in Lamaholot, East Nusa Tenggara, as the focal case. Anchored in Dynamic Capabilities Theory, the research explores how externally oriented marketing efforts foster internal innovation and long-term sustainability in heritage-based enterprises. A quantitative design was adopted, using a structured questionnaire distributed to 150 respondents selected through snowball sampling across East Flores, Adonara, Solor, and Lembata. The data were analyzed using Structural Equation Modeling with the partial least squares (SEM-PLS) technique. The results reveal that green marketing enhances sustainability, both directly and indirectly, by stimulating innovation with in resource-constrained traditional businesses. These findings underscore the dual role of eco-marketing as both a communication strategy and driver of adaptive capability. Environmentally conscious branding and consumer education significantly impact operational transformation, particularly in enterprises rooted in local traditions. The study contributes to theoretical development by contextualizing capability-building in culturally embedded enterprises and emphasizing alignment between ecological practices and heritage values. It illustrates how sustainability-oriented marketing enhances stakeholder engagement and fosters innovation that improves market relevance and organizational resilience. Practically, this research offers insights for artisans, business leaders, and policymakers on embedding environmental values into heritage branding and production. Emphasis is placed on culturally grounded training, certification schemes, and digital storytelling that elevate sustainability narratives. The study invites further exploration into diverse heritage-based enterprises and provides a strategic pathway for achieving sustainability through innovation, culture, and ecological responsibility.

INTRODUCTION

Growing global concerns over climate degradation, biodiversity loss, and resource scarcity have profoundly transformed how businesses approach long-term value creation. In response, sustainability has evolved from a peripheral concern to a strategic imperative across various sectors. Two interrelated paradigms green marketing and green innovation have emerged as essential tools for firms striving to operate responsibly while maintaining competitiveness (Dangelico et al., 2017; Papadas et al., 2017). Green marketing refers to the integration of ecological values into branding, promotion, and consumer education, aiming to shape pro-environmental behavior and build reputational capital (Aprilia et al., 2023; Groening et al., 2018). Green

innovation, in contrast, involves redesigning products, processes, and technologies to reduce environmental harm and optimize resource use (Chatterjee et al., 2023; Zhang et al., 2023). While the application of these strategies is gaining traction in manufacturing and high-tech industries, their role within cultural heritage enterprises, especially those deeply rooted in rural traditions, remains largely overlooked in both theoretical and empirical research.

The academic literature reveals a notable imbalance in sustainability research, with most studies disproportionately focusing on large corporations and formalized sectors in developed economies (Larbi-Siaw et al., 2022; Ning et al., 2023). Small, community-based enterprises particularly those rooted in indigenous knowledge and artisanal practices have received limited scholarly attention despite their potential to contribute to localized sustainability solutions. Moreover, while green marketing and green innovation have individually been linked to positive business outcomes, their combined impact on business sustainability remains underexamined, particularly in emerging market contexts where financial, technological, and institutional constraints are more pronounced (El-Kassar & Singh, 2019; Wang et al., 2022). In addition, few studies have explored the mediating role of green innovation as a dynamic capability that translates external market orientation into sustainable performance. The lack of research that integrates these constructs within the framework of Dynamic Capabilities Theory (DCT) creates a critical gap, especially in sectors where tradition, resource scarcity, and ecological vulnerability intersect (Ardhiyansyah & Juniansyah, 2024; Suki, 2016; Widodo, 2020).

This study aims to address these gaps by examining how green marketing contributes to business sustainability through the mediating role of green innovation in the context of Puing Tenane, a traditional weaving enterprise based in Lamaholot, East Nusa Tenggara, Indonesia. Anchored in the DCT perspective, the research is guided by three objectives: (1) to assess the direct effect of green marketing on business sustainability, (2) to examine the influence of green marketing on green innovation, and (3) to analyze whether green innovation mediates the relationship between green marketing and sustainability outcomes. By focusing on a culturally embedded enterprise that operates under resource constraints but possesses a rich intangible heritage, the study offers a unique empirical lens for understanding how modern sustainability paradigms can be harmonized with traditional entrepreneurial models.

This research makes significant contributions to both academic and practical domains in several meaningful ways. Theoretically, it advances Dynamic Capabilities Theory by demonstrating how green marketing and green innovation function as co-evolving capabilities that enable traditional enterprises to respond adaptively to environmental and institutional pressures. It also deepens the understanding of sustainability pathways in underrepresented contexts, challenging

the assumption that advanced infrastructure is a prerequisite for ecological innovation. Practically, the study offers a grounded framework for policymakers, non-governmental organizations, and community entrepreneurs seeking to design culturally adaptive, innovation-driven sustainability strategies. It affirms that traditional businesses can remain true to their cultural identity while actively participating in the green economy, thereby fostering inclusive growth, social resilience, and ecological integrity in rural creative sectors.

METHODS

This study applies a quantitative research design grounded in the principles of the Dynamic Capabilities Theory (DCT), aiming to examine the relationships among green marketing, green innovation, and business sustainability in the context of cultural heritage-based enterprises, specifically Puing Tenane in Lamaholot, Indonesia. The theoretical model tested in this research conceptualizes green marketing as an exogenous construct (X), business sustainability as the outcome variable (Y), and green innovation as a mediating construct (Z), allowing for the analysis of both direct and indirect relationships. Figure 1 outlines this hypothesized framework.

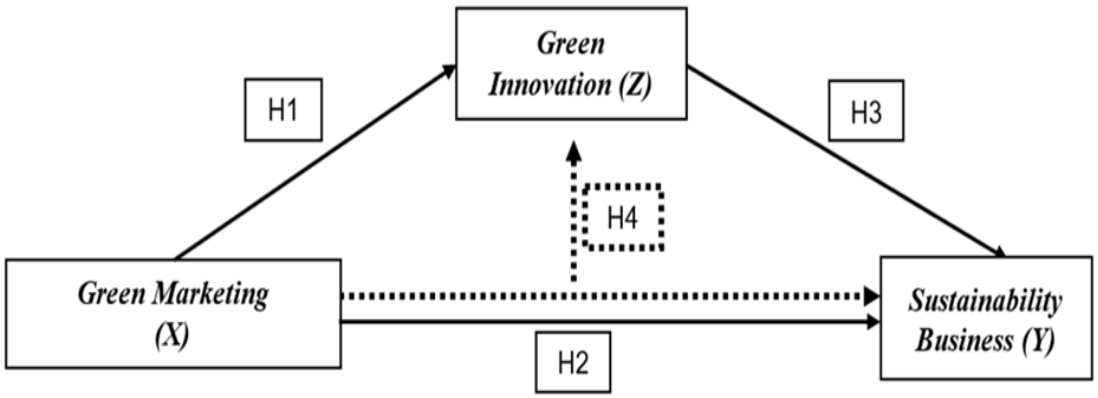

Figure 1. Conceptual Framework

The research employs a cross-sectional survey design, suitable for investigating causal relationships and mediation effects across latent constructs. The case focuses on Puing Tenane, a heritage-based microenterprise that engages in traditional weaving practices in Lamaholot, East Nusa Tenggara. This enterprise offers a pertinent setting for understanding how sustainability-oriented strategies manifest in culturally embedded, resource- constrained contexts. Given the geographical and logistical constraints of the research area, snowball sampling was adopted as the most feasible non-probability technique. Initial participants were selected based on their involvement with Puing Tenane and their knowledge of sustainability and innovation practices.

These respondents then referred additional participants from their networks, resulting in a final sample of 150 individuals comprising artisans, entrepreneurs, and community leaders engaged in heritage-based enterprises. Primary data were collected using a structured questionnaire administered in person to respondents across four key regions East Flores, Adonara, Solor, and Lembata. Snowball sampling was utilized to identify participants, starting with individuals possessing deep knowledge and involvement in the weaving industry, who subsequently referred additional qualified respondents. This method is effective for accessing dispersed and network-based populations in niche cultural settings (Chih-Pei & Chang, 2017; Hair et al., 2019). All participants had at least three years of engagement in heritage- based business activities, ensuring adequate contextual understanding. Responses were recorded using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

All constructs were measured using validated scales from previous studies to ensure reliability and comparability. Items for green marketing were adapted from (Papadas et al., 2019), capturing aspects such as eco-friendly promotion, environmental branding, and sustainability communication. Green innovation was measured using indicators from (Kuo et al., 2022; Pattinson et al., 2023), focusing on resource efficiency, eco-technology, and product innovation. Business sustainability items were drawn from (Schaltegger & Wagner, 2011) encompassing economic, environmental, and social dimensions. To ensure content validity, the questionnaire underwent expert review and pretesting with a subset of respondents. Minor revisions were made for clarity and contextual appropriateness.

Structural Equation Modeling Partial Least Squares (SEM–PLS) was employed to test the proposed hypotheses and examine the mediating role of green innovation. This method is suitable for analyzing complex models involving latent variables and mediation effects, especially in studies with moderately sized samples. Data analysis was conducted using SmartPLS 3.2 software, following standard procedures for testing reliability, convergent validity, and structural path significance.

This methodological approach aligns with the study's objectives to explore the extent to which green marketing initiatives influence business sustainability, both directly and indirectly through green innovation. It also enables the empirical operationalization of DCT by illustrating how traditional firms reconfigure internal competencies to respond to external environmental pressures.

RESULTS AND DISCUSSION

The demographic composition of respondents in this study reflects the dominant participation of women, with 97.3% identifying as female and only 2.7% as male. As presented in Table 1, the majority of participants (91.3%) fall within the age range of 31 to 40 years, while a smaller portion (8.7%) are aged between 20 and 30 years. In terms of educational attainment, 58.7% completed senior high school, 27.3% junior high school, 10% elementary school, and only 4% obtained a bachelor's degree. Notably, 94.7% of the respondents have operated their businesses for more than three years, indicating significant experience within the sector.

Table 1. Respondent Characteristics

Measure	Items	Frequency	Percentage (%)
Age	20–31	13	8,7%
	31–40	137	91,3%
Total		150	100%
Gender	Male	4	2,7%
	Female	146	97,3%
Total		150	100%
Education	Bachelor	6	4%
	SHS (Senior High School)	88	58,7%
	JHS (Junior High School)	41	27,3%
	ES (Elementary School)	15	10,0%
Total		150	100%
Business Duration	< 3 years	8	5,3%
	> 3 years	142	94,7%
Total		150	100%

To ensure the quality and integrity of the measurement model, validity and reliability assessments were carried out. The initial evaluation of convergent validity utilized outer loading values. In the early stages of development, a loading factor value greater than 0.5 – 0.6 can be said to be valid. Figure 2 illustrates the loading factor values for each of the existing variables.

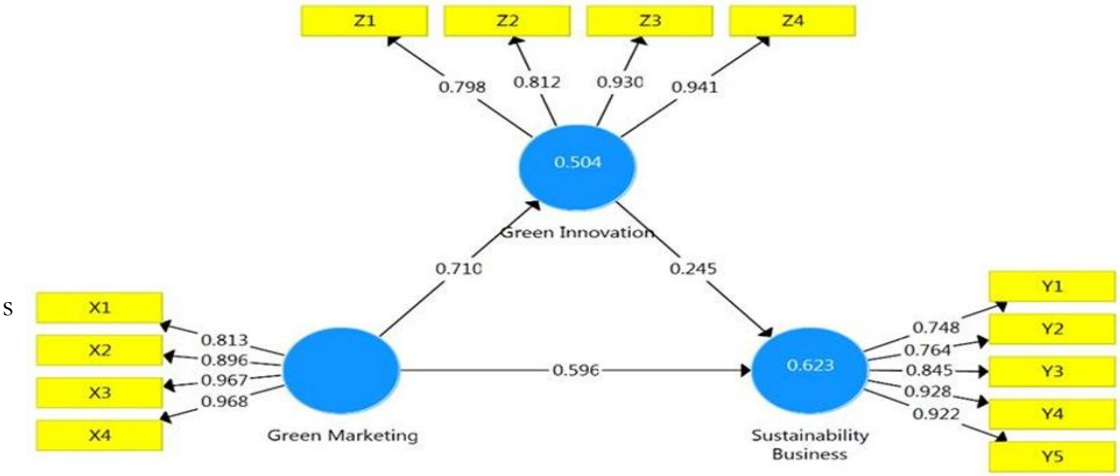

Figure 2. The Outer Model Analysis

As illustrated in Figure 2, all item loadings exceeded the threshold of 0.60, indicating acceptable construct validity (Hair et al., 2019).

Table 2. Average Variance Extracted (AVE)

Variable	Average Variance Extracted (AVE)
Green Marketing	0,834
Green Innovation	0,714
Sustainability Business	0,762

This is further corroborated in Table 2, where each variable's Average Variance Extracted (AVE) values are above 0.50, meeting the recommended minimum standard for convergent validity.

Table 3. Composite Reliability and Cronbach's Alpha Value

Variable	Cronbach's Alpha	Composite Reliability
Green Marketing	0,932	0,952
Green Innovation	0,894	0,927
Sustainability Business	0,897	0,925

Reliability was tested using both Cronbach's alpha and composite reliability metrics. Table 3 demonstrates that all variables achieved reliability coefficients above the 0.70 threshold, confirming internal consistency and the robustness of the measurement model.

Table 3. R2 Value

Variable	R-square	R-square Adjusted
Green Innovation	0,504	0,501
Sustainability Business	0,623	0,618

Subsequent analysis examined the structural model to evaluate the predictive capacity of the exogenous variables. The coefficient of determination (R^2) for green innovation is 0.504, suggesting that green marketing explains 50.4% of the variance in green innovation. The R^2 for business sustainability is 0.623, indicating that the combined influence of green marketing and green innovation accounts for 62.3% of the variation in business sustainability. The remaining variance (49.6% and 37.7%, respectively) is attributable to unobserved factors outside the current model.

To assess the predictive relevance of the model, the Q^2 value was calculated using the Stone-Geisser formula:

Q Square = 1 - [(1-R21) x (1-R22)
= 1 - [(1 – 0.504) x (1 – 0.623)]
= 0.813

Based on these results, the Q Square value is 0.813, which shows that the amount of data diversity that can be explained from the research that has been conducted is 81.3% and the remaining 18.7% is explained by other factors outside the research.

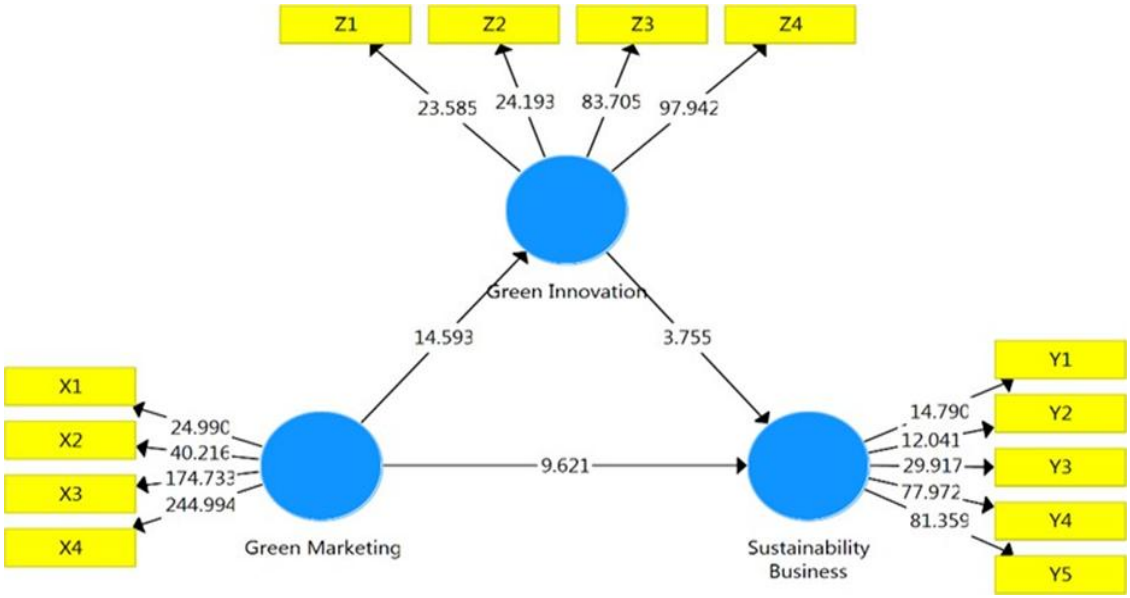

Figure 3. The Direct Effect Analysis

The hypotheses were evaluated using the bootstrapping method in SEM-PLS, applying a significance level of $p < 0.05$ and a t-statistic threshold of >1.96. Table 4 summarizes the direct path coefficients.

Table 4. Hypothesis Test Results for Direct Effect

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Green Marketing → Green Innovation	0,710	0,708	0,049	14,593	0,000
Green Marketing → Sustainability Business	0,596	0,595	0,062	9,621	0,000
Green Innovation → Sustainability Business	0,245	0,244	0,065	3,755	0,000

Based on the results in the Table 4 above, the influence of green marketing on green innovation obtained a t- statistic value greater than 1.96 (14.593 > 1.96), with a significance level smaller than 0.05 (0.000 < 0.05). So it can be concluded that green marketing has a positive and significant effect on green innovation. The influence of green marketing on business sustainability obtained a t-statistic value greater than 1.96 (9.621 > 1.96), with a

significance level smaller than 0.05 (0.000 < 0.05). So, it can be concluded that green marketing has a positive and significant effect on business sustainability. The influence of green innovation on business sustainability obtained a t-statistic value greater than 1.96 (3.755 > 1.96), with a significance level smaller than 0.05 (0.000 < 0.05). So it can be concluded that green innovation has a positive and significant effect on business sustainability.

Table 5. Hypothesis Test Results for Indirect Effect

Variable	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Green Marketing → Green Innovation → Sustainability Business	0,174	0,173	0,050	3,477	0,001

The mediating effect of green innovation was assessed using the indirect path analysis. As shown in Table 5, the effect of green marketing on business sustainability through green innovation is statistically significant ($t = 3.477$, $p = 0.001$), validating the presence of a meaningful mediating role. These results confirm all four hypotheses proposed in the conceptual model and demonstrate strong empirical support for the integration of green marketing and green innovation in enhancing business sustainability among cultural heritage-based enterprises.

Structural Equation Modeling – Partial Least Squares (SEM-PLS) provided robust empirical evidence in support of the proposed research model. Green marketing (GM) exhibited a strong and positive influence on green innovation (GI) ($\beta = 0.710$; $t = 14.59$; $p < 0.001$. Similarly, GM also had a substantial direct influence on business sustainability (BS) ($\beta = 0.596$; $t = 9.62$; $p < 0.001$). GI demonstrated a significant but relatively minor direct impact on BS ($\beta = 0.245$; $t = 3.76$; $p < 0.001$). Additionally, the mediation analysis confirmed GI's partial mediating role between GM and BS (indirect effect: $\beta = 0.174$; $t = 3.48$; $p = 0.001$), suggesting approximately 29% of GM's total effect on BS occurred indirectly through GI.

The substantial influence of green marketing on green innovation highlights the crucial role of marketing in stimulating internal adaptive processes. Artisans at Puing Tenane quickly adopted eco-friendly weaving techniques such as natural dyes and low-impact looms following the introduction of credible eco-branding and consumer education programs. This aligns with prior findings from (Chen et al., 2022) and (Chin et al., 2020; Iskandar et al., 2024) who showed that clear sustainability narratives significantly reshape organizational behaviors, driving companies toward environmentally innovative practices. In this case, transparent eco-branding and targeted consumer education not only enhanced Puing Tenane's market reputation but also internally motivated artisans to adopt ecological innovations, supporting the arguments presented by (Gelderman et al., 2021).

The direct impact of green marketing on business sustainability provided further critical insights. Results confirmed that communicated sustainability claims substantially improved market positioning, consumer trust, and overall financial performance. Digital marketing initiatives, particularly authentic storytelling shared via social media, significantly magnified these effects. This result aligns closely with studies conducted by (Ardyan & Sanapang, 2023), which highlights the substantial impact of genuine digital eco-marketing strategies on consumer loyalty, even within small-scale, community-oriented businesses. These insights are consistent with local empirical studies by (Khouroh et al., 2021; Liu & Wang, 2023), which highlights the critical role of stakeholder engagement in maximizing sustainability-oriented marketing outcomes in Indonesian micro-enterprises.

Furthermore, the positive, although more modest, direct influence of green innovation on business sustainability suggests that sustainability-oriented technological improvements and process optimizations yield tangible economic benefits. Within Puing Tenane, adopting resource-efficient production reduced dye-related expenses by approximately 14%, concurrently improving perceived product quality by about 9%. These operational outcomes closely parallel findings in rural craft studies by (Larbi-Siaw et al., 2022), which affirm that innovation in resource efficiency and waste management significantly enhances competitiveness and financial resilience in small-scale traditional industries.

The partial mediation by green innovation provides robust validation for Dynamic Capabilities Theory (DCT), demonstrating the sequential progression where external strategic orientation (green marketing) stimulates internal capability building (green innovation), ultimately enhancing overall business sustainability. This dual-route mechanism, combining direct marketing influence and mediated innovation effects, parallels integrated capability-building frameworks outlined by (Wang et al., 2022) and (Zhuge et al., 2023), further substantiating DCT's explanatory power in culturally distinct, resource-limited settings.

This study significantly advances existing theory in three critical ways. Firstly, it broadens the contextual scope of DCT by empirically validating its applicability within resource-constrained cultural heritage micro- enterprises, contrasting with the traditional focus on technology-intensive sectors (Zameer & Yasmeen, 2022; Zeng & Wang, 2023). Secondly, the findings affirm the sequential capability-building process, wherein external green marketing practices serve as precursors that energize internal innovation capabilities, as proposed by (Groening et al., 2018). Thirdly, the study highlights the strategic importance of integrating cultural authenticity with green marketing and innovation, building upon prior arguments from (Sanapang et al., 2024). Thus, the research contributes valuable theoretical nuance by demonstrating that cultural heritage

significantly enriches ecological value propositions, driving consumer engagement and innovation simultaneously.

This study reinforces, extends, and contextualizes previous academic findings, offering critical incremental insights. The significant linkage between green marketing and green innovation echoes prior assertions by (Groening et al., 2018). However, this research uniquely demonstrates these dynamics within micro-scale heritage enterprises, which are characterized by limited financial resources. Additionally, the robust direct effect of green marketing on sustainability outcomes corroborates the findings of (Papadas et al., 2019) and (Gelderman et al., 2021), which are further enriched by demonstrating how cost- effective digital storytelling amplifies sustainability performance, particularly within community-based contexts. Furthermore, this research extends existing insights on the positive impact of green innovation on sustainability (Nie et al., 2024), explicitly integrating cultural authenticity and traditional knowledge, thereby strengthening brand differentiation and competitive positioning. Finally, confirming the mediating role of green innovation significantly advances the insights provided by (Wang et al., 2022) and (Zhuge et al., 2023), delivering empirical substantiation of capability transformations within culturally embedded Indonesian microenterprises. Collectively, these findings underscore the importance of culturally adaptive strategies that integrate ecological objectives with heritage values, providing nuanced theoretical and practical insights for sustainable development in indigenous contexts.

Practically, this research advises managers of cultural heritage enterprises to adopt authentic, culturally aligned green marketing strategies that transparently communicate sustainability efforts, effectively building consumer trust and stimulating internal innovation. Targeted capability-building initiatives, such as training in sustainable production techniques, can significantly enhance the relationship between marketing and innovation practices. Policymakers should reinforce these initiatives through dedicated financial support mechanisms, local certification frameworks, and digital literacy programs, collectively fostering inclusive economic growth and cultural preservation.

Despite robust findings, this study's cross-sectional design restricts causality assertions, making longitudinal studies imperative for capturing the evolution of sustainability capabilities over time. Future research should incorporate objective performance metrics, such as life-cycle assessments (LCA), to complement self- reported data and enhance methodological rigor. Additionally, extending research across diverse heritage sectors and geographic contexts will enhance generalizability, revealing more profound insights into the context-specific dynamics of sustainability.

In summary, this study demonstrates that the strategic integration of green marketing and

innovation significantly enhances sustainability outcomes in cultural heritage enterprises. By validating DCT within culturally nuanced, resource-constrained contexts, the research offers substantial theoretical advancement, practical managerial insights, and clear policy recommendations, collectively forming a robust framework for achieving sustainability through culturally sensitive strategies.

CONCLUSION

This study provides strong empirical evidence that the strategic integration of green marketing and green innovation serves as a pivotal mechanism for advancing business sustainability, particularly within cultural heritage- based enterprises. Through the case of Puing Tenane, a traditional weaving micro-enterprise, the research demonstrates that green marketing not only enhances external value through increased customer trust and market competitiveness but also acts as a catalyst for internal innovation. Green innovation, in turn, reinforces sustainability by improving resource efficiency, reducing operational costs, and amplifying cultural brand authenticity.

From a theoretical perspective, the study extends the applicability of the Dynamic Capabilities Theory (DCT) beyond high-tech or corporate contexts. It affirms that external environmental sensing capabilities (such as green marketing) can stimulate internal capability reconfiguration (green innovation), even within resource- constrained, culturally embedded enterprises. By embedding ecological strategies within authentic cultural narratives, this research introduces a nuanced extension to DCT, highlighting that cultural capital can serve as a complementary dynamic resource that strengthens both differentiation and resilience. This contribution has broader implications for sustainability research in marginalized, indigenous, and informal sectors, which are often overlooked in mainstream literature.

Practically, the findings offer actionable guidance for a broad set of stakeholders. Managers and artisans of heritage-based enterprises are advised to embrace eco-marketing practices that integrate verifiable sustainability efforts with cultural storytelling. Such strategies simultaneously enhance consumer engagement and foster internal organizational learning and innovation. Policymakers and local governments should invest in enabling infrastructures, such as micro-financing schemes, digital literacy training, and localized green certification systems, that facilitate the adoption of sustainable technologies and enhance market access. In doing so, they can empower micro-enterprises to align their cultural heritage products with global sustainability agendas, enabling inclusive economic development rooted in cultural preservation.

This study also opens new pathways for future research. First, longitudinal studies are essential for understanding the dynamic evolution of sustainability capabilities over time and for

establishing stronger causal inferences. Second, replicating the study across various heritage-based industries such as pottery, batik, culinary traditions, or indigenous farming can uncover industry-specific contingencies and allow for cross-sector generalization. Comparative studies across different cultural and geographic settings would further enrich the theoretical landscape and practical applicability of sustainability frameworks. Finally, integrating objective metrics such as life-cycle analysis (LCA), consumer behavioral analytics, and digital footprint tracking into mixed-method designs would enhance validity and offer deeper insights into how sustainability interventions affect both business performance and cultural vitality.

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