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The Role Of Artificial Intelligence In Improving The Performance Of Green Marketing For SMEs

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Abstract: *Artificial Intelligence (AI) has emerged as a transformative force in the evolution of digital marketing, particularly for small and medium-sized enterprises (SMEs) striving to integrate sustainability into their competitive strategies. This study analyses the contribution of AI technologies to enhancing the performance and efficiency of green marketing initiatives within SMEs operating in the digital economy. The research employs a systematic literature review method by synthesizing peer-reviewed publications from 2020 to 2025. The findings demonstrate that AI-driven applications—such as machine learning, predictive analytics, and automated engagement systems—enable SMEs to personalize eco-oriented messages, identify environmentally conscious consumer segments, and measure campaign outcomes with higher precision. Moreover, the adoption of AI supports improvements in resource efficiency, targeting accuracy, and assessment of both social and environmental impacts. The evidence further indicates that SMEs utilizing AI in sustainable marketing experience increased customer loyalty, stronger brand reputation, and greater long-term competitiveness. Despite these benefits, several challenges remain, including limited digital readiness, high implementation costs, and insufficient technological capabilities among SMEs. Overall, integrating AI into green marketing practices presents a promising pathway for SMEs to achieve sustainable growth while meeting the expectations of environmentally aware consumers in the digital era. Future research is encouraged to develop affordable and user-friendly AI tools tailored to the marketing needs of small businesses.*
Keywords*: Artificial Intelligence, Green Marketing, SMEs, Sustainability, Digital Economy*

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) technologies has transformed business operations, marketing strategies, and decision-making processes across various industries. For small and medium-sized enterprises (SMEs), digital transformation offers both opportunities and challenges, especially in aligning technological adoption with sustainable practices. As global awareness of environmental degradation and resource efficiency continues to rise, many SMEs are under increasing pressure to integrate green marketing strategies into their business models to maintain competitiveness and consumer trust (Maduwinarti et al., 2025; Ni & Abdullah, 2025).

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Green marketing, defined as the promotion of products and practices designed to minimize environmental impact, has become a strategic tool for enterprises seeking long-term sustainability. However, the effectiveness of green marketing among SMEs often remains limited by financial constraints, lack of expertise, and low technological readiness (Rachman et al., 2025). In this context, AI emerges as a transformative enabler capable of optimizing marketing processes, improving targeting precision, and enhancing customer engagement through data-driven personalization (Hamza Farooq et al., n.d.). AI applications—such as machine learning, predictive analytics, and automated recommendation systems—have enabled marketers to understand consumer preferences, segment audiences, and evaluate the environmental impact of campaigns in real time(Golzarjannat & Gustafsson, 2025; Husni et al., 2025).

Recent studies highlight that the integration of AI into sustainability-oriented marketing can strengthen an organization's adaptive capabilities and strategic flexibility (Agostini et al., n.d.; Orioli & Veríssimo, 2024). In particular, bibliometric and systematic reviews reveal growing interest in exploring how technological innovations contribute to sustainable business competitiveness (Maduwinarti et al., 2025; Ni & Abdullah, 2025). However, despite the evident potential of AI, the literature still lacks a consolidated synthesis focusing specifically on how AI applications enhance the performance of green marketing within the SME context. Most existing studies either discuss AI adoption for general marketing or explore sustainability strategies without explicitly linking both domains (Pooe et al., n.d.; Rahma Dianti et al., n.d.). This fragmentation limits comprehensive understanding of how AI-driven tools can support SMEs in achieving environmental and economic objectives simultaneously.

Another key issue concerns the disparity between large corporations and SMEs in technology adoption. While large enterprises can invest heavily in AI-driven marketing systems, SMEs often face resource limitations, insufficient digital skills, and unclear return on investment (Golzarjannat & Gustafsson, 2025; Husni et al., 2025). Consequently, many SMEs remain in the early stages of digital transformation, unable to fully exploit AI's potential in promoting environmentally sustainable initiatives. Addressing these constraints is crucial to ensure that sustainability transitions are inclusive across all business scales.

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Given these challenges, this study aims to systematically analyze how AI contributes to improving the efficiency and effectiveness of green marketing strategies among SMEs in the digital economy. By conducting a systematic literature review (SLR) of scholarly articles published between 2020 and 2025, this paper synthesizes findings from previous research to identify the main drivers, benefits, and challenges of AI adoption in sustainable marketing. Specifically, the study seeks to:

1. Examine the extent to which AI technologies enhance the performance of green marketing initiatives in SMEs;
2. Identify the types of AI applications most relevant to sustainability oriented marketing; and
3. Explore the key barriers preventing SMEs from adopting AI to achieve long-term competitiveness.

The contributions of this paper are threefold. First, it consolidates fragmented literature on AI and green marketing to provide an integrative understanding of their intersection within the SME context. Second, it highlights the mechanisms through which AI improves green marketing performance—such as personalization, resource efficiency, and environmental impact evaluation. Third, it proposes a future research agenda for developing affordable, user-friendly AI tools to support sustainability-driven SMEs. The remainder of this paper is structured as follows: Section 2 reviews related literature and theoretical foundations; Section 3 outlines the systematic review methodology; Section 4 presents and discusses the results; and Section 5 concludes with implications and recommendations for future research.

METHOD

Research Design

This study adopts a Systematic Literature Review (SLR) approach to synthesize empirical evidence on how organizational and technological capabilities influence the successful adoption of Artificial Intelligence (AI) in enhancing green marketing performance among small and medium-sized enterprises (SMEs). The review aims to integrate theoretical and empirical insights to explain how AI-driven technologies strengthen sustainable marketing efficiency, eco-branding, and customer loyalty within SMEs.

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Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, this SLR was conducted through three major stages planning, conduction, and reporting to ensure methodological transparency and reproducibility. The research design was guided by a clearly defined research question (RQ2):

"What organizational and technological capabilities influence the successful adoption of Artificial Intelligence for enhancing green marketing performance among SMEs?"

This review not only identifies the impact of AI adoption but also explores the mediating role of organizational and technological readiness as enablers of sustainable marketing performance (Golzarjannat & Gustafsson, 2025; Husni et al., 2025).

Formatting of Mathematical Components

To ensure conceptual clarity, the study employed the PICOCS framework (Population, Intervention, Comparison, Outcome, Context, and Study type) to define the scope of inclusion.

Element	Description
P (Population)	SMEs operating in diverse industries that apply or intend to adopt AI-based marketing solutions
I (Intervention)	Adoption of AI technologies in green or sustainable marketing activities (e.g., CRM automation, predictive analytics, eco-branding tools).
C(Comparason)	SMEs with limited or no AI integration in their marketing processes.
O (Outcome)	Improvement in green marketing performance indicators such as campaign efficiency, eco-brand image, and customer loyalty.
C (Context)	Organizational and technological capabilities mediating AI adoption (e.g., digital infrastructure, innovation culture, leadership).
S (Study Type)	Empirical and review-based research (qualitative, quantitative, mixed-method, or systematic literature review).

The inclusion of PICOCS ensures that all selected studies align with the research focus on how AI interacts with organizational and technological capabilities to promote sustainable marketing outcomes.

Search Strategy

A comprehensive literature search was carried out in Scopus, Web of Science, ScienceDirect, Emerald Insight, MDPI, and Google Scholar**.** The search covered publications from January 2020 to April 2025 to capture the latest research trends. The Boolean query string was refined based on the log research document as follows:

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("Artificial Intelligence" OR "machine learning") AND ("green marketing" OR "sustainable marketing") AND ("SMEs" OR "small and medium enterprises") AND ("organizational capability" OR "technological capability" OR "AI readiness")

The search focused exclusively on peer-reviewed journal articles and conference papers in English or Indonesian. Reference lists of selected articles were also screened manually to identify additional relevant studies (Maduwinarti et al., 2025; Ni & Abdullah, 2025).

Inclusion and Exlusion Criteria

Based on the established SLR protocol, the inclusion and exclusion criteria were structured to ensure relevance and quality:

Inclusion criteria:

1. Studies published between 2020-2025;

2. Focus on AI use in green or sustainable marketing;

3. Discuss organizational and/or technological capabilities influencing AI adoption;

4. Empirical or review-based studies with clear methodological descriptions;

5. Contextualized within SMEs or micro-enterprises.

a. Exlusion criteria:

6. Non-peer-reviewed or grey literature;

7. Studies unrelated to sustainability or marketing;

8. Research focusing solely on large corporations or non-SME contexts;

9. Articles without methodological transparency.

This process ensured that the final dataset represented high-quality, conceptually relevant research (Agostini et al., n.d.; Rachman et al., 2025).

Study Selection and Data Extraction

The initial database search yielded 226 articles. After duplicate removal and sequential screening (title/abstract and full-text), a total of 30 eligible studies were retained for detailed analysis. Each selected article was coded based on:

1. Author(s), year, and publication source;
2. Research objectives and country of origin;
3. AI technology type and applicatioin domain;

4. Organizational or technological capability examined;
5. Reported outcomes on green marketing performance.

The extracted data were compiled into a structured matrix for cross-comparison and synthesis (Hamza Farooq et al., n.d.; Orioli & Veríssimo, 2024).

Quality Assessment and Analytical Approach

A quality appraisal was conducted using three dimensions: (1) methodological transparency, (2) theoretical alignment, and (3) data validity. Studies meeting at least two of these three criteria were retained to maintain analytical rigour (Husni et al., 2025; Sarri et al., 2020).

The synthesis employed thematic and descriptive analysis to identify patterns in how AI adoption interacts with organizational and technological capabilities to enhance sustainable marketing outcomes. Thematic coding categorized findings into five clusters:

1. Digital infrastructure and AI readliness
2. Leadership and innovation culture,
3. Human resource capability,
4. Technological integration and data analytics
5. Green marketing outcomes (efficiency, loyalty, eco-branding).

Descriptive statistics were also used to summarize research distribution by year, geography, and methodological type. The combination of these techniques ensured a comprehensive understanding of both conceptual linkages and empirical evidence connecting AI, organizational capability, and sustainable marketing in SMEs (Maduwinarti et al., 2025; Sánchez et al., 2025).

RESULT AND DISCUSSION

Figures and Tables

The systematic search identified 226 records across major databases, which after screening and duplicate removal, resulted in 30 final studies meeting the inclusion criteria. These studies were published between 2020 and 2025, illustrating a growing scholarly focus on the convergence between Artificial Intelligence (AI), green marketing, and SME sustainability.

The publication trend revealed a sharp rise in related research after 2022, coinciding with increased global attention toward digital sustainability and Industry 5.0 transformation. Most

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studies were published in journals under Emerald Publishing, MDPI, F1000Research, and Cogent OA, highlighting that this topic is gaining traction in high-impact business and management outlets (Maduwinarti et al., 2025; Ni & Abdullah, 2025).

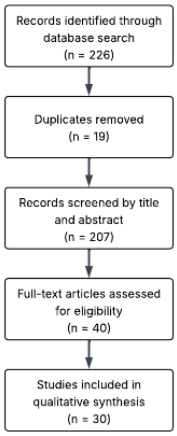

***Figure 1**. PRISMA Flow Diagram of the Study Selection Process.*

No	Author(s), Year	Source	Focus / Objective	Method
1	Maduwinarti et al. (2025)	Cogent Business and Management	Green marketing & social media in Southeast Asia	Bibliometric
2	Ni & Abdullah (2025)	Cogent Business and Management	Absorptive capacity in green context	Bibliometric
3	Golzarjannat & Gustafsson (2025)	journal of Financial Regulation and Compliance	Regulatory technologies for sustainability compliance	Multivocal Review
4	Husni et al. (2025)	F1000Research	Data analytics adoption	SLR
5	Farooq et al. (n.d.)	SSRN	AI and innovation in entrepreneurship	SLR
6	Orioli & Veríssimo (2024)	Benchmarking	Organizational capabilities in sustainable SCM	Cluster Analysis
7	Sánchez et al. (2025)	Applied Sciences (MDPI)	AI adoption in SMEs using TOE–DOI framework	Survey

***Table 1**. Summary of Reviewed Studies (2020-2025)*

Thematic Results and Cluster Interpretation

The thematic analysis identified five dominant clusters emerging across the reviewed studies, representing the conceptual structure of AI adoption in green marketing for SMEs.

Cluster 1: AI Readiness and Digital Infrastructure

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AI readiness—including digital infrastructure, connectivity, and analytics capability serves as the foundation for successful AI adoption. Studies highlight that SMEs with well developed digital systems are better positioned to integrate AI into marketing processes (Golzarjannat & Gustafsson, 2025; Husni et al., 2025). Adequate digital infrastructure allows real-time analytics, reduces material waste, and enhances decision-making accuracy. Conversely, low digital literacy and limited resources are major inhibitors in emerging economies (Pooe et al., n.d.).

Cluster 2: Organizational Capabilities and Leadership

Effective AI adoption is contingent upon organizational leadership and cultural readiness. Firms led by managers with strong digital vision tend to implement AI tools more successfully, aligning them with sustainability objectives(Agostini et al., n.d.; Orioli & Veríssimo, 2024). An innovation-oriented culture enhances flexibility and resilience, while continuous learning programs foster staff acceptance of technological change (Sarri et al., 2020).

Cluster 4: Green Marketing Performance Outcomes

AI-driven marketing systems significantly enhance green marketing performance indicators such as customer loyalty, brand trust, and eco-brand image (Maduwinarti et al., 2025; Rachman et al., 2025). By automating content distribution and leveraging sustainability-oriented analytics, SMEs can measure campaign impacts more accurately. (Ni & Abdullah, 2025) further found that AI-supported sentiment analysis helps brands assess consumer perceptions toward eco-initiatives.

Cluster 1: AI Readiness and Digital Infrastructure

Despite evident benefits, SMEs face substantial challenges including high implementation costs, lack of human capital, and ethical concerns regarding data privacy and algorithmic transparency (Golzarjannat & Gustafsson, 2025; Rahma Dianti et al., n.d.). Future frameworks should emphasize responsible AI practices that ensure environmental integrity, inclusivity, and fairness.

Thematic Model of AI Adoption and Capability Synergy

The findings suggest a synergistic relationship between organizational and technological capabilities in determining AI adoption success and its impact on green marketing outcomes.

Figure 2 illustrates this relationship: AI functions as the *core enabler*, connecting internal capabilities (leadership, innovation, culture) with external technological capabilities

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(infrastructure, data integration), leading to improved green marketing performance, customer loyalty, and sustainability competitiveness.

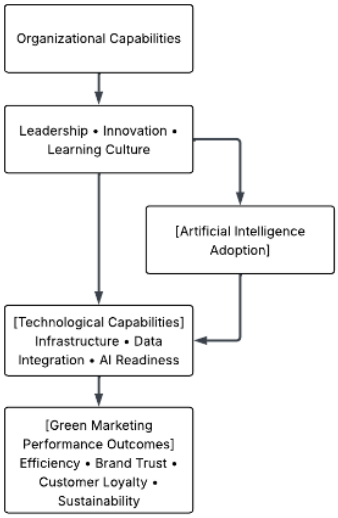

***Figure 2**. Conceptual Model of AI Adoption in Green Marketing for SMEs*

Comparative Discussion and Theoretical Implications

The results align closely with the Resource-Based View (RBV) and Dynamic Capabilities Theory, emphasizing that internal and technological resources jointly drive sustainable competitive advantage. AI serves as a *strategic amplifier* of these capabilities transforming static processes into adaptive, eco-efficient marketing systems (Agostini et al., n.d.; Orioli & Veríssimo, 2024).

Compared to prior reviews that treated AI and sustainability as separate research streams, this study integrates both under a unified capability-based perspective (Maduwinarti et al., 2025; Ni & Abdullah, 2025). The inclusion of organizational and technological mediators advances theoretical understanding by explaining *how* AI adoption translates into measurable marketing performance.

Empirically, SMEs that exhibit high digital maturity demonstrate superior resilience to market turbulence, regulatory shifts, and evolving consumer expectations. Leadership, innovation culture, and training initiatives reinforce this adaptability, validating prior claims that soft capabilities are as crucial as technological assets in sustaining long-term competitiveness (Sánchez et al., 2025; Sarri et al., 2020).

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Discussion Summary

The synthesized findings underscore several critical insights:

1. Interdependence of Capabilities: Organizational and technological capabilities must co-evolve to unlock AI's full potential for sustainable marketing.
2. Strategic Integration: AI initiatives should be embedded into long-term sustainability strategies rather than treated as short-term digital tools.
3. Human Capital Readiness: Investment in leadership training and workforce upskilling is key to overcoming SME-level adoption barriers.
4. Policy and Ecosystem Support: Institutional frameworks must enable affordable access to AI technologies and promote ethical governance.

Collectively, the integration of AI into SMEs' green marketing practices not only enhances performance efficiency but also strengthens environmental responsibility and brand authenticity. These findings contribute to both academic theory and practical management by establishing AI as a capability-enhancing mechanism that enables SMEs to achieve sustainable growth in the digital economy.

CONCLUSION

This study concludes that the integration of Artificial Intelligence (AI) into green marketing offers a strategic pathway for SMEs to enhance sustainability-oriented competitiveness in the digital economy. The review of 30 studies (2020–2025) revealed that AI functions as a key enabler linking technological readiness and organizational capability to improved marketing outcomes such as customer loyalty, brand trust, and resource efficiency. SMEs that cultivate leadership, innovation culture, and digital literacy demonstrate better adaptability and sustainability performance compared to those focusing solely on technology adoption.

Overall, this research reinforces that achieving effective AI-driven green marketing requires balanced development between technological infrastructure and organizational preparedness. Policymakers, practitioners, and academia should collaborate to create inclusive ecosystems that support SMEs in adopting AI responsibly and affordably. Future research is encouraged to

empirically validate these conceptual findings and design AI frameworks tailored to the specific needs and capacities of small and medium enterprises engaged in sustainable marketing.

REFERENCE

Agostini, L., Nosella, A., Sarala, R., & Nkeng, C. (n.d.). *Emerging trends around strategic flexibility: a systematic review supported by bibliometric techniques*. https://doi.org/10.1108/MD-02

Golzarjannat, A., & Gustafsson, R. (2025). Regulatory technologies for enhancing sustainability compliance: a multivocal literature review. *Journal of Financial Regulation and Compliance*. https://doi.org/10.1108/JFRC-04-2025-0074

Hamza Farooq, S., Riviezzo, A., & Ud Din, A. (n.d.). *Digitalization and Innovation in Entrepreneurship: A Systematic Review and Agenda for Future Research*. https://ssrn.com/abstract=5384929

Husni, A., Madurapperuma, W., & Thilini Sumudu Kumari, R. D. (2025). Antecedents of data analytics adoption: A systematic literature review from 2018-2024. *F1000Research*, *14*, 1026. https://doi.org/10.12688/f1000research.170252.1

Maduwinarti, A., Maruta, I. G. N. A., & Mahendra, I. A. (2025). The intersection of green marketing and social media in Southeast Asia: a bibliometric analysis and research agenda. In *Cogent Business and Management* (Vol. 12, Issue 1). Cogent OA. https://doi.org/10.1080/23311975.2025.2525499

Ni, C., & Abdullah, N. L. (2025). Research on absorptive capacity in the green context: a bibliometric and visualization analysis. *Cogent Business and Management*, *12*(1). https://doi.org/10.1080/23311975.2024.2435602

Orioli, F. P., & Veríssimo, J. M. C. (2024). Organizational capabilities and SSCM: a bibliographic review and cluster analysis. In *Benchmarking* (Vol. 31, Issue 6, pp. 1895–1921). Emerald Publishing. https://doi.org/10.1108/BIJ-02-2022-0132

Pooe, D., Takawira, B., & David Pooe, P. (n.d.). *Industry 5.0 Integration in Small and Medium-Sized Enterprises (SMEs) for Supply Chain Strategic Fit: A Systematic Literature Review*. https://www.researchgate.net/publication/385760139

Rachman, A., Efawati, Y., & Daniswara, M. D. (2025). The Effectiveness of Loyalty Programs in Driving Customer Retention in Fashion Retail: A Systematic Literature Review. *International Journal Administration, Business & Organization*, *6*(2), 106–113. https://doi.org/10.61242/ijabo.25.534

Rahma Dianti, A., Mualifah, T., Made, I., Dirgantara, B., & Dianti, A. R. (n.d.). *Artificial Intelligence for Marketing: Systematic Literature Review*.

Sánchez, E., Calderón, R., & Herrera, F. (2025). Artificial Intelligence Adoption in SMEs: Survey Based on TOE–DOI Framework, Primary Methodology and Challenges. In *Applied Sciences (Switzerland)* (Vol. 15, Issue 12). Multidisciplinary Digital Publishing Institute (MDPI). https://doi.org/10.3390/app15126465

Sarri, K., Mouratoglou, N., & Laspita, S. (2020). Emerging pedagogical principles in teachers' training on entrepreneurship education: An interdisciplinary intervention. *Proceedings of the European Conference on Innovation and Entrepreneurship, ECIE*, *2020-September*, 885–888. https://doi.org/10.34190/EIE.20.026