ipmi INTERNATIONAL JOURNAL OF BUSINESS STUDIES

e-ISSN: 2622-4585 | p-ISSN: 2580-0132
Vol. 10 | No. 1 (February, 2026)

Developing a Community Based Smart Edu Tourism Model: Integrating Green Marketing and Artificial Intelligence

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A B S T R A C T

Community based edu tourism in urban settings offers opportunities for sustainability, cultural preservation, and community empowerment; however, many initiatives face challenges related to competitiveness and digital adaptation in the post pandemic era. This study proposes a conceptual framework that integrates the seven dimensions of green marketing with AI enabled smart tourism to support the development of smart, sustainable, and personalized edu tourism experiences. The framework advances sustainability marketing theory by incorporating technological enablers and provides practical guidance for policymakers, tourism managers, and community stakeholders seeking to strengthen edu tourism models aligned with the United Nations Sustainable Development Goals (SDGs).

A R T I C L E I N F O

Article History:
Received : 12 – 01 - 2026
Revised : 27 – 01 – 2026
Accepted : 25 – 02 – 2026
Published : 27 – 02 – 2026

Keywords:
Community based tourism; Edu tourism; Green marketing; Artificial intelligence; Urban sustainability

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INTRODUCTION

Sustainable tourism has gained global prominence as countries work to align economic, social, and environmental policies with the United Nations Sustainable Development Goals (SDGs). Urban areas—traditionally associated with high consumption and environmental pressures—are increasingly becoming sites for community based sustainability initiatives. Edu tourism, which integrates educational activities, cultural engagement, and sustainability practices, has emerged as a promising approach within these contexts. Yet, maintaining competitiveness in urban edu tourism requires innovative marketing strategies and the integration of advanced technologies.

Green marketing provides a strategic foundation for aligning tourism practices with ecological values. Beyond environmental labeling, sustainability-oriented marketing encompasses eco friendly product design, fair pricing, ethical promotion, sustainable distribution, and authentic experience development. Prior research demonstrates that green marketing can shape tourist attitudes and enhance destination competitiveness; however, its application in tourism often remains limited to promotional activities rather than full integration across the tourism value chain.

Smart tourism introduces digital technologies—including big data, IoT, AR/VR, and artificial intelligence—to enhance efficiency, personalization, and sustainability in tourism destinations. AI driven tools support real time decision making, optimize visitor flows, and enable personalized recommendations. Emerging research also highlights the role of intelligent automation and predictive analytics in mitigating overtourism and promoting sustainable behaviors, demonstrating the potential of AI to reinforce sustainability-oriented tourism strategies.

Community based tourism (CBT) emphasizes local participation in tourism planning and management, ensuring equitable distribution of benefits while preserving cultural and ecological integrity. Research shows that community engagement enhances authenticity and visitor satisfaction, which contribute to sustainability outcomes. In urban edu tourism, community involvement is essential for integrating technological innovation with local knowledge and cultural assets, reinforcing both authenticity and competitiveness.

Despite growing interest in sustainability marketing, smart tourism, and CBT, these domains are often examined independently. Limited research explores how AI enabled smart tourism can strengthen sustainability marketing strategies, particularly within urban edu tourism contexts. Additionally, while CBT has been widely studied in rural settings, urban initiatives such as climate villages remain underexplored. Addressing these gaps is essential for advancing theoretical understanding and informing practical models for post pandemic edu tourism development.

LITERATURE REVIEW

Green Marketing and Sustainability Marketing

Green marketing has expanded from early eco labeling efforts to a comprehensive sustainability-oriented strategy that integrates ecological, social, and economic considerations. Within tourism, green marketing supports the promotion of eco friendly destinations, sustainable accommodation, and responsible visitor behavior. Despite its potential, many tourism organizations continue to apply green marketing superficially, emphasizing promotional messaging rather than embedding sustainability throughout the tourism value chain.

The seven dimensional sustainability marketing framework—encompassing products, pricing, distribution, promotion, people, processes, and physical evidence—provides a structured approach for evaluating sustainability performance in tourism. Empirical research demonstrates that applying this framework can enhance tourist satisfaction, strengthen destination competitiveness, and support long term environmental stewardship.

Smart Tourism and Artificial Intelligence (AI)

Smart tourism integrates digital technologies—including big data analytics, IoT, AR/VR, and artificial intelligence—to enhance destination efficiency, personalization, and sustainability. AI powered tools support real time information delivery, personalized recommendations, and predictive analytics that help manage visitor flows and reduce environmental pressures. These capabilities position smart tourism as a key enabler of sustainable destination management.

Emerging research underscores AI's potential to advance sustainability-oriented tourism practices. Intelligent automation can reduce resource consumption, while AI driven nudges encourage environmentally responsible behaviors. Additionally, context aware AI systems can enhance authenticity by facilitating meaningful interactions between visitors and local communities.

Integration of Green Marketing and Smart Tourism

Despite extensive research on green marketing and smart tourism, their integration remains underdeveloped. Green marketing emphasizes sustainability, while smart tourism focuses on technological innovation; yet combining these approaches can generate synergies that strengthen both sustainability outcomes and destination competitiveness. AI enabled tools can support sustainability marketing by delivering personalized sustainability information, promoting eco friendly behaviors, and enhancing visitor engagement.

Integrating green marketing with smart tourism can address persistent challenges in urban edu tourism, including limited community engagement, insufficient sustainability communication, and a lack of personalized learning experiences. AI enabled tools can deliver tailored educational content, provide real time sustainability feedback, and support immersive cultural experiences that enhance visitor satisfaction while empowering local communities.

Conceptual Framework & Propositions

The proposed framework integrates the seven dimensions of green marketing—green product, price, place, promotion, people, process, and experience—with artificial intelligence (AI) and smart tourism. These seven dimensions provide the ecological and social foundation for sustainable edu tourism, while AI enhances their effectiveness through personalization, predictive analytics, and digital engagement. Recent studies show that aligning green marketing practices with digital technologies strengthens tourist satisfaction, pro environmental behavioral intentions, and destination competitiveness. Building on this integrated perspective, the following propositions are developed.

Green Product and AI Enabled Personalization

Eco friendly educational products such as workshops, sustainability modules, and hands on environmental learning form the foundation of green edu tourism. Research consistently shows that green products enhance tourist satisfaction and encourage pro environmental behavior. AI enabled personalization further strengthens these effects by tailoring educational content to visitor interests, thereby increasing relevance, engagement, and memorability.

Proposition 1 (P1): Green products positively influence tourist satisfaction and pro environmental behavioral intentions, and this effect is enhanced by AI enabled personalization.

Green Price and Dynamic Sustainable Offers

Green pricing emphasizes fairness, transparency, and alignment with ecological values. Tourists increasingly demonstrate willingness to pay for sustainable offerings when pricing reflects authenticity and environmental responsibility. AI supports this process through dynamic pricing and tailored incentives for eco friendly choices, improving both revenue potential and sustainability outcomes.

Proposition 2 (P2): Green pricing positively influences willingness to pay for sustainable edu tourism, with AI driven dynamic offers further

strengthening this effect.

Green Place and Smart Management

Sustainable site design and eco friendly infrastructure shape visitor perceptions of environmental responsibility and destination competitiveness. Smart technologies—particularly IoT sensors and predictive analytics—enhance these efforts by optimizing resource use, managing visitor flows, and improving environmental performance. Integrating AI into place management reinforces sustainability credibility while improving visitor experiences.

Proposition 3 (P3): Green place positively influences perceived sustainability and destination competitiveness, and this relationship is enhanced by AI enabled smart management.

Green Promotion and AI Based Eco Communication

Green promotion communicates ecological values through storytelling, eco labels, and educational campaigns. Prior research shows that effective green communication increases awareness and intention to visit sustainable destinations. AI strengthens this process by delivering personalized messages through chatbots, recommendation systems, and digital platforms, making sustainability communication more engaging and persuasive.

Proposition 4 (P4): Green promotion positively influences tourist awareness and visit intention, and this effect is amplified by AI enabled eco communication.

Green People and Digital Co Creation

Tourism staff and community members serve as ambassadors of sustainability, shaping visitor perceptions of authenticity and cultural integrity. Digital co creation platforms enable residents and staff to share narratives, co develop educational content, and engage directly with visitors. These interactions enhance authenticity, satisfaction, and responsible behavior.

Proposition 5 (P5): Green people positively influence tourist satisfaction and perceived authenticity, with digital co creation enhancing this relationship.

Green Process and Predictive Analytics

Sustainable operational practices—such as waste reduction, energy efficiency, and transparent management—build credibility and trust in tourism destinations. AI strengthens these processes by forecasting demand, predicting visitor flows, and optimizing resource allocation. Predictive analytics reduce inefficiencies and reinforce destination competitiveness.

Proposition 6 (P6): Green process positively influences destination credibility and competitiveness, and AI enabled predictive analytics strengthen this effect.

Green Experience and Smart Personalization

Authentic, educational, and eco friendly experiences are central to long term behavioral change. Research shows that such experiences increase revisit intention and foster pro environmental behavior. AI tools such as AR/VR and personalized itineraries enrich these experiences by creating immersive, tailored engagements that enhance memorability and loyalty.

Proposition 7 (P7): Green experience positively influences revisit intention and pro environmental behavior, and AI enabled personalization enhances this effect.

Integrative Role of AI and Smart Tourism

AI and smart tourism function as integrative mechanisms that connect all seven dimensions of green marketing into cohesive edu tourism outcomes. By combining ecological values with operational efficiency, personalization, and digital engagement, AI mediates the relationship between green marketing strategies and sustainable outcomes. Empirical research increasingly positions AI not only as a supporting tool but as a central mechanism that explains how technological integration transforms green

marketing into visitor satisfaction, pro environmental behavior, and competitiveness.

Proposition 8 (P8): AI and smart tourism mediate the relationships between green marketing dimensions and edu tourism outcomes (tourist satisfaction, pro environmental behavior, and destination competitiveness).

Figure 1. Research Framework

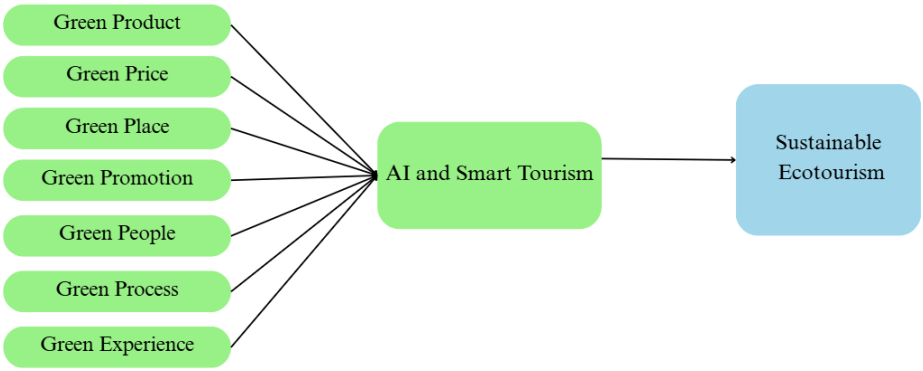

Figure 1 illustrates the integrated conceptual framework linking the seven dimensions of green marketing—green product, price, place, promotion, people, process, and experience—to key edu tourism outcomes, including tourist satisfaction, pro environmental behavior, and destination competitiveness. Artificial intelligence (AI) and smart tourism function as central mediating mechanisms that enhance personalization, predictive analytics, and digital engagement across all seven dimensions. The framework positions AI as the connective layer that strengthens the effectiveness of sustainability oriented strategies and explains how green marketing practices translate into improved visitor experiences and sustainable behavioral outcomes.

METHODOLOGY

This study adopts a qualitative, theory building orientation grounded in an interpretivist philosophical stance. Interpretivism assumes that meanings, behaviors, and sustainability practices in edu tourism are socially constructed rather than objectively fixed. This stance aligns with the study's focus on understanding how green marketing, AI, and smart tourism interact to shape visitor experiences, pro environmental behavior, and destination competitiveness. Because these constructs emerge from human interpretation, technological mediation, and contextual variation, a qualitative approach is the most appropriate means of capturing their complexity and interdependence.

The study follows a conceptual qualitative design that synthesizes empirical findings, theoretical developments, and emerging technological insights to construct a coherent framework. This approach is consistent with qualitative theory building traditions in management and tourism research, where new constructs and relationships are developed through systematic integration of prior evidence rather than statistical testing. The interpretive orientation also supports the study's goal of explaining how and why AI mediates the relationship between green marketing practices and edu tourism outcomes.

Research Design

A qualitative conceptual synthesis was employed to develop the propositions and the integrated framework. This design draws on structured literature analysis, thematic integration, and conceptual abstraction. The process involved identifying recurring patterns across studies on green marketing, AI, smart tourism, and edu tourism, and then synthesizing these patterns into theoretically meaningful relationships. This approach is well suited for emerging domains—such as AI enabled sustainability—where empirical evidence is growing but theoretical integration remains limited.

The design unfolded in three stages. First, relevant studies were identified across sustainability marketing, tourism management, AI enabled personalization, and smart destination research. Second, thematic patterns were extracted to identify how green marketing dimensions influence visitor outcomes and how AI strengthens or mediates these relationships. Third, these themes were integrated into a multi component conceptual framework that links the seven green marketing dimensions to edu tourism outcomes through AI and smart tourism mechanisms. This staged design ensures transparency, replicability, and conceptual rigor.

Data Sources and Selection Logic

The conceptual synthesis draws on peer reviewed journal articles published between 2015 and 2025, reflecting the period in which AI and smart tourism technologies became central to tourism research. Studies were selected based on their relevance to sustainability marketing, AI enabled personalization, predictive analytics, digital engagement, and edu tourism outcomes. Priority was given to empirical studies that examined behavioral intentions, visitor satisfaction, authenticity, and destination competitiveness, as these constructs form the outcome variables in the proposed framework.

The selection logic followed three criteria:

- Conceptual relevance to green marketing, AI, or smart tourism;
- Empirical contribution to understanding visitor behavior or sustainability outcomes;
- Methodological rigor, ensuring that included studies provide credible evidence for theory building.

This approach ensures that the propositions are grounded in a robust and diverse body of knowledge rather than anecdotal or isolated findings.

Analytic Strategy

The analytic strategy combined thematic synthesis with conceptual integration. Thematic synthesis was used to identify recurring patterns across studies, such as the role of personalization in shaping satisfaction or the influence of eco communication on behavioral intentions. These themes were then mapped onto the seven dimensions of green marketing to determine how each dimension contributes to edu tourism outcomes.

Conceptual integration was used to articulate the mediating role of AI and smart tourism. This involved examining how AI enabled personalization, predictive analytics, and digital engagement strengthen or transform the effects of green marketing practices. The integration process ensured that the resulting propositions reflect both sustainability theory and technological innovation.

The analytic strategy supports the development of a coherent, multi layered framework that explains not only what relationships exist but also why and how they operate in edu tourism contexts.

Ensuring Rigor and Credibility

Several strategies were used to enhance methodological rigor.

- Transparency was maintained by clearly documenting the selection criteria, analytic stages, and conceptual decisions.
- Triangulation was achieved by integrating evidence from sustainability marketing, tourism behavior, and AI driven personalization research.
- Theoretical saturation was reached when no new themes emerged from the literature, ensuring that the framework captures the full range of relevant relationships.
- Conceptual coherence was strengthened by aligning each proposition with both empirical evidence and theoretical logic.

These strategies ensure that the framework and propositions are grounded, credible, and suitable for advancing theory in sustainable tourism and management research.

Taken together, the methodological choices outlined above establish a coherent foundation for interpreting how green marketing, AI, and smart tourism interact to shape edu tourism

outcomes. By grounding the analysis in an interpretivist stance and a systematic conceptual synthesis, the study generates propositions that are both theoretically meaningful and empirically informed. This approach positions the framework not merely as a descriptive model but as a mechanism for explaining how sustainability practices and digital technologies jointly influence visitor behavior and destination competitiveness. With this foundation in place, the following section elaborates the theoretical and practical implications of the framework, highlighting its contributions to sustainability marketing, smart tourism research, and the design of AI enabled edu tourism experiences.

DISCUSSION

The integrated framework developed in this study advances theoretical understanding of how green marketing, artificial intelligence (AI), and smart tourism jointly shape edu tourism outcomes. By synthesizing seven dimensions of green marketing with AI enabled mechanisms, the study demonstrates that sustainability and digital transformation operate as mutually reinforcing systems rather than parallel strategies. The propositions clarify how AI strengthens the influence of green marketing practices on tourist satisfaction, pro environmental behavior, and destination competitiveness, offering a more holistic explanation of visitor behavior in technology rich environments.

Theoretical Implications

The framework contributes to sustainability marketing and smart tourism theory in several important ways. First, it reconceptualizes green marketing as a digitally mediated system whose effectiveness increasingly depends on AI enabled personalization, predictive analytics, and digital engagement. This extends prior work that treats green marketing as a set of discrete practices by positioning it within the technological infrastructure of smart destinations. Second, the study advances theory by identifying AI as a central mediating mechanism that explains how sustainability practices translate into behavioral and experiential outcomes. This elevates AI from a supporting tool to a theoretical construct with explanatory power. Third, the model bridges sustainability behavior research with digital experience design, demonstrating that pro environmental behavior is shaped not only by ecological values but also by the quality of digital interactions and immersive technologies. Finally, by focusing on educational experiences, the study positions edu tourism as a distinct theoretical domain where sustainability and technology converge, offering new pathways for theory development in experiential learning and environmental psychology.

Practical Implications

The framework offers actionable insights for destination managers, tourism educators, policymakers, and technology developers. AI enabled personalization can be used to tailor educational content and sustainability experiences to visitor interests, increasing engagement and strengthening pro environmental behavior. Dynamic and transparent green pricing strategies can reward eco friendly choices while supporting revenue optimization. Smart technologies such as IoT sensors and predictive analytics can improve resource management, enhance environmental performance, and reinforce the credibility of sustainability initiatives. Digital platforms can strengthen eco communication through personalized messaging, while community based co creation tools can enhance authenticity and deepen visitor–community relationships. Immersive technologies such as AR/VR can enrich educational experiences and foster long term behavioral change. Collectively, these implications underscore the need for integrated sustainability and technology strategies rather than isolated interventions.

Future Research Directions

The framework opens several avenues for future empirical and conceptual research. Empirical studies can test the mediating role of AI enabled personalization, predictive analytics, and digital engagement in shaping visitor outcomes. Cross cultural research can examine how cultural values influence responses to sustainability messages and AI enabled experiences. Ethical and privacy considerations related to AI adoption

in tourism warrant further investigation, particularly regarding data transparency and digital equity. Longitudinal studies can assess whether AI enhanced green experiences lead to sustained pro environmental behavior beyond the tourism context. Future research may also incorporate emerging technologies such as digital twins, blockchain based sustainability verification, or emotion recognition systems. Finally, studies examining community impacts of digital co creation can deepen understanding of how technology influences empowerment, participation, and well being.

CONCLUSION

This study develops an integrated conceptual framework that explains how green marketing, artificial intelligence (AI), and smart tourism jointly shape edu tourism outcomes. By synthesizing seven dimensions of green marketing with AI enabled mechanisms, the framework demonstrates that sustainability and digital transformation are interdependent systems that collectively influence tourist satisfaction, pro environmental behavior, and destination competitiveness. The propositions derived from this synthesis advance theoretical understanding by positioning AI as a central mediating mechanism that enhances the effectiveness of sustainability practices and transforms them into meaningful visitor experiences.

The study contributes to sustainability marketing, smart tourism, and edu tourism research by offering a coherent explanation of how ecological values, technological innovation, and educational engagement intersect. It also provides practical guidance for destination managers, policymakers, and educators seeking to design AI enhanced sustainability experiences that are authentic, immersive, and behaviorally impactful. While the framework is conceptual, it lays the groundwork for future empirical research that can test the proposed relationships, explore cross cultural variations, and examine ethical considerations associated with AI adoption in tourism.

Overall, the study positions edu tourism as a promising domain for integrating sustainability and digital transformation, offering new opportunities for theory development and practical innovation. By highlighting the synergistic role of AI in strengthening green marketing strategies, the framework contributes to ongoing efforts to create more sustainable, competitive, and educationally meaningful tourism experiences.

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