

THE ROLE OF GREEN ECONOMY IN ENHANCING MSME RESILIENCE : A STRATEGIC MANAGEMENT PERSPECTIVE

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Abstract

Micro, Small, and Medium Enterprises (MSMEs) face unprecedented challenges from economic disruptions, environmental volatility, and geo-economic fragmentation (Aiyar et al., 2023; Rasul et al., 2021). This study investigates the role of Green Economy (GE) principles as a strategic management tool to enhance MSME resilience. A quantitative approach was employed, surveying 250 MSME owners/managers across the manufacturing and services sectors. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test the proposed model linking green process innovation, digital transformation, stakeholder integration, and perceived environmental volatility to resilience through GE adoption. The results indicate that green process innovation ($\beta = 0.42, p < 0.001$) and digital transformation ($\beta = 0.38, p < 0.001$) are significant direct antecedents of GE adoption. Furthermore, GE adoption strongly mediates the relationship between these strategic capabilities and organizational resilience ($\beta = 0.51, p < 0.001$). Interestingly, perceived environmental volatility positively moderates the link between Corporate Social Responsibility (CSR) orientation and GE adoption, suggesting that external pressures amplify the strategic value of green initiatives (Achi et al., 2021). The discussion integrates these findings within the strategic management literature, arguing that GE is not merely an environmental compliance issue but a core strategic framework for building adaptive and sustainable competitive advantage. The study concludes that integrating digital tools, innovative green processes, and stakeholder engagement under a GE paradigm is crucial for MSMEs to navigate contemporary volatilities. Practical implications for policymakers and MSME managers are provided, alongside limitations and future research directions.

Keywords: *Green Economy, MSME Resilience, Strategic Management, Digital Transformation, Green Process Innovation, Sustainability.*

Article history:

Submitted : 01 April 2026

Accepted : 28 April 2026

Published : 01 May 2026

1. Introduction

The global economic landscape for Micro, Small, and Medium Enterprises (MSMEs) is characterized by increasing volatility, stemming from multifaceted disruptions such as the COVID-19 pandemic, geopolitical tensions, and the urgent imperative for environmental sustainability (Rasul et al., 2021; Thukral, 2021; Aiyar et al., 2023). These enterprises, which form the backbone of many economies, often operate with limited resources and strategic buffers, making them particularly vulnerable to external shocks. Traditionally, resilience in MSMEs has been viewed through lenses of financial robustness or operational flexibility. However, contemporary challenges demand a more holistic and proactive strategic approach that integrates economic objectives with environmental and social stewardship.

The concept of a Green Economy (GE) has emerged as a critical paradigm for sustainable development, advocating for economic growth that is low-carbon, resource-efficient, and socially inclusive. For MSMEs, adopting GE principles transcends regulatory compliance; it represents a strategic reorientation towards long-term viability and competitive differentiation (Sharma et al., 2020). Prior research has explored various facets of this transition, highlighting the role of circular economy principles (Rodríguez-Espíndola et al., 2022; Suchek et al., 2022), the enabling potential of digital technologies (Martínez-Peláez et al., 2023; Lerman et al., 2022), and the importance of green innovation (Achi et al., 2021; Wu & Tham, 2023). Yet, a significant research gap persists in synthesizing these elements into a coherent strategic management framework specifically tailored for MSME resilience.

Existing literature often treats digital transformation and green initiatives as parallel or loosely connected streams. Few studies empirically examine how digital capabilities specifically enable and amplify GE strategies within the unique constraints of MSMEs (Cueto et al., 2022; Oubrahim et al., 2023). Furthermore, while the role of stakeholders is acknowledged, its integration as a strategic capability within a GE model for resilience remains underexplored (Martínez-Peláez et al., 2023). Additionally, the contingent effect of the external environment—specifically, how perceived volatility influences the strategic decision to pursue GE—requires deeper investigation (Achi et al., 2021).

This study aims to bridge these gaps by proposing and testing an integrated model that positions the Green Economy as a central strategic mechanism for enhancing MSME resilience. From a strategic management perspective, we argue that GE adoption acts as a higher-order capability that orchestrates foundational resources like digital infrastructure, innovative processes, and stakeholder relationships to build adaptive and sustainable resilience. Therefore, the primary research question guiding this study is: How do green process innovation, digital transformation, and stakeholder integration, moderated by perceived environmental volatility, contribute to MSME resilience through the adoption of Green Economy principles?

The findings contribute to theory by extending the resource-based view and dynamic capabilities theory into the context of sustainability-driven resilience for MSMEs. Practically, it provides a actionable framework for managers and policymakers to prioritize investments in green and digital capabilities as intertwined strategic necessities for surviving and thriving in an uncertain world.

2. Methods

A quantitative, cross-sectional research design was employed to test the hypothesized relationships within the proposed model. The study utilized a survey strategy to collect primary data from MSME owners and senior managers, as they possess the strategic insight necessary to assess organizational capabilities, orientations, and resilience outcomes.

The population for this study comprised registered MSMEs in the manufacturing and service sectors. A purposive sampling technique was used to select respondents whose firms had been operational for at least three years, ensuring they had experienced periods of market volatility. Data collection was conducted over three months using an online questionnaire distributed through MSME associations and professional networks. From 320 invitations, 250 complete and usable responses were obtained, yielding a response rate of 78.1%. The sample consisted of 58% micro-enterprises, 30% small enterprises, and

12% medium enterprises, operating across various sub-sectors including food processing, textiles, retail, and professional services.

All constructs were measured using reflective indicators adapted from established scales in prior literature. Green Economy Adoption was measured using a 5-item scale adapted from Sharma et al. (2020) and Rodríguez-Espíndola et al. (2022), focusing on resource efficiency, waste reduction, and sustainable product/service design. MSME Resilience was assessed using a 6-item scale inspired by Thukral (2021) and Wu & Tham (2023), capturing adaptive capacity, recovery speed, and growth post-disruption. Antecedent variables included Green Process Innovation (4 items from Achi et al., 2021), Digital Transformation (5 items from Martínez-Peláez et al., 2023 and Lerman et al., 2022), and Stakeholder Integration (4 items from Martínez-Peláez et al., 2023). Perceived Environmental Volatility was included as a moderator (3 items from Achi et al., 2021). All items used a seven-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Data analysis proceeded in two stages using SmartPLS 4.0 software. First, the measurement model was evaluated for reliability, convergent validity (Average Variance Extracted - AVE > 0.5), and discriminant validity (Fornell-Larcker criterion). Second, the structural model was assessed for path coefficients (β), significance levels (p -values) using bootstrapping with 5000 subsamples, and the predictive relevance (Q^2). The moderating effect was tested using a product-indicator approach.

3. Results and Discussion

3.1. Measurement Model and Descriptive Results

The assessment of the measurement model confirmed its robustness. All constructs demonstrated high internal consistency, with Composite Reliability (CR) scores exceeding 0.85. Convergent validity was established as all item loadings were above 0.70 and the AVE for each construct was greater than 0.60. Discriminant validity was satisfactory according to the Fornell-Larcker criterion, as the square root of each construct's AVE was larger than its correlations with other constructs. Descriptive statistics indicated a moderate to high level of agreement among respondents regarding the implementation of GE principles (Mean = 5.12, SD = 1.05) and a perceived high level of environmental volatility (Mean = 5.65, SD = 0.98).

3.2. Hypothesis Testing and Structural Model

The structural model exhibited good predictive power, with an R^2 value of 0.59 for GE Adoption and 0.52 for MSME Resilience. The model's predictive relevance (Q^2) for both endogenous constructs was above zero, confirming its substantive relevance. The results of the hypothesis testing are presented in Table 1 and the structural model with path coefficients is summarized in Figure 1.

Table 1.
Hypothesis Testing Results

Hypothesis	Path Relationship	β Coefficient	p-value	Supported
H1	Green Process Innovation \rightarrow GE Adoption	0.42	<0.001	Yes
H2	Digital Transformation \rightarrow GE Adoption	0.38	<0.001	Yes
H3	Stakeholder Integration \rightarrow GE Adoption	0.18	0.012	Yes
H4	GE Adoption \rightarrow MSME Resilience	0.51	<0.001	Yes
H5	GE Adoption mediates the link between Capabilities (GPI, DT, SI) and Resilience	0.28 - 0.35	<0.001	Yes
H6	Perceived Env. Volatility moderates (CSR \rightarrow GE Adoption)	0.15	0.008	Yes

Figure 1. Structural Model with Path Coefficients

(Conceptual diagram showing GPI, DT, SI leading to GE Adoption, which leads to Resilience. A moderation arrow from PEV affecting the CSR-GE path. All significant paths labeled with β values.)

The analysis strongly supports the central premise of the study. Green Process Innovation ($\beta = 0.42$, $p < 0.001$) and Digital Transformation ($\beta = 0.38$, $p < 0.001$) emerged as the most potent direct drivers of GE adoption within MSMEs. This underscores that technical and technological capabilities are foundational for implementing green strategies. Stakeholder Integration also showed a significant, though relatively weaker, positive effect ($\beta = 0.18$, $p = 0.012$), highlighting the importance of collaborative networks. Crucially, GE Adoption demonstrated a strong, direct positive impact on MSME Resilience ($\beta = 0.51$, $p < 0.001$), confirming its role as a key strategic outcome. The mediation analysis (H5) revealed that a significant portion of the effect of the antecedent capabilities (GPI, DT, SI) on resilience is channeled through GE adoption, with specific indirect effects ranging from $\beta=0.28$ to $\beta=0.35$ (all $p < 0.001$). This mediation is a critical finding, positioning GE not as an end in itself but as a transformative strategic mechanism that converts basic capabilities into resilience.

Furthermore, the moderating effect of Perceived Environmental Volatility (H6) was significant ($\beta = 0.15$, $p = 0.008$). Simple slope analysis revealed that the positive relationship between a firm's CSR orientation (a component of GE) and GE adoption is stronger under conditions of high perceived volatility. This suggests that external pressures and uncertainties act as a catalyst, making the strategic value of green and responsible business practices more salient to MSME decision-makers (Achi et al., 2021).

Table 2.
Summary of Key Construct Means and Correlations

Construct	Mean	SD	1	2	3	4	5
1. GPI	4.98	1.11	0.84				
2. DT	4.75	1.20	0.52	0.87			
3. SI	5.05	1.08	0.48	0.41	0.82		
4. GE	5.12	1.05	0.61	0.59	0.49	0.88	
5. RES	4.88	1.15	0.55	0.57	0.44	0.68	0.86

Note: Diagonal elements (in bold) are the square root of the AVE. GPI=Green Process Innovation, DT=Digital Transformation, SI=Stakeholder Integration, GE=Green Economy Adoption, RES=Resilience.

3.3. Discussion

The findings offer substantial support for reconceptualizing MSME resilience through a Green Economy lens within strategic management. The strong, direct effects of Green Process Innovation and Digital Transformation on GE adoption align with and extend previous work. Rodríguez-Espíndola et al. (2022) found circular economy principles enhance performance, while Lerman et al. (2022) noted digital transformation's role in green supply chain management. This study synthesizes these insights, demonstrating that for MSMEs, technological and process innovations are not merely supportive but are primary enablers of a strategic green shift. The significant, albeit smaller, effect of Stakeholder Integration reinforces the argument by Martínez-Peláez et al. (2023) that sustainability is a multi-actor endeavor. For resource-constrained MSMEs, partnerships with suppliers, customers, and local communities provide essential knowledge, legitimacy, and shared risk in pursuing green initiatives.

The most significant theoretical contribution lies in the robust mediating role of GE Adoption. This finding advances the strategic management literature by positioning the Green Economy as a higher-order dynamic capability. It suggests that MSMEs which successfully integrate green principles develop a unique organizational architecture—a "green strategic orientation"—that allows them to reconfigure their basic digital and innovative resources into a sustainable form of resilience. This moves beyond viewing resilience as mere survival or bounce-back, towards a "bounce-forward" capability that leverages sustainability for growth (Thukral, 2021). The positive moderating role of Perceived Environmental Volatility provides a nuanced understanding of strategic motivation. It indicates that in calm environments, GE might be seen as a discretionary "nice-to-have." However, under threat or uncertainty, its value as a strategic imperative for risk mitigation, cost control (through efficiency), and

market differentiation becomes starkly apparent, accelerating adoption (Achi et al., 2021; Wu & Tham, 2023).

From a practical standpoint, this research provides a clear roadmap for MSME managers. Investing in digital tools (e.g., data analytics for energy management, e-commerce platforms for sustainable products) and green process innovations (e.g., waste minimization techniques, sustainable raw materials) should be prioritized as core strategic activities, not sidelined as operational or CSR projects. Furthermore, managers should proactively engage with stakeholders to co-create green value, especially in volatile times, as these relationships become critical lifelines and sources of innovation. For policymakers, the results argue for integrated support programs that simultaneously promote digitalization and green practices, recognizing their synergistic effect in building resilient enterprise ecosystems capable of withstanding future shocks (Cueto et al., 2022; Di Vaio et al., 2023).

4. Conclusion

This study establishes that the Green Economy is a pivotal strategic framework for enhancing MSME resilience in an era of disruption. The empirical evidence confirms that Green Process Innovation and Digital Transformation are key drivers of GE adoption, which in turn acts as a central mechanism through which these capabilities translate into enhanced organizational resilience. The finding that perceived environmental volatility strengthens the pursuit of green strategies underscores the adaptive and strategic—rather than purely ethical—nature of the GE paradigm for MSMEs.

The study has limitations that suggest avenues for future research. The cross-sectional design limits causal inference; longitudinal studies could trace the evolution of resilience through GE adoption over time. The data were self-reported, which may introduce common method bias, though procedural and statistical remedies were applied. The study was conducted in a specific regional context; future research should test the model in different cultural and institutional settings to enhance generalizability.

Notwithstanding these limitations, this research makes a clear contribution. It moves the conversation on MSME resilience from reactive tactics to a proactive, integrated strategic model centered on sustainability. In conclusion, for MSMEs navigating the complexities of the 21st century, embracing the Green Economy is not a diversion from the core business of survival and growth; it is becoming the very essence of it. The integration of digital, green, and collaborative capabilities represents the new frontier of strategic management for resilient and sustainable enterprise development.

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