

Semarang's nature tourism: Sustaining growth through digital-based innovation and stakeholder collaboration

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Abstract

Purpose: This study aims to explore strategies for conserving sustainable nature tourism in Semarang City by emphasizing the roles of stakeholder collaboration and digital-based innovation. As a provincial capital, Semarang holds diverse yet under-optimized tourism potential, especially in its natural attractions.

Methodology/approach: The research uses a qualitative case study approach focusing on Tinjomoyo Forest and Jatibarang Reservoir. Data were gathered through in-depth interviews with stakeholders, participant observation, and document analysis. Thematic analysis was applied to identify patterns related to collaboration and digital transformation in tourism management.

Results/findings: Findings show that collaboration among local governments, MSMEs, and communities has supported improvements in tourism services and promotion. However, the adoption of digital technologies for governance and marketing remains limited. Infrastructure deficits and lack of digital capacity are key barriers

Conclusion: Strengthening stakeholder collaboration, enhancing digital literacy, and developing inclusive infrastructure are critical to advancing sustainable tourism in Semarang. A practical development model integrating community empowerment and technology is essential for long-term impact. equipment, reducing reliance on conventional UPS systems.

Limitations: This study is limited to two tourism sites and relies solely on qualitative methods, reducing its generalizability.

Contribution: This research contributes to the discourse on urban sustainable tourism by offering a replicable model centered on collaboration and digital innovation, particularly applicable to developing cities facing rapid urbanization and environmental challenges.

Keywords: *Collaboration, Digital Innovation, MSMEs, Semarang, Sustainable Tourism*

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1. Introduction

Semarang City is a provincial capital on the island of Java, specifically in Central Java. As a provincial capital, Semarang is known for its diverse tourist attractions, including ecotourism, shopping districts, religious tourism, heritage sites, culinary spots and tourism villages. Although not yet fully optimized, improvements have been made by the relevant municipal authorities in Semarang City, particularly in their use of social media, which has shown promising results in this study. These platforms also provide

details about annual events that highlight local wisdom (Vitasurya, 2016), such as the Dugderan Festival, Pasar Imlek Semawis, Sam Poo Kong, Imlek Festivals, and Nyadran, traditions observed by the residents of Kali Kandri. These events are organized by the residents of Semarang City and have been passed down through generations. These events uphold inclusivity without discrimination based on race, ethnicity, social class, origin, or religion. Their successful implementation is deeply rooted in the spirit of Pancasila nationalism, which is reflected in these events.

The improvements made by the relevant authorities have yielded significant results. This is evident in the increasing number of visitors to tourist attractions in the city. From 2019, during the pandemic, to 2023, the data shows a steady rise in tourist numbers. This trend is illustrated in Table 1, which highlights the continuous growth in tourist arrivals from 2019 to 2023 as follows:

Table 1. Tourist Visit in Semarang City

No.	Year	International Tourists	Nusantara Tourists	Total
1	2017	59.672	4.964.804	5.024.476
2	2018	66.105	5.703.283	5.769.388
3	2019	82.030	7.223.529	7.305.559
4	2020	6.628	3.260.303	3.266.931
5	2021	77	2.663.684	2.663.761
6	2022	4.918	5.338.233	5.343.151
7	2023	13.992	6.478.883	6.492.875

Source: Semarang City Department of Culture and Tourism 2017-2023

Table 1 highlights the significant impact of the pandemic (Zhang, Qiu, Wen, Song, & Liu, 2023), particularly in reducing the number of visitors, especially international tourists. This situation has provided valuable lessons for society, particularly for those involved in the tourism sector, revealing that international tourists are highly sensitive not only to security concerns, such as theft, violence, or fraud at tourist sites, but also to environmental health issues, which have become key considerations when choosing a travel destination (Gavurova, Skare, Belas, Rigelsky, & Ivankova, 2023). Therefore, the management of tourist attractions must collaborate with other stakeholders to ensure that tourists, especially international ones, can enjoy their trips according to their needs. Based on the references and expectations of tourists, tourism visits are more likely to materialize if the necessary facilities are available and accessible.

Tirang Beach is a nature tourism destination in Semarang City, offering scenic beauty that can be enjoyed in the morning and evening. However, the facilities at this tourist site are inadequate. For example, accessibility to the location is poorly maintained, public transportation is unavailable, and essential facilities such as accommodations, information centers, restaurants, and cafés are minimally provided at the location. Moreover, cleanliness and environmental health have not yet been prioritized in the region. Despite its captivating charm, the lack of essential tourist facilities makes it less appealing to visitors (Mahrinasari, Bangsawan, & Sabri, 2024). Many other nature tourism sites in Semarang City require further development, both in terms of essential tourist amenities and supporting facilities that enhance the overall experience. These supporting elements include unique souvenirs and distinctive culinary options, which can be provided by local micro, small, and medium enterprises (MSMEs) operating near tourist sites (Maziliauske, 2024). To develop natural tourism in Semarang City, several key challenges must be addressed, including limited transportation, insufficient information centers, environmental cleanliness and health concerns, inadequate accommodations, and a lack of engagement with MSMEs. Additionally, the use of digital systems remains underutilized in tourism management and as a means of promotion and information dissemination. The involvement of stakeholders in collaborative efforts is still lacking.

These issues must be resolved promptly in the future. What strategies should be implemented to ensure sustainable development of nature-based tourism? In fostering collaboration, careful consideration is required regarding the strategy. Digitalization is an effective means of providing information; however,

not all tourism actors fully understand the importance of digital systems and social media as tools for promotion and information dissemination.

2. Literature Review

2.1. Nature Tourism

Semarang City boasts a rich diversity of natural tourist attractions, ranging from coastal areas to the highlands. Marina Beach and Tirang Beach offer stunning ocean views and recreational activities (Widiyanti 2018). Goa Kreo, located in the Jatibarang Reservoir, provides a spectacular landscape and serves as a habitat for monkeys (Ernadia, Werdiningsih, & Suyono, 2014). Dukuh Semilir combines cool, fresh air with a scenic city landscape, whereas Mangkang Wildlife Park serves as an educational destination for wildlife conservation (Pradana, Larasati, & Mustam, 2013). Digital innovations, such as the reservation system at Goa Kreo, have improved tourism management efficiency (Santarsiero et al., 2024). Additionally, Marina Beach is enhancing its eco-friendly facilities, and conservation efforts at Mangkang Wildlife Park actively involve local communities (WWF, 2009)

2.2. Shopping Tourism

As a metropolitan city, Semarang offers diverse shopping experiences. Pasar Johar, the largest traditional market in Central Java, provides a wide range of goods, including daily necessities and antiques (Ikram and Nur, 2012). Modern malls such as Paragon City, Citraland, and DP Mall have adopted a one-stop shopping concept that integrates retail, entertainment, and culinary experiences (Kirk, 2023). Gang Baru in the Chinatown district showcases authentic Chinese products and cuisine, while Pasar Semawis serves as a successful night market model that merges culture with the creative economy (Kirk, 2023). Innovations such as the use of QRIS in Pasar Johar and augmented reality technology in Paragon City further enhance the shopping experience (Gunawan, Fatikasari, & Putri, 2023). This is in line for prominent brand experience to enhance tourism (Tarigan, Lubis, Rini, & Sembiring, 2020).

2.3. Religious Tourism

Semarang City offers a rich religious tourism experience that reflects its cultural and religious diversity. The Grand Mosque of Central Java, with its magnificent architecture and Al-Husna Tower, is a remarkable religious landmark (Rysbekova, Duissenbayeva, & Izmailov, 2014). Sam Poo Kong Temple not only been used as a place of worship but also as a center for the preservation of Chinese cultural heritage (Cristea, Apostol, & Dosescu, 2015). The Blenduk Church, with its distinctive colonial architecture, exemplifies the acculturation of European and local cultures. Religious complexes in Semarang have evolved into tourist destinations that promote tolerance and cross-cultural understanding (de Matos, Chen, Maggs, Godfrey, & Hort, 2025).

2.4. Heritage Tourism

Semarang's Old Town, known as *Little Netherlands*, is the largest Dutch colonial architectural complex in Indonesia, featuring stunning historical buildings. The revitalization of this area has successfully enhanced its historical and economic value.

Lawang Sewu serves as a prime example of the successful adaptation of a historical building into a modern tourist destination, demonstrating the contribution of Semarang's heritage district to the creative economy through historical tourism (Idajati, 2014). The revitalization of the Old Town adopts an innovative preservation model, such as *smart heritage tourism*, which utilizes mobile applications for an interactive historical exploration experience (Mandić and Kennell, 2021). Additionally, the development of heritage routes connecting historical sites has improved accessibility and deepened tourists' understanding of the city's historical significance. Through these efforts, the Old Town not only preserves its cultural heritage but also functions as a hub for creative economic activities (Indrianto & Kristanti, 2024), creating a unique attraction for both local and international visitors. Heritage and cultural tourism can promote sustainable tourism, particularly in rural areas rich in cultural traditions (Soeswoyo, Arafah, Oktadiana, & Budiman, 2025).

2.5. Culinary Tourism

In the ethnographic study of Semarang's signature culinary heritage, dishes such as *lunpia*, *bandeng presto*, and *wingko babat* are widely recognized as culinary icons that have gained national acclaim. For instance, Lunpia has been identified as a signature dish that blends local flavors with Chinese cultural influences. *Bandeng presto* and *wingko babat* are also highly sought-after souvenirs among tourists due to their uniqueness. Uniqueness in taste and syncretic local and non-local tastes contribute to the growth of culinary tourism (Khairatun, 2020).

Culinary tourism not only strengthens cultural identity but also makes a significant contribution to the local economy through the tourism sector. Culinary tourism has been identified as a key element driving the development of tourism in Semarang (Indrianto & Kristanti, 2024) and has a substantial impact on the local economy. The success of Pasar Semawis in managing nighttime culinary tourism serves as a model for sustainable culinary development.

Various studies have emphasized the importance of innovation and standardization in advancing traditional cuisine. Innovation includes the application of modern food technology to extend the shelf life of *lunpia* through advanced packaging techniques, without compromising its authentic taste. Additionally, the development of food mapping applications has helped tourists locate authentic Semarang cuisine. Programs such as halal certification and hygiene standardization for traditional food vendors have also contributed to improving food safety (Patandianan and Shibusawa, 2020).

2.6. Tourism Village

The development of tourism villages in the Semarang region is a tangible example of effective community empowerment. For instance, the Kandri Tourism Village has successfully integrated environmental conservation with local economic growth. Through interactive programs, the village not only attracts tourists but also fosters a deeper appreciation of local traditions (Gao & Wu, 2017). The adoption of digital technology also plays a crucial role, such as the implementation of a digital-based tourism management system for accommodation reservations and visitor monitoring, which enhances convenience for tourists. Additionally, digital marketing training for local MSME entrepreneurs has helped expand the market reach of their products (Pattiyagedara and Ranasinghe, 2024).

In contrast, Wonolopo Tourism Village offers a unique appeal through the development of technology-driven agro-tourism or smart farming, which not only enhances tourist appeal but also promotes innovation in the agricultural sector. By integrating digital technology with community empowerment, tourism villages in Semarang can preserve their cultural and environmental heritage while simultaneously improving the livelihoods of local residents. This success has positioned Semarang's tourism villages as models of sustainable community-based tourism (Zeng, 2024).

Sustainable tourism management is a complex endeavor that encompasses environmental conservation, economic growth, and social inclusion. To achieve this, the key strategy involves synergy among stakeholders and the utilization of digital technologies. This synergy includes the roles of the government, business actors, local communities and tourists. The government is responsible for providing supportive policies and infrastructure, while the private sector plays a role in investing and developing tourism services. Local communities preserve cultural wisdom and environmental sustainability, whereas tourists must be empowered to support responsible tourism practices. The success of this approach requires effective communication and equitable distribution of responsibilities among all stakeholders (Luongo, Sepe, & Del Gaudio, 2023).

Digital technology is a key driver of sustainable tourism. Mobile applications, Geographic Information Systems (GIS), and social media can be utilized to enhance transparency in management and strengthen community participation. Digital marketing plays a crucial role in effectively promoting destinations and mitigating the risks of over-tourism. Additionally, the use of technologies such as the Internet of Things (IoT) enables real-time environmental monitoring, whereas augmented reality (AR) and virtual reality (VR) can raise awareness of ecosystem conservation without causing direct environmental impacts. These technologies have been recognized for their potential to enhance tourists'

environmentally responsible behaviors by providing virtual experiences that foster a deeper understanding of ecological issues (Su, Lei, Lu, Lai, & Zhang, 2024).

The empowerment of local communities through e-commerce and culture-based platforms strengthens their roles in managing and promoting destinations. Sustainability can be achieved if digital technology serves as a tool that connects the government, business actors, local communities, and tourists. Digital platforms can be leveraged to foster more inclusive collaboration, enabling local communities to actively participate in sustainable tourism management. For instance, the adoption of digital technologies in rural tourism has been shown to enhance residents' empowerment across individual, political, and social dimensions, thereby facilitating more effective participation in tourism development processes (Lapuz 2023).

3. Research Methodology

To foster long-term tourism sustainability, collaboration must be accompanied by evidence-based innovation. Creating inclusive development plans that integrate digital tools and participatory governance mechanisms is key to empowering MSMEs. Digital storytelling, mobile-based promotional platforms, and tourism-focused e-commerce not only enhance visibility but also increase market competitiveness. Such strategies align with the findings of Luongo et al. (2023) and Maziliauske (2024), who emphasized regional innovation systems in tourism and co-creation benefits (Luongo et al., 2023; Maziliauske, 2024).

This study employs a qualitative approach with a case study design to explore collaboration and innovation practices in the management of sustainable nature tourism in Semarang. A case study design was chosen to enable an in-depth analysis of specific phenomena, including actor interactions and local dynamics (Creswell & Creswell, 2017). The research subjects included tourism managers, local government authorities, business actors, local community groups, and tourists. This study focuses on Tinjomoyo Forest Tourism and the Jatibarang Reservoir, two destinations with significant potential but facing sustainability challenges.

Data were collected using three primary methods. In-depth interviews with tourism managers, government officials, and business actors were conducted to examine collaboration and innovation strategies. Participant observation provided direct insights into management practices, and documentation analysis gathered secondary data from official reports and media articles. The combination of these methods ensured comprehensive data collection from multiple perspectives. Data were analyzed using thematic analysis (Braun & Clarke, 2006).

This process involved familiarization with the data, coding, identification of key themes, such as cross-sector collaboration and digital technology, and analyzing the relationships among themes to develop a holistic understanding. Validity and reliability were ensured through methodological triangulation by comparing the findings from the interviews, observations, and document analysis, as well as validating the results with key informants (Miles, Huberman, & Saldana, 2014). These findings highlight the importance of cross-sector collaboration and digital innovation in sustainable tourism management. The government, local communities, and businesses play complementary roles in ensuring environmental sustainability while generating economic and social benefits. Digital technology, including management and marketing applications, enhances operational efficiency and the tourist experience. This approach presents an adaptive management model for addressing the sustainability challenges in Semarang.

The strategic use of digital technology in tourism village planning also provides scalable models for environmental, social, and economic resilience. Zeng (2024), argues that entrepreneurial orientation paired with localized support mechanisms boosts MSME productivity in tourism. Training and infrastructure should be paired with analytics platforms to track visitor preferences and behaviors and maximize innovation impact. (Zeng, 2024).

4. Results and Discussion

The collaboration between Micro, Small, and Medium Enterprises (MSMEs) and the tourism attraction sector represents a synergy that enriches the tourist experience and has the potential to enhance local economic competitiveness. Such collaborations can be sustained and expanded through systematic, collaborative, and innovation-driven approaches. Achieving this requires the active involvement of various stakeholders, including MSMEs, the government, local communities, and the tourism sector itself. Recent studies have shown that fostering social capital—encompassing trust, networks, and shared norms—alongside innovation, significantly contributes to improving MSME competitiveness in tourism areas. These elements facilitate better collaboration and adaptability, enabling MSMEs to effectively meet the evolving demands of the tourism market (Kawulur, Sumual, & Wuryaningrat, 2025).

MSMEs in Indonesia serve as a key pillar of the national economy. According to data from the Ministry of Cooperatives and MSMEs (2020), more than 99% of businesses in Indonesia are MSMEs, contributing approximately 60% to the country's gross domestic product (GDP). The tourism sector also plays a crucial role in the economy, as Indonesia boasts numerous attractive destinations. Therefore, collaboration between MSMEs and the tourism sector is highly strategic for enhancing tourism appeal, improving service quality, and accelerating post-pandemic economic recovery. This collaboration strengthens the tourism ecosystem by introducing unique and authentic local products from MSMEs, such as handicrafts, regional culinary specialties, and traditional clothing, which attract tourists. Additionally, such partnerships enable MSMEs to benefit from the increasing number of tourists at specific tourism destinations. To ensure long-term sustainability, stakeholders must take several key steps to strengthen collaboration.

4.1. Innovative Product Development Rooted in Local Wisdom

One effective form of collaboration is the development of innovative products with a high market value in the tourism sector. For instance, MSMEs can create handicraft products that reflect local culture, which can be sold at tourist destinations. These products should meet the needs of the tourism market in terms of quality and uniqueness. Local governments and tourism destination managers can collaborate to facilitate training programs for MSMEs in product design and attractive packaging, enabling their products to compete in broader markets (Ginting, 2019).

An example of this is the production of Troso Ikat Weaving (*Tenun Ikat Troso*) bags and accessories from Jepara. This initiative utilizes *Troso* woven fabric, which features distinctive traditional motifs, as the primary material and transforms it into modern products, such as bags, wallets, shoes, and fashion accessories. The design incorporates a combination of traditional woven patterns and contemporary elements to attract younger markets. Furthermore, the production process applies eco-friendly dyeing technology, using natural dyes derived from plants, such as *Indigofera* and mangosteen peels. The marketing of these products is enhanced through digital collaboration, with sales conducted via e-commerce platforms and social media under the branding of 'Eco-Luxury Fashion'. This initiative not only promotes the uniqueness of *Troso* weaving but also highlights local wisdom, as the woven motifs symbolize the traditional narratives and cultural philosophy of the Jepara community. This initiative plays a crucial role in preserving the traditional weaving industry by empowering local artisans and ensuring that craftsmanship continues to thrive in the modern market.

4.2. Human Resource Capacity Development

To ensure optimal collaboration, human resources involved—both from MSMEs and tourism destination managers—must receive training in business management, tourism services, and technology use to promote products and destinations. MSMEs actors need to be trained to adapt to digital trends, such as social media marketing, to enable their products to be more easily discovered by tourists. Additionally, training is essential to ensure the quality of the products and services offered. Effective training programs have been shown to significantly enhance the digital marketing capabilities of MSMEs, leading to improved business performance and increased competitiveness in the tourism sector (Basalamah, Mahmud, & Hasbi, 2023).

One innovative approach to human resource training is gamification-based learning. Gamification-based learning integrates game elements and mechanics into the learning process to create a more engaging, interactive, and enjoyable experience. Its primary goal is to enhance the motivation, engagement, and learning outcomes of participants, aligning with the intended objectives (Nuanmeesri, 2022).

4.3. Strengthening Infrastructure and Accessibility

Adequate infrastructure is essential for ensuring smooth collaboration between MSMEs and the tourism sector. Improving accessibility to tourist destinations, such as well-maintained roads, integrated public transportation, and other supporting facilities, will accelerate the flow of visitors to these areas. A study focusing on East Java, Indonesia, demonstrated that improvements in transportation services, such as increased accessibility, comfort, and connectivity, positively influence tourists' decisions to visit (Murniati & Wenzano, 2024). Consequently, MSMEs will gain greater benefits from the increasing number of tourists visiting the area. Government and tourism destination managers must collaborate to develop infrastructure that supports this ecosystem. The infrastructure and accessibility measures provided are as follows:

4.3.1. Revitalization of Semarang Old Town

The Old Town has been revitalized with pedestrian-friendly facilities, such as parks, artistic street lighting, and seating areas. This area also serves as a regular venue for festivals and MSME bazaars, where local delicacies, such as *lumpia*, and traditional handicrafts are showcased. Improved infrastructure enhances visitor comfort, attracts more tourists, and creates valuable opportunities for MSMEs to expand their market, increase revenue, and introduce local products to domestic and international visitors.

4.3.2. Accessibility of Roads to Key Tourist Destinations

The Semarang City Government has improved road quality, leading to major tourist destinations such as Goa Kreo and Jatibarang Reservoir. Widened and upgraded transportation routes have facilitated easier access for tourists to the region. As mobility improves, the number of visitors to these destinations has increased, creating a positive impact on local MSMEs, including souvenir vendors selling *Batik Semarangan* and popular local snacks.

4.3.3. Implementation of Integrated Tourism Transport Systems

The double-decker sightseeing buses, known as *Si Denok*, *Si Kenang*, and *Si Kuncung*, collectively referred to as the *Semarang Sightseeing Bus*, serve as an innovative transportation solution connecting major tourist destinations such as the Old Town, Lawang Sewu, and Simpang Lima. This route also includes local souvenir centers and traditional markets, allowing tourists easy access to MSME products and services.

This integrated transportation system enhances travel convenience, increases the attractiveness of tourist destinations, and creates economic opportunities for MSME entrepreneurs along the key tourism routes. These three buses are available for free to the public, allowing families and individuals to explore Semarang at no cost. They operate daily with a well-organized schedule that is easily accessible to the public.

4.3.4. Expansion of MSME Markets in Strategic Areas

Modern MSME markets have been established in strategic locations, such as Simpang Lima and Marina Beach. These centers provide kiosks for MSMEs to market products, such as handicrafts and local culinary specialties. Their proximity to major tourist attractions makes these products accessible to visitors. With attractive designs and comfortable facilities, these markets serve as both shopping tourism destinations and key drivers of MSME growth in the region.

4.3.5. Implementation of Free Wi-Fi Services in Tourist Areas

Free Wi-Fi in tourist areas such as Srigunting Park and Simpang Lima supports both tourists and MSME entrepreneurs. Tourists can share their experiences online, enhancing the digital promotion of tourist

destinations. Meanwhile, MSME entrepreneurs can leverage this connectivity to market their products on digital platforms, expand their consumer reach, and increase their competitiveness in the modern marketplace.

4.3.6. Expansion and Modernization of Rest Areas on Semarang's Entries

Rest areas along the Semarang-Solo and Semarang-Demak toll roads are equipped with MSME kiosks selling local products, such as *wingko babat* and *bandeng presto*. These facilities provide a strategic space for MSMEs to showcase Semarang's signature products to tourists. With comfortable rest areas, tourists are more inclined to stop and shop, thereby increasing sales opportunities.

4.3.7. Infrastructure Enhancement at Ahmad Yani International Airport

Ahmad Yani International Airport now features modern facilities and improved access to the city center and tourist destinations. As the primary gateway for both domestic and international travelers, airports play a crucial role in tourism growth. This expansion has significantly benefited MSMEs around the airport by enabling direct sales through official outlets and promoting local products, such as Semarang's signature souvenirs, to tourists.

4.3.8. Tourism and Local MSME Festivals

Semarang City regularly hosts events, such as the Semarang Night Carnival and Semarang Culinary Festival. These events provide a platform for MSMEs to market their products directly to tourists. Festivals not only attract public attention but also enhance the visibility of local products, create opportunities for collaboration, and strengthen the appeal of tourism destinations based on culture and the creative economy.

4.3.9. Strategic Development of New Tourism Areas

Kampung Pelangi Semarang serves as a successful example of a newly developed tourism area that has gained widespread attention. With its brightly colored houses and strategic location, this area has become popular on social media platforms. Local MSMEs have capitalized on this opportunity by selling souvenirs and traditional food to tourists. The area's growing popularity has increased visitor numbers and generated direct economic benefits for the local entrepreneurs.

4.3.10. Collaboration with the Private Sector

Collaboration between the government and private sector facilitates the development of infrastructure, such as hotels, restaurants, and parking facilities, near major tourist destinations. These amenities enhance tourist comfort, attract more tourists, and create an ecosystem that supports MSME growth. MSMEs around tourist sites directly benefit from increased tourist numbers through higher sales of their local products.

4.4. Collaborative Marketing

Marketing is crucial to ensuring effective collaboration between MSMEs and tourist attractions. Integrated marketing efforts that combine MSME products with tourist destinations can be implemented through social media, tourism campaigns and joint promotional events. A notable example is the *One Village One Product (OVOP)* program, which has been widely adopted in various regions to promote local MSME products and tourism destinations. Through collaborative marketing, both parties can benefit mutually. The OVOP program has been instrumental in promoting local products by integrating them with tourism initiatives, thereby enhancing the visibility of both products and tourist destinations (Widiyanti, 2018).

In Semarang City, several subdistricts have successfully implemented the OVOP program. For instance, the Kandri Sub-district (Gunungpati District) is known for its bamboo handicrafts and culture-based tourism sector. This village is recognized for its educational agro-tourism initiatives and local festivals, such as the *Kampung Dolanan Festival*. Similarly, Tembalang Sub-district specializes in local culinary products, including *bandeng presto* (pressure-cooked milkfish), *wingko babat* (coconut sticky rice cake), and *keripik tempe* (tempeh chips). Meanwhile, Gemah Sub-district (Pedurungan District) is

renowned for its distinctive Semarang batik, featuring local motifs such as *Tugu Muda* and *Lawang Sewu*.

4.5. Sustainability and Local Economic Continuity

Sustainable collaboration must prioritize sustainability principles in environmental, social, and economic aspects. Therefore, tourism products and destination management must consider their impact on the environment and local communities. MSMEs should be empowered to utilize environmentally friendly and sustainable raw materials while minimizing production waste.

Additionally, this collaboration must actively involve local communities in preserving cultural and environmental heritage to ensure that tourism remains an attractive option for visitors (Pattiyagedara & Ranasinghe, 2024). Collaborative efforts to ensure sustainability and the long-term viability of tourism in Semarang can be illustrated as follows:

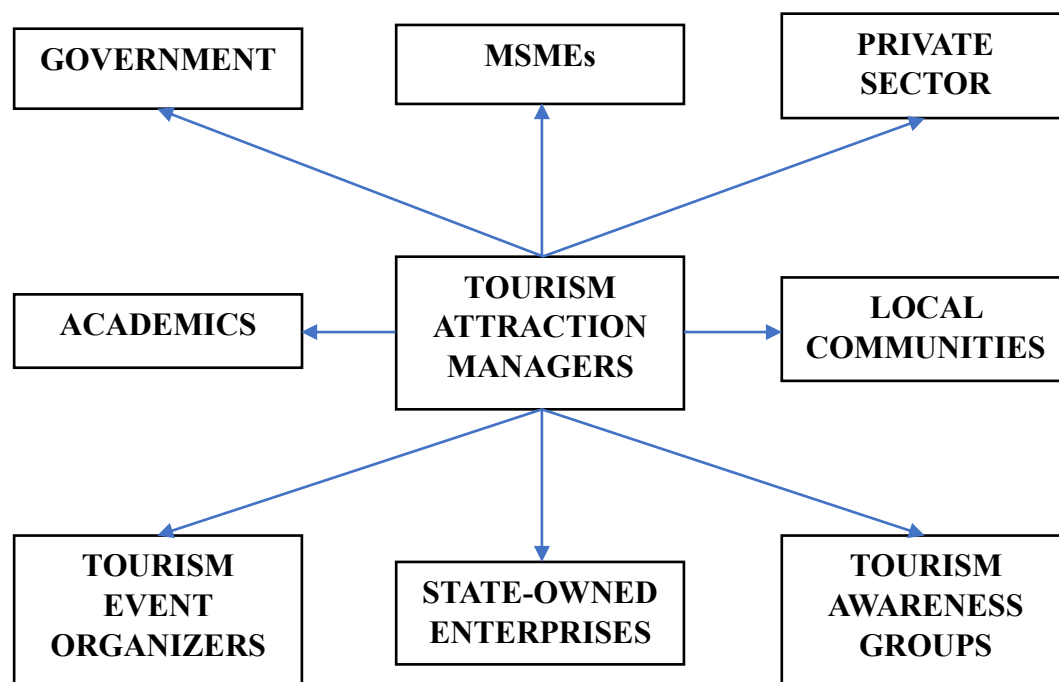


Figure 1. Stakeholder Collaboration in Tourism Attraction Management

Collaboration among the government, local communities, private sector, and academia is key to ensuring the sustainability of tourism in Semarang City. The government works alongside local communities to preserve culture and the environment, such as the revitalization of the Old Town and the promotion of local wisdom-based tourism, including Kampung Pelangi and Kampung Batik. Partnerships with MSMEs and the private sector help promote authentic experiences through local tourism packages, and digitalization enhances access to tourism information. Environmentally friendly infrastructure, education, and awareness campaigns support sustainable ecotourism, which is reinforced by academic research and sustainability-based event management.

Regular monitoring and evaluation ensure a balance between economic growth and the preservation of the environmental and cultural heritage. Additionally, tourism infrastructure must incorporate climate-resilient designs and smart technologies. Santarsiero et al. (2024) highlight how innovation labs can play a critical role in rethinking tourism systems at the local level. These spaces facilitate adaptive planning, stakeholder experimentation, and real-time performance monitoring. The use of AR/VR and the Internet of Things (IoT) further opens the door to immersive yet low-impact visitor experiences (Santarsiero et al., 2024).

5. Conclusion

5.1. Conclusion

Semarang City has significant potential for various types of tourism, reflecting its unique cultural heritage and local values as key attractions. The integration of digital technology, such as mobile applications and social media marketing, has significantly enhanced tourism promotion and destination management. However, infrastructure challenges in certain natural tourism destinations must be addressed to improve accessibility and visitor comfort. With the continuous increase in tourist arrivals post-pandemic, developing sustainable tourism has become a priority. This requires collaboration among the government, businesses, local communities, and tourists to create high-quality, environmentally friendly tourism services.

5.2. Limitation

While this study is insightful in exploring collaboration and digital innovation within Semarang's tourism sector, it has several limitations that should be addressed in future research. First, focusing on a single city (Semarang) limits the generalizability of the findings to other regions in Indonesia or abroad. Different regions may face unique challenges and opportunities in tourism management; thus, the strategies outlined in this study may not be directly applicable elsewhere. Furthermore, the study primarily used qualitative methods, which, although valuable for in-depth analysis, may not capture the broad statistical trends that could be identified through quantitative approaches. The reliance on interviews and participant observations, while providing rich insights, could also be influenced by subjective interpretations as they depend on the perspectives of the individuals involved.

Additionally, this study does not fully account for the economic, social, and environmental impacts of the proposed strategies, as it mainly focuses on collaboration and technological integration. Future studies should include a more comprehensive assessment of these factors, especially regarding the long-term sustainability of tourism development in Semarang. The limited scope of digitalization in this study also poses a challenge, as it acknowledges that not all tourism actors are familiar with or willing to adopt technological tools, which could hinder the full potential of digital solutions. Finally, while this study emphasizes the need for cross-sector collaboration, it does not explore in detail the barriers to such collaboration, such as political, institutional, or financial challenges, which may prevent stakeholders from effectively working together.

5.3. Suggestion

Strengthening the tourism sector requires synergy among various elements to ensure the sustainability and competitiveness of the tourist destinations. Local governments should prioritize enhancing tourism infrastructure, including road improvements, public transportation, and accommodation facilities, to enhance visitor comfort. Digital literacy training for MSMEs is crucial for maximizing product marketing through technology. Additionally, the development of an integrated tourism application can facilitate access to information and services for tourists to plan their trips. Inclusive digital-based promotion should be reinforced through social media and official websites to reach the global market and attract foreign tourists. The involvement of local communities is also essential, both in destination management and MSME empowerment, to improve their overall well-being and quality of life.

All these initiatives should align with sustainable tourism principles, such as ecotourism and environmental conservation, to preserve the natural and cultural resources. Finally, regular evaluation and monitoring by a dedicated team are necessary to ensure that the collaboration remains effective, sustainable, and aligned with its objectives.

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