

Technology and Innovation in Smart and Sustainable Tourism: A Comprehensive Analysis

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Received : 27 June - 2026

Accepted : 08 August - 2026

Published online : 12 August - 2026

Abstract

Indonesian tourism faces demands to utilize technology and innovation in supporting the transformation toward a smart, inclusive, and sustainable tourism system amid the rapid development of the digital economy. This study aims to comprehensively analyze the role of technology and innovation in the implementation of smart and sustainable tourism in Indonesia. The research adopts a Systematic Literature Review (SLR) approach using the PRISMA method, which includes the stages of identification, selection, evaluation, and synthesis of ten scientific articles published between 2023 and 2025. The findings reveal that technology plays a vital role in enhancing the efficiency of tourism management, strengthening digital promotion, and supporting environmental sustainability. The main innovations identified include the use of the Internet of Things (IoT), Augmented Reality (AR), financial technology (fintech), smart destination systems, and community-based digitalization initiatives. Nevertheless, this study also highlights several challenges in implementing technology-driven tourism in Indonesia, such as limited digital infrastructure in remote areas, low digital literacy among tourism actors, and weak inter-agency coordination. On the other hand, significant opportunities are emerging through the growing adoption of digital technology and government support for the digital economy. The results of this research are expected to contribute to the development of strategic policies, tourism technology innovations, and collaborative models that can strengthen the competitiveness of Indonesia's tourism sector toward long-term sustainability.

Keywords: Digitalization, Smart Tourism, Sustainable Tourism, Technological Innovation.

1. Introduction

Tourism is one of the strategic sectors in Indonesia's economic development, as it plays a vital role in boosting the country's foreign exchange earnings, creating jobs, and serving as a means of preserving culture and the environment. However, amidst the increasing mobility of global travellers and the growth of the digital economy, the tourism industry faces a new challenge in maintaining growth without compromising environmental, social and economic sustainability (Nyoman Berlian et al., 2024). This challenge demands a comprehensive transformation that relies not only on destination promotion but also on the application of smart technology and innovation to create a more efficient, inclusive and sustainable tourism system.

Advances in information and communication technology (ICT) have transformed the way travellers plan, enjoy and evaluate their travel experiences. The concept of smart tourism has thus emerged as an adaptation to the digital age, where technologies such as the Internet of Things (IoT), Big Data, digital applications and destination information systems are utilised to enhance the quality of tourism services and management (Nasir, 2025). In this context,



innovation serves as the key driver bridging technology and sustainability objectives, such as energy efficiency, waste management, and the empowerment of local communities through the digitalisation of the creative economy.

In Indonesia, tourism holds great potential to evolve into smart and sustainable tourism. The government, through the Ministry of Tourism and Creative Economy, has launched various initiatives such as the Super Priority Tourism Destinations (DPSP) programme, which emphasises the importance of digitalising the governance and promotion of national tourism. The application of technology is expected to boost competitiveness and attract global tourists who are increasingly reliant on digital platforms when making travel decisions (Hadi, 2023). However, although digital transformation is beginning to be implemented, the integration of technology with sustainability principles is still not fully optimised across all destinations, particularly in areas facing infrastructure and human resource constraints.

Various studies in Indonesia indicate a positive correlation between the adoption of smart tourism technology and an increase in tourist interest in visiting a destination. Research conducted by Rafdinal (2021) shows that technological attributes such as tourism information systems, digital security and virtual attractions have a significant influence on tourists' intention to visit a destination. Meanwhile, research by Are et al. (2025) confirms that the digitalisation of online booking and information systems contributes to an enhanced tourism experience and supports the sustainability of a destination.

Research by Rahmawati et al. (2023) also concluded that smart tourism technology not only influences tourists' direct experiences but also, indirectly through satisfaction, influences whether tourists will return. This is important as it demonstrates that technology must be designed to enhance the actual experience, rather than merely serving as a superficial add-on.

A policy study by Fasa et al. (2023) highlights the importance of environmentally friendly technology transfer in developing low-carbon tourism in Indonesia, particularly in the context of the shift towards green energy and resource efficiency. From these various studies, it can be concluded that technology and innovation have played a tangible role in improving efficiency, experience and sustainability within Indonesia's tourism sector. However, there remains a gap between digital innovation and the comprehensive application of sustainability principles, particularly regarding the measurement of social and environmental impacts, human resource readiness, and integrated digital governance policies.

Research results indicate that limitations in digital infrastructure, digital literacy among tourism stakeholders, as well as the implementation of regulations and funding support, can pose challenges in developing a smart and sustainable tourism ecosystem in several local destinations in Indonesia. However, these challenges are not always uniform across regions, as they can be shaped by local conditions, institutional capacity, and the availability of digital infrastructure and existing support. Therefore, a systematic review of the existing literature is required to gain a comprehensive understanding of the extent to which technology and innovation have supported the implementation of smart and sustainable tourism at both global and national levels.

Against this background, this study aims to conduct a systematic literature review (SLR) on the role of technology and innovation in the implementation of smart and sustainable tourism. The specific objectives of this study include: (1) identifying and summarising the latest literature on the use of technology and innovation in the implementation of smart and sustainable tourism, (2) analysing the trends, challenges and opportunities of such implementation, particularly in the Indonesian context, (3) to develop an integrative conceptual framework linking innovation and sustainability in tourism governance, and (4) to provide strategic recommendations for stakeholders including the government, tourism

industry players and local communities so that the application of technology and innovation can contribute to the development of a more adaptive, inclusive and sustainable tourism sector in Indonesia.

2. Literature Review

Smart tourism has emerged as the tourism sector's response to the digital age, in which information and communication technology (ICT) serves as the lifeblood for improving the efficiency of destination management, enhancing the visitor experience, and optimising interactions between stakeholders. Smart tourism can encompass several themes, such as ICT infrastructure, data management, connectivity, and the integration of smart city services (Gursoy et al., 2024). The implementation of smart tourism often centres on technological aspects, such as tourism apps, destination information systems, mobile services and big data, but has not yet addressed how these aspects are implemented within the context of long-term sustainability (Kontogianni & Alepis, 2020).

The concept of a 'smart destination' is often derived from the 'smart city' analogy, where the integration of infrastructure, public services, sensor/IoT systems, and data analysis are key elements. However, a focus on technological aspects can overshadow attention to human elements, social values, local community participation, and equitable access. Destination stakeholders must balance the focus on technology with 'soft values' to ensure that destination development remains sustainable from a social and cultural perspective (Gelter et al., 2022).

Sustainable tourism is a concept that emphasises that tourism activities must strike a balance between economic, social and environmental needs, not only for the present but also for future generations. Although tourism legislation mandates a multi-sectoral approach, the concept of sustainability has not yet been consistently adopted at the policy and operational levels. Fragmentation in implementation occurs due to differences in financial capacity, human resources and interpretation amongst stakeholders (Fadli et al., 2022).

In terms of innovation, ecological innovations such as eco-product innovation, eco-process innovation, eco-organisational innovation and the use of social media as a strategic communication channel significantly influence the development of sustainable tourism in Indonesia (Firman et al., 2022). In the context of disasters or crises (such as COVID-19), the role of innovation and creativity among stakeholders becomes particularly important. During times of crisis, tourism operators and local authorities must devise innovative strategies such as the digitalisation of services, policy adaptation and collaboration to ensure that destinations remain viable and grow sustainably (Ali et al., 2024).

The concept of smart tourism within the framework of sustainable tourism refers to how technology and innovation are utilised not only for efficiency and the tourist experience, but also to safeguard the environmental, social and economic aspects of a destination. Although technology and digital platforms are already widely used such as destination access apps, IoT sensors and big data, the application of technology that genuinely supports sustainability, such as for environmental monitoring, natural resource management and impact reduction, remains limited (Kusumawardhani et al., 2024).

Research by Alsharif et al.,(2024) demonstrates how ICT can be used to enhance the tourist experience, improve the quality of life for local residents, and support the principles of sustainability when implemented with the right design. Furthermore, research by Cerdá-Mansilla et al. (2024) also highlights the importance of a multi-stakeholder perspective in shaping smart destinations that do not merely rely on technology, but also take into account the perceptions of residents, business operators and tourists, so that the policies and

innovations adopted remain inclusive and sustainable. This indicates that the combination of smart tourism and sustainable tourism is not merely a matter of installing sensors or smart systems, but rather how technology and innovation are designed and implemented in accordance with the principles of sustainability.

3. Method

This study employs the Systematic Literature Review (SLR) method using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. The SLR method was chosen as it provides a comprehensive and evidence-based overview of the role of technology and innovation in the implementation of smart and sustainable tourism. According to Kitchenham and Charters (2007), an SLR is a systematic, transparent and replicable approach to identifying, evaluating and synthesising the results of previous research relevant to a specific topic. Meanwhile, according to Moher et al. (2009), the PRISMA method assists researchers in structuring the literature review process through structured stages, including identification, screening, eligibility, and inclusion.

The application of PRISMA in this study aims to ensure that the article selection process is conducted objectively and is scientifically accountable. Consequently, the results of the literature review not only describe research trends but also present an in-depth analysis of the relationship between technology, innovation and sustainability in the tourism sector. Inclusion and exclusion criteria were used to ensure that only relevant, high-quality articles were included in the analysis. These criteria are explained in Table 1 as follows:

Table 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Year of Publication	2015 – 2025	Before 2015
Language	Indonesian and English	Languages other than Indonesian and English
Document Type	Scientific journal articles, conference proceedings and review papers	Books, theses or reports
Focus of Study	Technology and innovation in the context of smart and sustainable tourism	Technology topics outside the tourism sector
Accessibility	Articles are available in full (open access)	Paid articles or restricted-access content

Source: Compiled by the researcher (2025)

This study followed the four main stages of the PRISMA method, as described by Moher et al. (2009):

- A. Identification: At this stage, an initial search for articles was carried out using the keywords ‘smart tourism’, ‘sustainable tourism’, ‘tourism innovation’ and ‘application of tourism technology’. The initial search yielded around 230 articles from various databases. Duplicate articles were then removed to avoid bias.
- B. Screening: The remaining articles were screened based on their titles and abstracts to ensure their relevance to the research topic. At this stage, around 145 articles that were irrelevant or merely discussed general aspects of tourism were removed.
- C. Eligibility: Articles that passed the screening stage were further examined in depth through full text reading. Articles were assessed based on the clarity of methodology, their relevance to the concepts of smart tourism and sustainability, and the quality of

analysis. Based on this assessment, a total of 45 articles were declared to meet the eligibility criteria.

- D. Inclusion: The final stage involved further assessment of the 45 articles that had met the eligibility criteria. At this stage, 35 articles were excluded because, following further evaluation, these articles did not adequately meet the inclusion focus of the research. The excluded articles primarily focused on tourism in general, the application of technology without a clear connection to sustainability aspects, or sustainability issues that did not have a strong relationship with technology and innovation in the context of smart tourism. Thus, a total of 10 articles that met all inclusion criteria and were most relevant to the research objectives and focus were retained for systematic analysis. This final selection process was carried out to ensure that the articles analyzed had a strong alignment with the research focus.

The following is a flowchart for this study, using the PRISMA model based on literature from Google Scholar, ScienceDirect, CrossRef, SpringerLink, Garuda and ResearchGate:

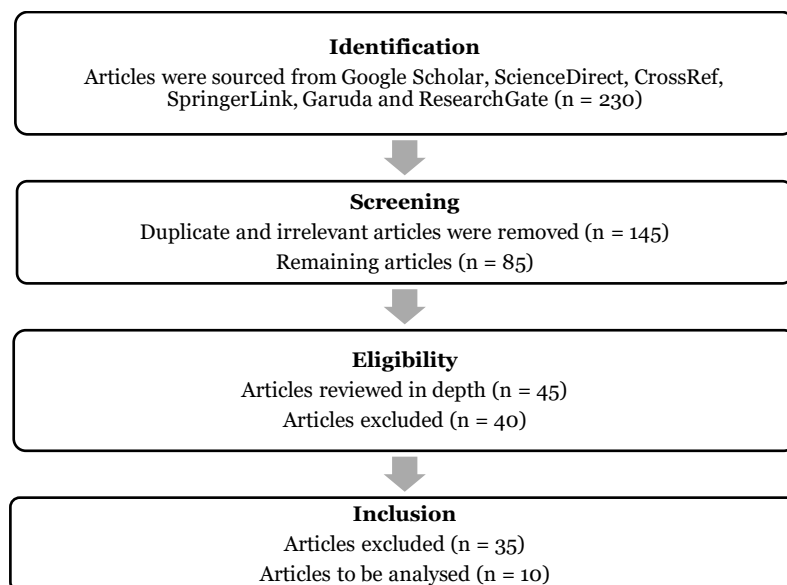


Figure 1. PRISMA Stages Diagram
Source: Compiled by the researcher (2025)

This research follows the four main stages of the PRISMA method as described by Moher et al. (2009), namely identification, screening, eligibility, and inclusion. The article selection process based on these PRISMA stages is presented in Figure 1.

4. Results and Discussion

4.1. Identification and Classification of the Literature

Table 2 below shows that technology and innovation such as digitalization, IoT, fintech, and AR play a role in supporting sustainable tourism, particularly through improvements in destination management, efficiency, tourist experience, and community empowerment.

Table 2. Summary of Literature on Digital Technology and Sustainable Tourism

No	Author	Research Methodology	Research Findings
1.	Jamilati et al. (2023)	Descriptive qualitative study	Digital technology has the potential to revolutionise destination management (information, management, communication). However, in the case of Bangkalan, adoption has not been uniform. 50 per cent of respondents still rely on verbal information, and managers have not yet fully utilised digital platforms.
2.	Andini (2023)	Descriptive method	Technologies such as the Internet of Things (IoT) for environmental monitoring, e-tourism platforms, digital signage and waste management information systems can facilitate the development of green tourism, provided they are designed to minimise environmental impact.
3.	Mahayasa et al. (2024)	Quantitative method (questionnaire) with SEM-PLS analysis	The economic and environmental dimensions have a positive influence on Gen-Z's perceptions of sustainable tourism. The socio-cultural dimension has a positive but not significant influence. Technology moderates the relationship between these dimensions in various ways.
4.	Satriawati et al. (2024)	Literature review	The implementation of zero-waste requires technological innovation in waste management, community participation, partnership models such as B2B, and tourism product design that reduces waste.
5.	Nugroho et al. (2024)	Literature review, surveys, interviews and observation	IoT (sensors, smart parking, automated energy management, environmental quality monitoring) can improve operational efficiency and the visitor experience. Key challenges include data security, technological compatibility and significant investment.
6.	Hikmah and Vidiati (2024)	Literature review	Fintech can open up access to capital for local tourism SMEs, supporting economic inclusion and creative businesses. Digital literacy and regulation are key determining factors.
7.	Eraku et al. (2023)	Qualitative field study	Social innovation (community-based management, training for local guides, profit-sharing mechanisms) effectively boosts local ownership and conservation. Simple technologies (information platforms, online booking) aid coordination.

No	Author	Research Methodology	Research Findings
8.	Yuniarto and Helmiawan (2023)	Software development methods	AR enhances visitors' educational experiences, reduces the need for printed materials and physical documentation (potentially reducing waste), and strengthens the conservation of cultural values through digital storytelling.
9.	Fitriani et al. (2025)	Qualitative methods	A combination of technological strategies (data analytics, booking platforms, smart services) and long-term policies (human resource capacity, regulations) is required to achieve sustainability.
10.	Adiatma et al. (2025)	Descriptive qualitative	The synergy between AR, influencer marketing and community engagement effectively boosts a destination's visibility without compromising local values; however, success depends on the authenticity of the message and the direct participation of the local community.

Source: Compiled by the researcher (2025)

Based on an analysis of ten academic studies, it was found that innovation and digital technology play a significant role in strengthening sustainable tourism practices in Indonesia. Most studies emphasise that the use of technologies such as the Internet of Things (IoT), Augmented Reality (AR), financial technology (fintech), and the digitisation of tourism destination information can accelerate the transformation towards a smart and environmentally friendly tourism ecosystem. Research by Jamilati et al. (2023) demonstrates how digital technology can enhance the performance of tourism managers, though challenges relating to digital literacy and infrastructure remain the main obstacles.

Research by Andini (2023) highlights the concept of green technology as an innovative solution for creating green tourism, emphasising the use of digital systems for energy efficiency, waste management, and environmental data transparency. Meanwhile, Nugroho et al. (2024) explain that the application of the Internet of Things (IoT) in smart destinations can facilitate the sustainable management of tourism resources and services through environmental sensors, smart transport systems, and real-time air quality monitoring.

From the perspective of the tourist experience, research by Yuniarto and Helmiawan (2023) and Adiatma et al. (2025) highlights the use of Augmented Reality (AR) as an innovation capable of bringing cultural and educational value to life within the travel experience. AR is used to introduce local monuments and history interactively, reduce the use of printed materials, and enhance a destination's appeal through technology-based promotion. These findings indicate that AR-based innovations not only serve to enhance the visual appeal of destinations but also act as an effective tool in cultural conservation and environmental preservation through resource-efficient digital education.

Furthermore, research by Hikmah and Vidiati (2024) also reveals that fintech which primarily through peer-to-peer lending models and digital payment systems opens up access to funding for small and medium-sized enterprises in the tourism sector, thereby strengthening economic inclusion and enhancing the self-reliance of local communities. This

research broadens the meaning of innovation in sustainable tourism, not only in the context of information technology, but also in the context of socially just financial innovation.

Social innovation is also a key aspect of sustainable tourism development at the community level. Research by Eraku et al. (2023) shows that the active participation of local communities through training, the formation of tourism awareness groups, and community-based management can enhance the sustainability of nature-based tourist destinations. Meanwhile, Satriawati et al. (2024) introduced the concept of zero-waste tourism as an approach that minimises waste through integrated waste management and community involvement in maintaining the cleanliness of destinations.

From the perspective of tourist behavior, research by Mahayasa et al. (2024) shows that the younger generation has a positive perception toward tourism that prioritizes sustainability, especially when supported by access to digital technology and informative social media platforms. This indicates a significant opportunity to increase the awareness of the digital generation toward environmentally friendly tourism through technology-based communication strategies. Furthermore, Fitriani et al. (2025) emphasize that the development of sustainable tourism in the Digital 4.0 era needs to involve innovative strategies that combine digital transformation, supportive regulations, and improvement of tourism human resource competencies.

Based on an analysis of the ten reviewed articles, technological and social innovation in the development of smart and sustainable tourism in Indonesia can be grouped into seven main categories, namely: (1) information and communication technology innovation and destination management, which includes the use of digital technology, Internet of Things (IoT), destination information systems, and smart destination; (2) technology for tourism experience and promotion, such as Augmented Reality (AR), digital storytelling, and destination promotion technology; (3) fintech-based financial innovation, particularly for expanding access to financing and supporting the economic empowerment of local tourism business actors; (4) community-based social and participatory innovation, which emphasizes local community involvement, capacity strengthening, and community-based destination management; (5) environmental innovation, including zero waste, waste management, energy efficiency, and technology-based environmental quality monitoring; (6) tourist perception and behavior toward technology and sustainability, which covers how technology shapes the perception of tourist generations toward sustainable tourism; and (7) digital transformation strategy and tourism governance, which covers technology integration, human resource development, regulation, policy, and management strategy to support long-term sustainability.

Mapping of the ten articles shows that all the analyzed literature can be placed within this framework. Jamilati et al. (2023) belongs to the information and communication technology innovation and destination management category because it discusses the utilization of digital technology to improve the performance of tourism managers. Andini (2023) belongs to the environmental innovation category because it emphasizes IoT, waste management information systems, energy efficiency, and technology to support green tourism. Mahayasa et al. (2024) is placed in the tourist perception and behavior category because its research focus is the role of technology in shaping Generation Z's perception toward sustainable tourism. Satriawati et al. (2024) belongs to the environmental and social innovation category because the zero waste concept integrates waste management with community participation. Nugroho et al. (2024) belongs to the information and communication technology and destination management category through the application of IoT and smart destination.

Hikmah and Vidiati (2024) belong to the fintech-based financial innovation category because they discuss access to financing and economic inclusion for local tourism business actors. Eraku et al. (2023) belongs to the community-based social and participatory innovation category through capacity strengthening and local community involvement. Yuniarto and Helmiawan (2023) belong to the tourism experience and promotion technology category through the application of AR for monument introduction and tourism education. Fitriani et al. (2025) is placed in the digital transformation strategy and governance category because it integrates digital strategy, human resource capacity improvement, and regulatory support. Meanwhile, Adiatma et al. (2025) belong to the tourism experience and promotion technology category as well as social and participatory innovation because they integrate AR, influencer marketing, and community participation in destination promotion. Thus, the seven-category framework is more representative of the entire analyzed literature because it not only accommodates the forms of technology used, but also covers the dimension of tourist perception as well as digital transformation strategy and governance found in the reviewed articles.

Thus, the findings of this literature review point clearly to the fact that the success of sustainable tourism in Indonesia depends not only on the application of digital technology, but also on the adaptive capacity of tourism stakeholders, regulatory support, and the active participation of local communities in every stage of the transformation process. It is this combination of technological and social innovation that forms the foundation for the development of smart and sustainable tourism in the future.

4.2. Challenges and Opportunities for Implementation in Indonesia

Based on a review of the literature, the following are the challenges and opportunities in the implementation of sustainable tourism technology and innovation in Indonesia. Implementation challenges in the development of smart and sustainable tourism can be identified across several dimensions. In terms of digital infrastructure, some tourist destinations in remote areas still have poor internet access, which hinders the implementation of the smart destination concept and the integration of technologies such as the Internet of Things (IoT) (Nugroho et al., 2024). This is compounded by low digital literacy among tourism stakeholders, as many local tourism managers do not yet understand how to use digital technology for destination promotion and management, with Jamilati et al. (2023) highlighting the need for digital literacy training for regional tourism stakeholders.

In addition, policy and coordination limitations remain a challenge, as the implementation of zero waste or green tourism programs is often hampered by weak technical regulations and inter-agency coordination (Satriawati et al., 2024), and there are currently no integrated national guidelines regarding the application of environmentally friendly technologies in tourist destinations. Social resistance to change also presents an obstacle, since some members of the local community still do not understand the long-term benefits of tourism digitalization, while cultural barriers and the perception that technology reduces traditional social interaction pose further difficulties (Hikmah & Vidiati, 2024). Finally, data security and trust in digital systems remain major concerns, as uncertainties regarding user data security, digital financial transactions, and privacy have the potential to hinder the adoption of fintech-based technologies in the tourism sector.

Opportunities for implementation in the development of smart and sustainable tourism can be seen across several dimensions. Indonesia has a continuously increasing number of internet users, opening up significant opportunities for digital tourism promotion and the development of e-tourism. The growth of internet usage and digital technology expands the reach of promotion and tourists' access to destination information, and in this context,

technologies such as Augmented Reality (AR), virtual tour, and digital storytelling can enhance the tourist experience (Yuniarto & Helmiawan, 2023). The utilization of financial technology (fintech) also presents an opportunity, as digital payment systems and tourism crowdfunding can improve financial efficiency and transparency (Hikmah & Vidiati, 2024), opening opportunities for the development of community-based micro-investment in tourism.

In addition, the integration of IoT and the smart destination concept, through the use of sensors, data analytics, and smart management systems, helps monitor visitor numbers and safeguard environmental sustainability (Nugroho et al., 2024), thereby improving the operational efficiency of tourist destinations. Innovation-based empowerment of local communities offers a further opportunity, as empowering communities through technology training can strengthen their sense of ownership of the destination (Eraku et al., 2023), with collaboration between communities, academia, and the private sector being key to the success of sustainable innovation. Finally, opportunities for branding and digital marketing are opened by the integration of AR technology, influencer marketing, and community participation, which paves the way for smart tourism branding (Adiatma et al., 2025) and makes Indonesian tourism more competitive in the global market.

These challenges cannot be viewed as standalone obstacles, but are interrelated and reflect differences in the level of readiness of each destination. Infrastructure limitations can reduce the effectiveness of digital system implementation, while limitations in the digital capacity of tourism actors can restrict the utilization of technology that is already available. At the institutional level, coordination that has not been optimal can also hinder the integration of various technology initiatives into sustainable tourism development programs. Thus, the main issue is not merely the availability of technology, but the ability of destinations to align infrastructure, human resources, governance, community participation, and funding support within an integrated implementation framework.

This condition simultaneously opens up opportunities for the application of a smart and sustainable tourism development approach that is more adaptive to the characteristics of each destination. Destinations with different levels of technological readiness do not need to apply the same digitalization model. Destinations with limited capacity can prioritize basic digital services that provide direct benefits, while destinations with stronger infrastructure and institutional capacity can develop data integration, IoT applications, and more integrated destination management systems. This staged approach can help reduce the implementation gap while ensuring that technology development remains in line with local needs and sustainability priorities.

In addition, opportunities for digital tourism development need to be directed from merely adopting technology toward creating value for destinations and communities. Technology will provide greater benefits when integrated with local economic empowerment, environmental management, cultural preservation, and community participation. Therefore, the success of smart and sustainable tourism should not be assessed solely based on the amount of technology applied, but also based on its contribution to inclusive governance, better resource management, strengthened community participation, and the long-term resilience of destinations.

4.3. Implications and Recommendations

Based on the findings of the study, there are several strategic implications that can serve as guidance for stakeholders. For the government, policies are needed to promote the digitalization of tourism based on open data, as well as the development of digital infrastructure in priority destinations, and the government also needs to expand the smart tourism village program, which integrates digital technology with local values. For the tourism

industry, industry players need to invest in environmentally friendly digital innovations centered on the traveler's experience, with collaboration between technology companies and local tourism operators being vital to enhance efficiency while boosting global competitiveness. For local communities and society, there is a need to enhance human resource capacity through digitalization training for SMEs, the use of tourism e-commerce platforms, and the utilization of social media for sustainable local promotion. For academics and researchers, further research should focus on developing indicators to measure the effectiveness of smart sustainable tourism, as well as the socio-environmental impacts of digital technology implementation in Indonesia's tourism sector.

5. Conclusion

Based on the results of the Systematic Literature Review (SLR), technology and innovation play an important role in supporting the transformation toward smart and sustainable tourism in Indonesia. Various technologies, such as the Internet of Things (IoT), Augmented Reality (AR), financial technology (fintech), and the digitalization of destination promotion and management, contribute to improving management efficiency, expanding promotional reach, tourist experience, and local community empowerment. Community-based innovation and sustainable approaches also support the balance between economic, social, and environmental aspects in destination development.

However, technology implementation still faces a number of challenges, particularly limitations in digital infrastructure, low digital literacy among tourism stakeholders, weak coordination, and resistance to digital change. These findings show that the success of smart and sustainable tourism does not depend solely on the availability of technology, but also on the readiness of human resources, policy support, and local community involvement. Therefore, the development of a smart and sustainable tourism ecosystem requires cross-sector collaboration involving the government, academics, the tourism industry, and society. This collaboration is needed to ensure that the implementation of technology and innovation takes place inclusively, adaptively, and sustainably, and provides long-term benefits for the development of Indonesian tourism.

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