

Green Innovation as a Strategy for Strengthening the Competitiveness of Micro, Small, and Medium Enterprises

Yulnita Muchtar^{1*}, Rahmat Hidayat², Mildayanti³

Department of Entrepreneurship, Faculty of Economics and Business,
Universitas Negeri Makassar

Corresponding Author: Yulnita Muchtar yulnita.muchtar@unm.ac.id

ARTICLE INFO

Keywords: Green Innovation, Competitiveness, MSMEs, Sustainability, Green Economy

Received : 20, July

Revised : 22, August

Accepted: 25, September

©2026 Muchtar, Hidayat, Mildayanti: This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

Micro, small, and medium enterprises (MSMEs) anchor much of the national economy, yet many still compete on a narrow base of resources, technology, and conventional market thinking. As environmental expectations tighten, green innovation—rethinking products, production processes, and business models around ecological responsibility—has emerged as an alternative source of advantage. Drawing on scholarly publications from the last five years, this paper conceptually examines how green innovation can function as a competitiveness strategy for MSMEs. The review suggests that green product, process, and management innovation together lower operating costs, differentiate offerings, widen market reach, and build business reputation. Adoption nonetheless remains constrained by limited capital, weak green-technology literacy, and thin policy support. The paper concludes that a coordinated effort among MSME actors, financial institutions, universities, and government is needed to sustain MSMEs' green transformation.

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) form the backbone of the Indonesian economy, contributing roughly 61% of national gross domestic product and absorbing the majority of the domestic workforce (Aponno & Siahaya, 2026). This position makes MSMEs both a driver of economic equity and a stabilizer of local livelihoods. Yet the same sector that anchors growth is also a meaningful source of environmental pressure: MSME activity was estimated to generate around 216 million tons of CO₂ in 2022 alone (Aponno & Siahaya, 2026). The resulting paradox is straightforward to state but difficult to resolve—MSMEs are expected to keep growing and competing while simultaneously adapting to increasingly strict sustainability expectations.

As market competition intensifies, innovation has become a decisive factor in MSME survival and competitiveness (Rachman et al., 2025). That innovation is no longer confined to product features or technology adoption; it is increasingly environmental in orientation, a shift commonly labeled green innovation. In broad terms, green innovation covers the development of products, production processes, and managerial practices intended to reduce environmental harm without eroding a firm's economic value (Padilla-Lozano & Collazzo, 2022). For MSMEs, this reorientation offers a route to new competitive ground, since consumer preference for environmentally responsible products continues to rise even as government regulation on sustainable business practice tightens.

Recent studies converge on the view that green innovation improves small-business performance—through lower operating costs, wider market share, and stronger reputation and customer loyalty (Sharma et al., 2025; Wei et al., 2023). In the Indonesian context specifically, green innovation has been linked to the growth of the MSME green economy nationally (Aponno & Siahaya, 2026) and to firm financial performance, mediated by accounting capability (Khusnah & Khoiriyah, 2025). Despite this promise, adoption at the MSME level continues to run into structural obstacles, including limited capital, restricted access to technology, and shallow owner understanding of sustainable business concepts (Achi et al., 2022).

Building on this background, the present paper conceptually examines the role of green innovation as a strategy for strengthening MSME competitiveness, drawing on national and international literature published between 2021 and 2026. The discussion is intended to contribute to the theoretical literature on sustainable entrepreneurship while offering practical implications for MSME owners, academics, and policymakers designing applicable green-transformation strategies.

LITERATURE REVIEW

The Concept of Green Innovation

Green innovation is generally defined as the development and application of products, processes, technologies, or business strategies that embed environmental-sustainability principles into everyday business activity (Sharma et al., 2025). The literature typically separates two core categories: green product innovation and green process innovation. The first centers on

products built from environmentally friendly, recyclable inputs with minimal hazardous residue; the second emphasizes efficient energy use, waste management, and cleaner production methods (Achi et al., 2022).

A third dimension frequently highlighted alongside these two is green management innovation—governance systems that embed an environmentally responsible work culture across raw-material sourcing, supply-chain management, and green marketing (Wibowo et al., 2023). These three dimensions are complementary rather than substitutable; treating green innovation as a single, isolated initiative undersells its value, which is realized more fully when integrated across the whole business model.

Green Innovation as a Dynamic Capability

Viewed through a resource-based lens, green innovation can be understood as a dynamic capability that lets a firm convert internal resources into a competitive advantage that rivals find difficult to replicate (Sohu et al., 2024, as cited in Sharma et al., 2025). This framing is particularly relevant for MSMEs: their limited scale, often treated as a constraint, can instead be offset by the flexibility to adopt contextual, innovative green practices without the large-scale technology investment that big firms require.

Because the present study synthesizes prior conceptual and empirical work rather than testing new hypotheses, it does not put forward formal propositions to be statistically verified. Instead, it organizes the reviewed evidence around the mechanisms through which green innovation is reported to shape MSME competitiveness, which are set out in the following section.

METHODOLOGY

This paper adopts a conceptual, literature-based method. Sources were drawn from peer-reviewed journals and conference proceedings published between 2021 and 2026, identified through targeted searches on green innovation, MSME competitiveness, and sustainable entrepreneurship. Priority was given to studies that examined the relationship between green innovation and small-business performance across different countries and sectors, including Indonesia, China, and India. The selected literature was read thematically and organized around four recurring mechanisms—cost, differentiation, market access, and reputation—before being synthesized into the discussion that follows. No primary data collection or statistical testing was undertaken; the contribution of the paper lies in organizing and interpreting existing evidence rather than generating new empirical measurements.

RESEARCH RESULT

Mechanisms Linking Green Innovation to Competitiveness

The reviewed literature points to four mechanisms through which green innovation supports MSME competitiveness. The first is operating-cost efficiency: cleaner and more energy-efficient production has been shown to reduce raw-material and energy spending, improving margins (Achi et al., 2022). The second is product differentiation: environmentally framed products carry distinct appeal for increasingly eco-conscious consumers, opening room

for premium pricing and a stronger bargaining position in the market (Padilla-Lozano & Collazzo, 2022).

The third mechanism is market-access expansion. A study of Chinese SMEs found that a green-innovation culture raised market performance by strengthening product and marketing innovation (Wei et al., 2023), a pattern echoed in Indonesian research linking green innovation to MSME sustainability performance (Rachman et al., 2025) and to national green-economy growth in the MSME sector (Aponno & Siahaya, 2026). The fourth mechanism is reputational and legitimacy strengthening: sustained social-responsibility and green-innovation practice builds stakeholder trust, reinforces brand image, and supports long-run customer loyalty (Achi et al., 2022). Table 1 summarizes these mechanisms alongside representative evidence.

Table 1. Mechanisms Linking Green Innovation to MSME Competitiveness

Mechanism	Representative Evidence
Operating-cost efficiency	Cleaner, energy-efficient production lowers input and energy costs (Achi et al., 2022)
Product differentiation	Environmentally framed products support premium pricing and stronger bargaining position (Padilla-Lozano & Collazzo, 2022)
Market-access expansion	Green innovation culture raises market performance among Chinese SMEs (Wei et al., 2023); similar effects reported in Indonesia (Rachman et al., 2025; Aponno & Siahaya, 2026)
Reputation and legitimacy	Consistent green and socially responsible practice builds stakeholder trust and brand image (Achi et al., 2022)

Evidence Across Business Contexts

In craft and textile MSMEs, green management practice has been shown to raise product competitiveness while supporting business continuity, illustrated by a batik-MSME empowerment program that integrated waste processing with cleaner production (Wibowo et al., 2023). In a broader setting, research on Indian SMEs found that pairing green innovation with a green-premium strategy sustained small firms despite limited resources and a narrow customer base (Sharma et al., 2025). Research conducted during the post-COVID-19 recovery period likewise found green innovation important for maintaining sustainable MSME business performance amid economic-crisis pressure (Sisca & Wijaya, 2023).

On the financing and governance side, research on green-economy-based digital transformation found that combining digital innovation with sustainability principles helped MSMEs manage market volatility while strengthening long-term competitiveness (Ratnawita et al., 2023). This is reinforced by evidence that Indonesian MSMEs combining digital transformation with a green-economy orientation have greater odds of

surviving and growing amid global competition (Islam et al., 2023). Taken together, this body of evidence indicates that green innovation functions less as a compliance response to regulatory pressure and more as a competitive strategy relevant across sectors and firm sizes.

DISCUSSION

The pattern that emerges from this review is that green innovation rarely acts through a single channel; cost savings, differentiation, market reach, and reputation tend to reinforce one another over time. A firm that lowers costs through cleaner production, for instance, is also better positioned to price a differentiated green product competitively, which in turn can widen market access as demand grows and further consolidate reputational gains. This reinforcing pattern helps explain why the reviewed studies find consistent, positive associations between green innovation and MSME performance across very different settings—batik producers in Indonesia, SMEs in India and China, and digitally oriented MSMEs navigating post-pandemic recovery.

At the same time, the resource-based view helps explain why scale need not be a barrier. Because green innovation for MSMEs often takes the form of incremental, context-specific adjustments—switching suppliers, adjusting process steps, or repositioning marketing—rather than large capital projects, smaller firms can adopt it in ways proportionate to their means. This is consistent with findings that link human-capital development and digitalization, rather than capital intensity alone, to stronger green-innovation outcomes (Khusnah & Khoiriyah, 2025; Aponno & Siahaya, 2026).

The evidence also suggests that green innovation works best as a deliberate, medium-to-long-term strategy rather than a one-off compliance measure. Where studies describe more durable gains—batik SME empowerment, Indian green-premium strategies, digitally integrated Indonesian MSMEs—green practice tends to be embedded in the business model rather than treated as an isolated project. This has a direct bearing on how MSME owners, financial institutions, and policymakers might sequence support: early, low-cost product and process adjustments can build the internal capability needed for later, more ambitious digital or financing-linked green strategies.

CONCLUSIONS AND RECOMMENDATIONS

This review indicates that green innovation plays a strategic role in strengthening MSME competitiveness through several interconnected mechanisms: lower operating costs, product differentiation, wider market access, and a stronger business reputation. Five years of literature show a consistent pattern across countries and sectors, confirming that green innovation has moved beyond being a response to environmental pressure to become one of the pillars of competitive strategy for MSMEs operating in a sustainability-oriented economy. Implementation nonetheless remains constrained by limited capital, uneven technology literacy, and policy support that has yet to catch up with these needs.

Addressing these constraints calls for coordinated action among MSME actors, financial institutions, universities, and government. Practically, MSMEs are advised to begin with affordable, incremental steps—sustainable product adjustments and leaner production processes—before layering on digitalization and green financing as capability grows. Financial institutions and policymakers, in turn, can support this trajectory by expanding flexible green-financing schemes and aligning fiscal incentives, digitalization subsidies, and vocational training with MSME needs.

ADVANCED RESEARCH

As a conceptual literature review, this paper does not include primary data and cannot establish causal effects or quantify the relative size of each mechanism. Future research would benefit from empirical, primary-data studies across MSME sectors and regions in Indonesia to test how strongly each mechanism—cost, differentiation, market access, and reputation—contributes to competitiveness in practice, and to identify which combinations of support (financing, training, digitalization) are most effective for firms at different stages of green-innovation adoption.

ACKNOWLEDGMENT

The author thanks colleagues at the Department of Entrepreneurship, Faculty of Economics and Business, Universitas Negeri Makassar, for their feedback during the preparation of this paper.

REFERENCE

- Achi, A., Adeola, O., & Achi, F. C. (2022). CSR and green process innovation as antecedents of micro, small, and medium enterprise performance: Moderating role of perceived environmental volatility. *Journal of Business Research*, 139, 771–781. <https://doi.org/10.1016/j.jbusres.2021.10.016>
- Anwar, S. U., Xu, J., Yuan, P. Z., Su, K., Ur Rehman, S., Hameed, M., Wen, M., & Li, F. (2024). Green entrepreneurial orientation and environmental performance: A moderated mediation perspective of perceived environmental innovation and stakeholder pressure. *Scientific Reports*, 14, 30266. <https://doi.org/10.1038/s41598-024-81885-y>
- Aponno, C., & Siahaya, S. L. (2026). Determinan pertumbuhan ekonomi hijau pada sektor UMKM Indonesia tahun 2020–2025. *Jurnal Administrasi Terapan*, 5(1), 41–52.
- Fildzah'Izzati, H. (2025). Digitalisasi UKM di Indonesia: Pendekatan strategis untuk mendorong adopsi teknologi berkelanjutan dalam perubahan bisnis modern. *Journal of Applied Digital Business Research*, 1(1), 85–103.

- Islam, A. A. A., Trinugroho, I., & Suryanto. (2023). SMEs' flight to digital and green economy: Evidence from Indonesia. *International Journal of Business and Society*, 24(1), 362–379. <https://doi.org/10.33736/ijbs.5622.2023>
- Khusnah, H., & Khoiriyah, L. (2025). Peran mediasi green innovation dan accounting capability pada pengaruh human capital terhadap kinerja keuangan UMKM di Kota Surabaya. *Accounting and Management Journal*, 9(1), 50–69. <https://doi.org/10.33086/amj.v9i1.7811>
- Padilla-Lozano, C. P., & Collazzo, P. (2022). Corporate social responsibility, green innovation and competitiveness—causality in manufacturing. *Competitiveness Review*, 32(7), 21–39. <https://doi.org/10.1108/CR-12-2020-0160>
- Rachman, A. B., Efani, A., & Atikawati, D. (2025). The impact of green innovation on corporate sustainability performance: A case study of micro, small, and medium-sized enterprises (MSMEs) in Malang City, Indonesia. *Jurnal Penelitian Pendidikan IPA*, 11(12). <https://doi.org/10.29303/jppipa.v11i12.13267>
- Ratnawita, Nengsih, W., & Latifah Jusdienar, A. (2023). Inovasi digital berbasis green economy sebagai strategi UMKM menghadapi volatilitas pasar. *Ikraith-Ekonomika*, 8(3), 416–425. <https://doi.org/10.37817/ikraith-ekonomika.v8i3.5436>
- Sharma, R., Gunasekaran, A., Sharma, M., & Luthra, S. (2025). Building a sustainable future: The role of green innovation and green premium in transforming Indian SMEs. *Environment, Development and Sustainability*. <https://doi.org/10.1007/s10668-025-06515-7>
- Sisca, S., & Wijaya, A. (2023). The role of green innovation to achieve sustainable business performance of MSMEs in the Covid-19 pandemic. *International Journal of Science, Technology & Management*, 4(1), 228–232. <https://doi.org/10.46729/ijstm.v4i1.750>
- Wei, C., Cai, X., & Song, X. (2023). Towards achieving the sustainable development goal 9: Analyzing the role of green innovation culture on market performance of Chinese SMEs. *Frontiers in Psychology*, 13, Article 1018915. <https://doi.org/10.3389/fpsyg.2022.1018915>
- Wibowo, N. M., Widiastuti, Y., Siswadi, S., Ni'am, A. C., Wijaya, R. M. A., Puteramika, A., Ghifari, F. H., & Putri, I. S. (2023). Increasing the empowerment of Batik SMEs through the implementation of green management. In Y. Chen, M. R. Bustami, S. Sawai, A. Iriany, & D. Sedláček

(Eds.), Proceedings of the International Conference for Community Service Program.