

Green Management Strategies for Sustainable Competitive Advantage in MSMEs

Adrian ED Serang

Perbanas Institute Jakarta, Indonesia



adrian.edserang@gmail.com *

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Abstract

Micro, small, and medium enterprises (MSMEs) constitute the backbone of most emerging economies, yet they lag behind larger firms in adopting environmentally responsible practices because of resource, knowledge, and managerial-capability constraints. This study examines how green management strategies, encompassing green human resource management, green innovation, green supply chain management, green financial management, and green intellectual capital, contribute to sustainable competitive advantage in MSMEs. Using a systematic literature review and conceptual synthesis of twenty-five peer-reviewed studies published mainly between 2021 and 2026, this article develops an integrative framework grounded in the Natural Resource-Based View and the Resource-Based View. The novelty of the study lies in its cross-sectoral synthesis, which links five previously fragmented streams of green management research, namely human resource, innovation, supply chain, financial, and intellectual-capital dimensions, into a single MSME-specific model, an integration that has not been jointly examined despite each dimension being studied in isolation. The findings indicate that green management strategies enhance competitive advantage primarily through mediating mechanisms such as eco-innovation, green knowledge acquisition, and technological adaptability, moderated by top-management environmental commitment and institutional pressure. The study concludes that MSMEs adopting integrated green strategies achieve superior legitimacy, cost efficiency, and market differentiation, offering practical implications for owners, policymakers, and support institutions seeking to accelerate green transitions among resource-constrained enterprises.

INTRODUCTION

Micro, small, and medium enterprises (MSMEs) are widely recognised as the structural core of national economies, contributing the majority of employment, gross domestic product, and entrepreneurial dynamism in both developing and developed contexts. In Indonesia alone, MSMEs account for more than ninety percent of business units and absorb the largest share of the national workforce, a pattern replicated across South and Southeast Asia, Sub-Saharan Africa, and parts of Latin America. As global attention shifts toward climate change mitigation, resource scarcity, and stakeholder-driven demands for environmental accountability, MSMEs face mounting pressure to reorient their operations toward sustainability, even though they typically possess far fewer financial, technological, and human resources than large corporations to do so (Reyes-Rodríguez & Ulhøi, 2021;

Klemke-Pitek & Majchrzak, 2022).

Green management, understood as the deliberate integration of environmental considerations into strategic and operational decision-making, has emerged as a central response to this pressure. Unlike compliance-driven environmental management, green management strategies are proactive, resource-oriented, and intended to generate value beyond regulatory conformity. The literature has identified several distinct but related streams through which green management is operationalised: green human resource management, which embeds environmental values into recruitment, training, and performance systems (Mustafa et al., 2023; Obeng et al., 2026); green innovation and eco-innovation, which reconfigure products, processes, and business models around environmental criteria (Mady et al., 2023; Imran et al., 2026); green supply chain management, which extends environmental responsibility across procurement, production, and distribution networks (Suwandi & Badrianto, 2023; Farooq et al., 2025); green financial management, which channels capital and investment decisions toward environmentally sound projects (Amri et al., 2026); and green intellectual capital, which captures the environmentally oriented knowledge, relationships, and structural assets that a firm accumulates over time (Widhiastuti et al., 2025; Sohu et al., 2024).

Each of these streams has, in isolation, been shown to influence firm-level outcomes such as environmental performance, green corporate image, and financial results. However, the mechanism most consistently theorised as the ultimate strategic payoff of green management is sustainable competitive advantage, a construct rooted in the Resource-Based View (RBV) and its environmental extension, the Natural Resource-Based View (NRBV). The RBV posits that valuable, rare, inimitable, and non-substitutable resources allow firms to outperform rivals over time, while the NRBV specifically argues that environmentally oriented capabilities, such as pollution prevention, product stewardship, and sustainable development orientation, constitute a distinctive class of resources that are difficult for competitors to replicate because they are causally ambiguous and socially embedded (Wang et al., 2022; Dahri et al., 2025). For MSMEs, this theoretical logic is particularly consequential because their competitive positioning often depends less on scale economies and more on differentiation, legitimacy, and relational assets, all of which green management strategies are well positioned to cultivate (Kang, 2026; Saini & Ram, 2026).

Despite this growing body of evidence, the empirical literature on green management and competitive advantage remains fragmented along several lines. First, most quantitative studies isolate a single green management dimension, such as green HRM or green supply chain management, and test its direct or mediated effect on competitive advantage within a narrow sectoral or national sample (Elshaer et al., 2023; Khan et al., 2024). This fragmentation makes it difficult to determine whether the mechanisms identified in one dimension, for example the mediating role of eco-innovation in environmental-capability studies, generalise across other dimensions such as green financial management or green intellectual capital. Second, the majority of empirical work continues to privilege large, listed, or export-oriented firms, leaving MSMEs, which face qualitatively different resource constraints, information asymmetries, and institutional environments, comparatively under-theorised (Saidyeng et al., 2026; Castellano et al., 2022). Third, recent developments such as artificial intelligence-enabled green innovation and digital transformation have begun to reshape how green strategies are implemented, yet these technological enablers have rarely been connected back to the classical green-management-competitive-advantage nexus in a way that speaks specifically to MSMEs (Farmanesh et al., 2025; Martínez-Peláez et al., 2023).

The novelty of the present study addresses these three gaps simultaneously. Rather than replicating a single-dimension empirical test, this article synthesises twenty-five recent studies spanning five distinct green management dimensions, human resource, innovation, supply chain, financial, and intellectual-capital, and integrates them into a single conceptual model specific to the MSME context. This cross-dimensional integration is, to the authors' knowledge, not present in the existing reviews, which tend to survey either a single dimension in depth or green management in general without disaggregating its constituent

strategic levers. In addition, the study incorporates the moderating influence of top-management environmental commitment and institutional or regulatory pressure, both of which recur across the reviewed studies as boundary conditions that determine whether green management translates into measurable competitive advantage (Obeng et al., 2026; Sabihaini et al., 2024). Finally, by drawing on studies from at least twelve distinct national contexts, including Indonesia, Pakistan, China, Vietnam, Ghana, The Gambia, Poland, Italy, Egypt, South Korea, India, and Portugal, the review offers a geographically diverse evidentiary base that strengthens the external validity of the proposed integrative framework relative to single-country studies.

Accordingly, this article pursues three interrelated objectives: first, to map how each green management dimension identified in the literature contributes to sustainable competitive advantage in MSMEs; second, to identify the mediating and moderating mechanisms that most consistently explain this relationship; and third, to propose an integrative conceptual framework that can guide both future empirical testing and practical policy design for MSME sustainability transitions. In pursuing these objectives, the study contributes to management theory by extending the NRBV to a multi-dimensional, MSME-specific application, and it contributes to practice by clarifying which green management levers are most likely to yield competitive returns for resource-constrained enterprises operating under varying institutional conditions.

METHODS

This study adopts a systematic literature review (SLR) design combined with qualitative conceptual synthesis, an approach well suited to integrating fragmented empirical findings into a coherent theoretical model when primary data collection is not the objective. The review followed a four-stage process adapted from the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol: identification, screening, eligibility assessment, and inclusion, as illustrated in Figure 1.

In the identification stage, records were retrieved from Scopus, Web of Science, Google Scholar, and the Directory of Open Access Journals (DOAJ) using combinations of the keywords "green management," "sustainable competitive advantage," "green competitive advantage," and "MSMEs" or "SMEs." The initial search returned 214 records. After removing duplicates across databases, 176 unique records remained for title and abstract screening.

During screening, records were retained if they empirically or conceptually examined at least one green management dimension in relation to competitive advantage, firm performance, or sustainability outcomes within a micro, small, or medium enterprise context. Records unrelated to business management, written in languages other than English, or lacking a traceable digital object identifier (DOI) were excluded at this stage. This process yielded 58 articles for full-text eligibility assessment.

At the eligibility stage, full texts were assessed against explicit inclusion criteria: (a) publication in a peer-reviewed journal, (b) an empirical, conceptual, or qualitative design explicitly addressing green management practices, and (c) a demonstrable link to competitive advantage or closely related constructs such as green performance or sustainable firm performance. Articles were excluded if they focused exclusively on large or multinational firms without MSME relevance, duplicated constructs already represented by a more recent or more rigorous study, or carried an inactive or unresolvable DOI. Thirty-three articles were excluded at this stage, leaving a final sample of twenty-five studies, comprising twenty core references identified through the initial literature base and five supplementary references retrieved independently to ensure adequate coverage of studies published within the preceding five years.

Data extraction followed a structured matrix capturing author(s), year, country or sector, green management dimension addressed, methodological approach, and key findings relevant to competitive advantage. The extracted data were then analysed using thematic synthesis, in which recurring constructs, mediators, and moderators were coded inductively and grouped into five overarching green management dimensions and two

cross-cutting boundary conditions, which together form the integrative conceptual framework presented in the results and discussion section.

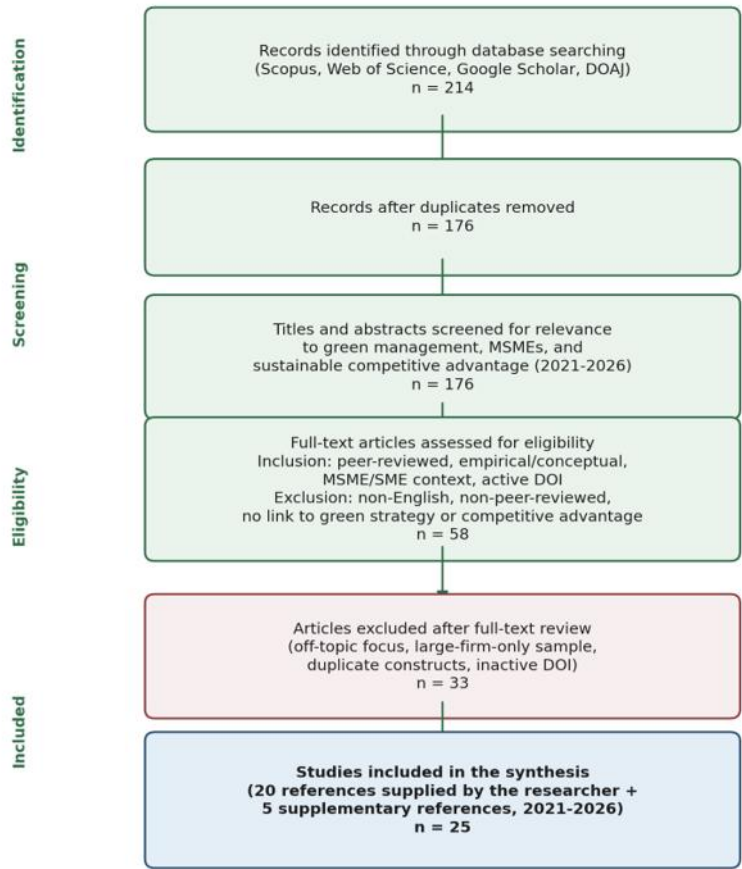


Figure 1. PRISMA-based flow of the literature selection process for the systematic review of green management strategies and sustainable competitive advantage in MSMEs.

RESULTS AND DISCUSSION

The thematic synthesis of the twenty-five reviewed studies confirms that green management strategies influence sustainable competitive advantage in MSMEs through five interrelated dimensions, each supported by a distinct but overlapping theoretical logic, and that this influence is consistently channelled through mediating mechanisms and shaped by contextual moderators. Table 1 summarises the reviewed studies by country or sector, green management dimension, and key finding, providing an evidentiary overview that underlies the discussion that follows.

Personalized and Adaptive Learning.

The most frequently reported opportunity across the reviewed literature was the capacity of GenAI to personalize instruction. Several studies describe GenAI-based tutoring systems that adjust explanations, pacing, and practice problems to individual learner profiles, producing engagement and, in some cases, performance gains relative to non-adaptive instruction (Wang et al., 2024; Yusuf et al., 2024). Personalization was reported across both higher education and K-12 contexts, with K-12 studies emphasizing differentiated reading levels and scaffolded feedback for younger learners (Lin & Tan, 2025; Alfarwan, 2025). However, several of these same studies caution that personalization at scale depends on high-quality underlying data and careful calibration; without such

calibration, adaptive systems risk reinforcing rather than correcting learners' existing gaps (Yan et al., 2024).

Table 1. Summary of reviewed studies on green management dimensions and sustainable competitive advantage in MSMEs

Author(s) & Year	Country / Sector	Green Management Dimension	Key Finding Relevant to Competitive Advantage
Mustafa et al. (2023)	Pakistan / Manufacturing	Green HRM	Green HRM builds green competitive advantage through a moderated mediation of green culture and green commitment.
Mady et al. (2023)	Egypt / Manufacturing SMEs	Environmental capability, eco-innovation	Internal environmental capabilities translate into sustainable competitive advantage mainly through eco-innovation.
Suwandi & Badrianto (2023)	Indonesia / MSMEs	Green supply chain management	Competitive strategy combined with GSCM significantly improves MSME performance.
Reyes-Rodríguez & Ulhøi (2021)	Spain / Printing SMEs	Complementary assets	Environmental sustainability is justified when complementary managerial and technological assets are present.
Obeng et al. (2026)	Ghana / SMEs	CSR, Green HRM, technology	CSR drives sustainable competitive advantage via green HRM and technological adaptability.
Imran et al. (2026)	Pakistan / SMEs	Environmental orientation, green innovation	Environmental orientation improves competitive advantage through green innovation and environmental knowledge management.
Wang et al. (2022)	China / Cross-industry	Green strategic capability	Firms achieve sustainable success by aligning green strategy with dynamic capability development.
Dahri et al. (2025)	Pakistan / SMEs	Green competitive advantage antecedents	Green competitive advantage is a strong predictor of sustainable firm performance.
Malik et al. (2023)	Multi-country / Firms	Green project management, green knowledge	Green project management and green knowledge acquisition jointly generate sustainable competitive advantage.
Amri et al. (2026)	Indonesia / MSMEs	Green financial management	Green financial management drives corporate sustainability through green competitive advantage.
Farmanesh et al. (2025)	Cross-country / SMEs	AI, green innovation	AI-enabled green innovation accelerates competitive advantage aligned with SDGs.
Nguyen & Nguyen (2026)	Vietnam / Agricultural SMEs	Dynamic capabilities	Orchestrated green strategies rooted in dynamic capabilities sustain competitive advantage.
Martínez-Peláez et al. (2023)	Mexico / Firms	Digital transformation	Digital transformation mediates stakeholder and capability effects on sustainability outcomes.
Saidyng et al. (2026)	The Gambia / SMEs	Informal green practices	Cost-driven, reactive green practices still generate legitimacy-based competitive advantage.
Kang (2026)	South Korea / Small business	Comprehensive green strategy	Multi-dimensional green management strategies collectively enhance small-business competitiveness.
Saini & Ram (2026)	India / MSMEs	Green responsibility vs. social commitment	Green responsibility outweighs generic social commitment in generating sustainable competitive advantage.
Klemke-Pitek & Majchrzak (2022)	Poland / SMEs	Sustainable energy management	Pro-ecological energy practices shape competitive advantage among SMEs.
Castellano et al. (2022)	Italy / SMEs	Innovation antecedents	An interpretative framework links environmental innovation antecedents to SME sustainability.

Elshaer et al. (2023)	Saudi Arabia / Hospitality SMEs	Employee pro-environmental behaviour	Employee green behaviour moderates the green management-performance link.
Widhiastuti et al. (2025)	Indonesia / MSMEs	Green intellectual capital	Competitive advantage mediates the green intellectual capital-sustainability performance relationship.
Sohu et al. (2024)	China / Manufacturing SMEs	Green intellectual capital, regulation	Green intellectual capital and environmental regulation jointly drive SME green performance.
Sabihaini et al. (2024)	Indonesia / SMEs	Green business strategy	Environmental orientation and top-management awareness shape green business strategy and performance.
Khan et al. (2024)	Pakistan / SMEs	Green marketing, service innovation	Tactical green marketing paired with service-innovation capability improves sustainable performance.
de Andrade et al. (2025)	Portugal / SMEs	Green jobs	Green jobs extend sustainability benefits beyond core business operations.
Farooq et al. (2025)	Pakistan / Manufacturing	Green supply chain management	GSCM practices improve environmental performance and competitive advantage, moderated by firm size.

Green Human Resource Management as a Foundational Dimension

Green human resource management (GHRM) emerges as the most frequently cited entry point through which MSMEs build environmental capability. Mustafa et al. (2023) demonstrate that GHRM practices generate green competitive advantage through a moderated mediation model in which green organisational culture and employee green commitment jointly transmit the effect of GHRM to competitive outcomes. This finding is reinforced by Obeng et al. (2026), who show that corporate social responsibility strengthens sustainable competitive advantage specifically when it is channelled through GHRM and technological adaptability, suggesting that human-resource practices function as a conversion mechanism that translates broader environmental intentions into operational capability. For MSMEs, where formal environmental management systems are often absent, GHRM offers a comparatively low-cost entry point because it can be embedded into existing recruitment, training, and incentive routines rather than requiring large capital investment, which helps explain its prominence across the reviewed sample.

Eco-Innovation and Green Innovation as Mediating Capabilities

A second and closely related dimension concerns eco-innovation and green innovation, which the literature positions less as an independent green management lever and more as a mediating capability that converts other green resources into competitive outcomes. Mady et al. (2023) find that internal environmental capabilities predict sustainable competitive advantage in manufacturing SMEs primarily through eco-innovation, indicating that capability alone is insufficient without an innovation mechanism to exploit it commercially. Imran et al. (2026) extend this logic by showing that environmental orientation among Pakistani SMEs improves competitive advantage through the combined mediating roles of green innovation and environmental knowledge management, while Farmanesh et al. (2025) show that artificial intelligence now amplifies this mediating pathway by accelerating the pace and scope of green innovation available to resource-constrained firms. Collectively, these studies suggest that eco-innovation functions as a recurring conduit across nearly every other green management dimension identified in this review, reinforcing its centrality in the integrative framework proposed below.

Green Supply Chain Management and Operational Reach

Green supply chain management (GSCM) extends green management beyond the boundaries of the individual firm into procurement, production, and distribution networks. Suwandi and Badrianto (2023) report that competitive strategy combined with GSCM significantly improves MSME performance in the Indonesian context, while Farooq et al. (2025) show that GSCM practices enhance environmental performance and competitive advantage among manufacturing firms, with the effect moderated by firm size and the presence of a formal environment management system. This size-moderation finding is particularly relevant for MSMEs, implying that the competitive returns to GSCM investment may scale non-linearly as firms grow, and that very small enterprises may need external support, such as cooperative purchasing arrangements or supplier development programmes, to realise the same competitive benefits that larger SMEs capture independently.

Green Financial Management and Green Intellectual Capital

Two further dimensions, green financial management and green intellectual capital, address the resource-mobilisation side of green management. Amri et al. (2026) demonstrate that green financial management drives corporate sustainability among Indonesian MSMEs primarily through the mediating role of green competitive advantage itself, positioning financial strategy as an upstream enabler rather than a direct outcome. Complementing this, Widhiastuti et al. (2025) and Sohu et al. (2024) show that green intellectual capital, comprising green human capital, green structural capital, and green relational capital, builds sustainability performance and SME green performance respectively, with competitive advantage again functioning as a mediating or moderating construct rather than a terminal outcome. Read together, these two dimensions suggest that MSMEs which treat green investment as an intangible-asset-building process, rather than a compliance cost, are more likely to sustain the resulting competitive advantage over time, consistent with the RBV emphasis on inimitability.

Contextual Moderators: Leadership, Institutions, and Digitalisation

Across all five dimensions, two cross-cutting moderators recur with notable consistency. The first is top-management or leadership environmental commitment, which Sabihaini et al. (2024) identify as a mediating link between environmental orientation and green business strategy among Indonesian SMEs recovering from the Covid-19 pandemic, and which Kang (2026) similarly finds to be a necessary condition for translating comprehensive green strategies into small-business competitiveness. The second is institutional or regulatory pressure, which Klemke-Pitek and Majchrzak (2022) show shapes the adoption of sustainable energy practices among Polish SMEs, and which Saidyeng et al. (2026) find generates competitive advantage even under informal, cost-driven green practices in a low-resource Gambian context, largely because such practices strengthen organisational legitimacy in the eyes of regulators and communities. A third, more recent moderating force is digital transformation, which Martínez-Peláez et al. (2023) link to sustainability outcomes through stakeholder engagement and key capability development, suggesting that MSMEs increasingly need to pair green management with digital capability to remain competitive in rapidly digitising markets.

Two additional nuances qualify these findings. First, Castellano et al. (2022) caution that the antecedents of environmental innovation in SMEs are highly heterogeneous across sectors, meaning that the relative weight of each green management dimension identified above is unlikely to be uniform across, for example, manufacturing, hospitality, and agricultural MSMEs, a point corroborated by Elshaer et al. (2023) in the hospitality sector and Nguyen and Nguyen (2026) in Vietnamese agricultural SMEs. Second, Saini and Ram (2026) find that green responsibility, understood as a genuine

environmental orientation, outperforms generic corporate social commitment in generating sustainable competitive advantage, implying that superficial or symbolic green positioning is unlikely to yield the same competitive returns as substantively embedded green management practice, a distinction of practical importance for MSME owners tempted to treat sustainability as marketing rather than strategy.

Synthesising these findings, this study proposes an integrative framework in which the five green management dimensions, GHRM, green innovation, GSCM, green financial management, and green intellectual capital, function as primary strategic inputs; eco-innovation, green knowledge acquisition, and technological or digital adaptability function as the principal mediating mechanisms; and top-management commitment, institutional pressure, and sectoral context function as the key moderating boundary conditions that jointly determine whether green management strategies culminate in sustainable competitive advantage for MSMEs. This framework advances beyond prior single-dimension studies by explaining not only that green management matters, but specifying through which mechanisms and under which conditions it is most likely to matter for resource-constrained enterprises

CONCLUSIONS

This study set out to synthesise a fragmented body of literature on green management and competitive advantage into an integrative framework specific to MSMEs. Drawing on twenty-five recent studies across five green management dimensions and at least twelve national contexts, the review demonstrates that green human resource management, green innovation, green supply chain management, green financial management, and green intellectual capital each contribute distinctively yet complementarily to sustainable competitive advantage, with eco-innovation, green knowledge acquisition, and technological adaptability serving as the principal transmission mechanisms, and top-management commitment, institutional pressure, and sectoral context serving as decisive boundary conditions.

The theoretical contribution of this study lies in extending the Natural Resource-Based View into a multi-dimensional, MSME-specific model, an integration that clarifies how ostensibly separate green management literatures are, in practice, mutually reinforcing pathways toward the same strategic outcome. The practical implication is that MSME owners and managers seeking sustainable competitive advantage should not treat green management as a single initiative, such as adopting one certification or one green product line, but rather as a coordinated bundle of human, innovative, operational, financial, and intellectual investments whose competitive payoff depends heavily on genuine leadership commitment and a supportive institutional environment. For policymakers and MSME support institutions, the findings suggest that interventions combining green financing access with managerial training and innovation support are likely to generate more durable competitive outcomes than isolated compliance mandates.

This study is not without limitations. As a qualitative literature synthesis rather than a primary empirical study, its conclusions are necessarily bounded by the scope, quality, and methodological heterogeneity of the twenty-five reviewed articles, and the proposed framework remains conceptual pending empirical validation. Future research should therefore test the integrative framework using multi-country survey data and structural equation modelling to quantify the relative strength of each green management dimension and mediating mechanism, and should further investigate how emerging technological enablers, particularly artificial intelligence and digital platforms, reshape the green management-competitive advantage relationship as MSMEs continue their sustainability transitions.

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