The Role of Local Stakeholders in the Development of Smart Tourism Destinations: Evidence from Kota Lama Semarang, Indonesia

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ABSTRACT: The success of implementing the Smart Tourism Destination (STD) dimension is determined by the ability of local planning authorities to adopt technological innovations in building a smart ecosystem. However, the flexible use of technology in planning has resulted in a lack of conceptual clarity. This condition raises questions about whether a destination can be classified as a Smart Tourism Destination solely through technological adoption, or whether such innovations fail to address urban problems and eventually remain unused. Therefore, the implementation of the STD dimension should begin with the formulation of definitions and characteristics aligned with local capacities. The concept of STD emphasizes interaction among stakeholders as a key element in the development of tourism activities. This study employs a qualitative descriptive approach to understand the actual conditions of actors, their roles, and the interaction patterns that shape tourism activities in Kota Lama Semarang. The transformation of interactions among local stakeholders within tourism destinations into the Smart Tourism Destination framework is expected to contribute to the formulation of development strategies for the Kota Lama Semarang tourism area. Considering that the implementation of a Smart Tourism Destination must be adapted to regional characteristics, financial capacity, and human resource capabilities in adopting technological innovation, this study seeks to identify the stakeholders involved in the STD ecosystem at a fundamental level. The study aims to ensure that technological innovation remains aligned with the primary objective of a Smart Tourism Destination, namely enhancing the quality of experience for all actors involved in tourism activities.

KEYWORDS: Smart tourism destination; stakeholder interaction; Kota Lama Semarang

1. Introduction

Smart Tourism Destination (STD) emphasized the use of advanced technologies, especially IoT-based sensors, to provide real-time data on destination conditions. The collected data supported future projections and enabled adaptive planning in response to emerging issues. These data were subsequently consolidated within an open STD platform, facilitating shared

understanding and coordinated responses among local stakeholders [1–2]. Previous studies on smart cities showed that implementation was often fragmented and dominated by application-based solutions rather than integrated systems. A holistic assessment based on six core dimensions across dozens of cities in both developed and developing contexts indicated that many smart city initiatives remained partial, with limited integration of information system infrastructures and insufficient community participation. Similar patterns appeared in smart city readiness assessments, where governance arrangements, citizen participation gaps, and unequal infrastructure capacity emerged as major barriers to implementation, while discussions of actor roles tended to stop at stakeholder identification without deeper relational analysis. In several regions such as the GCC, smart city and community development also continued to be driven largely by top-down and infrastructure-oriented approaches, with relatively weak grassroots involvement [3–4].

Within the smart tourism domain, research highlighted that tourism indicators were still weakly integrated into broader smart city and smart destination measurement systems. The development of smart tourism destinations was therefore increasingly understood not merely as a technological project but as a collaborative and adaptive governance process among multiple actors. Parallel findings from community-based tourism research further underlined that destination development effectiveness depended on community participation and institutional strengthening. Heritage-focused studies stressed the importance of local identity and community awareness, although they often did not yet incorporate smart city or smart tourism dimensions [5–8].

A clear pattern emerged in which research objects were predominantly examined at the regional scale, with smart city and smart tourism topics largely oriented toward technology, indicators, and implementation performance. Community-based studies placed greater emphasis on participation and local identity, yet remained insufficiently integrated into smart city or smart tourism destination frameworks. Consequently, analyses of actor roles and interactions within smart city and smart tourism destination ecosystems remained limited, particularly in the context of developing countries.

At the practical level, STD implementation was closely linked to the capacity of local governments to adopt and manage technological innovation. Disparities in fiscal resources, regional contexts, and stakeholder characteristics led to diverse implementation patterns, indicating that STD could not be applied through a single standardized model across regions. The application of the STD concept by merely replicating best practices from developed countries without considering local fiscal capacity and stakeholder characteristics could lead to planning failure. This occurred because the adopted solutions did not always correspond to the actual needs and challenges faced by a particular planning area [9–10].

Large-scale development of technological infrastructure without careful planning carried the risk of creating a digital divide. Such conditions could limit access to smart tourism ecosystems only to groups with sufficient financial capacity. As a result, planning objectives might not have been optimally achieved and could even have led to unsustainable projects that failed to deliver long-term benefits [11].

Local actors were a central element in tourism development because they were directly connected to place, identity, and social dynamics. Communities shared interests and territorial attachment, so tourism outcomes depended on the extent to which their potentials and priorities were accommodated in planning processes. Tourism activities directly used local living space

and could shape social, economic, and cultural conditions; therefore, development needed to align with local capacity and characteristics to avoid social pressure and environmental degradation while supporting long-term livelihood and heritage sustainability [12–13].

From a governance perspective, participation represented the distribution of decision-making power, where exclusion could trigger resistance and conflict. Effective participation was typically driven by capable and committed key actors and supported by institutional capacity, access to information, and cross-actor collaboration to ensure fair benefit distribution and destination sustainability [14–15].

Tourism destinations themselves were complex multi-actor systems with interdependent and often competing interests, making integrated management challenging and requiring more adaptive governance approaches. The Smart Tourism Destination (STD) concept evolved from the Smart City framework, emphasizing ICT integration to improve destination performance and competitiveness through connected digital platforms and real-time information exchange. However, technology alone was insufficient; smart destination development also depended on human capital, leadership, social capital, and innovation capacity. Patterns of ICT utilization were highly influenced by local contexts. Smart tourism development therefore needed to be adapted to the specific needs, characteristics, and capacities of each area [16–19].

A bottom-up approach was essential, ensuring that technological development was not solely oriented toward system sophistication but also toward its relevance to local community needs. Intensive interactions among these actors fostered continuous innovation in tourism products and services. In this context, tourism organizations functioned as information management hubs that coordinated diverse data sources and provided real-time information to users. Tourists were no longer passive consumers but active, connected participants who co-created tourism experiences [20].

This study was directed toward examining smart tourism destination dimensions from a spatial and urban planning perspective, with a focus on analyzing actor roles within the smart tourism destination environment. By adopting a district-scale research object, this study aimed to provide a more contextual understanding of smart destination governance in developing countries. In the context of Kota Lama Semarang, as part of a developing country, a more simplified form of STD implementation was considered the most realistic approach. This approach emphasized the use of the STD platform as a means to manage and integrate interactions among local stakeholders involved in tourism activities. The development of digital services and physical infrastructure was then adjusted based on the characteristics of the destination as shaped by feedback from local actors. Therefore, identifying stakeholders and understanding their roles became crucial initial steps in implementing Smart Tourism Destination, as the entire process ultimately aimed to enhance the overall quality of the tourism experience [21].

2. Research Methodology

2.1. Research design.

This study uses a qualitative descriptive research design to explore the dynamics of local stakeholder interactions in the implementation of Smart Tourism Destination (STD) in Kota Lama Semarang. The qualitative approach is considered appropriate because this research aims to understand the roles and patterns of interaction among actors involved. Implementation of

the Smart City dimension in Indonesia has undergone contextual adaptation, particularly with the emergence of the Smart Branding dimension. In the national program "Gerakan 100 Smart City," which in its initial stage involved 25 regencies/cities, Semarang City demonstrated the courage to explore Smart Branding as a development priority. Within this framework, the digitalization of the tourism sector was designated as a quick win program, with Kota Lama Semarang positioned as the main icon of Semarang City's tourism destination branding. The transformation of Kota Lama Semarang's space after revitalization received UNESCO recognition as a World Heritage in 2020.

2.2. Data collection.

The primary data of this study were obtained through direct field observations conducted from 13–16 August 2025 in the Kota Lama Semarang area. The observations aimed to capture real-time interactions among Smart Tourism Destination (STD) actors, identify stakeholder engagement patterns, and examine the physical and digital environments that support tourism activities. To validate the observational findings, the study was complemented by semi-structured interviews covering the actor categories of Tourism organisations, Governments, Local residents/local communities, Tourists, private sector, and Environment. The Governments category was represented by the Dinas Pariwisata, Dinas Komunikasi dan Informatika, and Dinas Tata Ruang to explore policy direction, digital platform development, infrastructure provision, and institutional coordination related to Smart Tourism. Tourism organisations were represented by the Badan Pengelola Kawasan Kota Lama to understand destination governance and the operationalization of the smart hub function. Tourists' perceptions and experiences were collected through interviews and supported by sentiment analysis of Google Maps reviews. From the private sector, business actors and tourism startup platforms were examined to assess economic dynamics and the role of digital services. Meanwhile, the Environment aspect was analyzed through assessment of the destination's digital environment and sentiment analysis of both government STD platforms and private platforms to compare user engagement and platform effectiveness within the digital ecosystem.

3. Findings and Analysis

3.1. Smart tourism destination local actor.

The determination of local actor variables in this study was based on the intersection between Indonesia's stakeholder planning policy framework and the theoretical characteristics of Smart Tourism Destinations (STD), enabling the identification of key local actors involved in developing the STD ecosystem within the study area. Smart Tourism Destination did not merely emphasize the adoption of technology but also required a transformation in the roles of all actors within the destination ecosystem. Each stakeholder performed distinct yet interconnected functions within a system structured around data integration, participation, and co-creation [22]. The classification of stakeholders and their outcome characteristics is presented in Table 1.

Table 1. Characteristics of smart tourism destination.

No	Stakeholder	Characteristics of Outcome
1	Tourism Organisations	• Function as smart hubs coordinating relevant information and providing real-time access for users • Digitization of core business processes • Optimize energy use • Engage with local communities, tourists, and government in co-creating tourism experiences • Organizational agility, rapid decision-making, and responsiveness based on just-in-time insights • Precision targeting and personalized services
2	Governments	• Information governance supporting data openness • Regulation of data privacy • Establishment of Public–Private Partnerships
3	Local Residents / Local Communities	• Constantly connected • Creative and empowered • Technology-savvy • Engage in citizen journalism • Actively involved in developing smart heritage and e-culture initiatives
4	Tourists	• Well-connected and well-informed • Active critics and buzz makers • Demand highly personalized services • Socially and technologically engaged • Dynamically interact through social media • Co-create experiences • Contribute content
5	Environment	• Utilize end-user devices at multiple touchpoints • Interconnected through the Internet of Things (IoT) • Presence of cloud computing services • Innovation ecosystem • Sensor networks across the environment • Integration of digital information and social contexts augmenting geophysical reality • Interoperable social platforms

Tourism organizations functioned as smart hub managers responsible for coordinating up-to-date tourism information within the destination and ensuring real-time accessibility for visitors. They also acted as intermediaries between government and local communities in facilitating collaboration, digitizing core business processes, and enhancing service responsiveness. Governments served as facilitators and regulators, providing strategic direction, establishing infrastructure, ensuring data governance and privacy protection, and promoting cross-sector collaboration through public–private partnerships.

Local residents and communities played an active role in shaping the smart tourism ecosystem by utilizing available infrastructure, developing community-based attractions, and contributing to the co-creation of tourism experiences. Their participation reflected the importance of empowerment, technological adaptability, and local identity in sustaining destination development. Tourists, supported by digital technologies, assumed roles beyond passive consumption; they actively generated feedback, shared experiences through digital platforms, and contributed to content creation, thereby influencing innovation and service improvement within the destination.

The environment referred to the integrated physical and digital infrastructure supporting tourism activities. Within the STD framework, the convergence of spatial elements, sensor networks, cloud services, and interconnected platforms enhanced accessibility, information exchange, and overall destination performance. The interdependence among these five

stakeholder groups demonstrated that successful Smart Tourism Destination implementation required systemic coordination rather than isolated technological deployment [23].

The analysis of stakeholders and applicable regulatory frameworks in Indonesia demonstrated that development planning formally required multi-actor involvement. Law of the Republic of Indonesia Number 25 of 2004 concerning the National Development Planning System defined development actors as the government (central, provincial, regency, and municipal levels), the business sector, and the community, including individuals or groups with relevance and interest in development processes. The regulation mandated the participation of these three actors across all stages of development planning and implementation [24].

Further reinforcement was provided by Government Regulation Number 45 of 2017 concerning Community Participation in Regional Government Administration, which emphasized the roles of government and community actors in regional governance. This regulation required regional governments to actively encourage public participation in long-term regional development plans (RPJP), medium-term regional development plans (RPJMD), and annual regional planning processes [25]. At the local level, Regional Regulation (Perda) of Semarang City Number 6 of 2021 concerning the RPJMD 2021–2026 stipulated that policy instruments were implemented by regional government agencies and/or the community to achieve development goals and targets, thereby institutionalizing collaborative governance within the regional planning framework [26].

The synthesis of these regulatory frameworks indicated that Indonesian development policy formally recognized government, business actors, and communities as central stakeholders in development implementation. When intersected with the theoretical framework of Smart Tourism Destination (STD), these actors formed the foundational local stakeholder structure for STD governance, as illustrated in Figure 1. Based on the integration of theoretical perspectives and regulatory mandates, the scope of Smart Tourism Destination implementation in this study was divided into two principal dimensions: physical space and digital space. Physical space referred to tourism areas, supporting infrastructure, public facilities, and the built environment where tourism activities occurred. Digital space encompassed information technology utilization, data management systems, digital promotion platforms, sensor-based infrastructure, and interactive media connecting destination managers, tourists, and other stakeholders. These two dimensions were mutually reinforcing and collectively constituted the operational arena for implementing the smart tourism concept within the urban context.
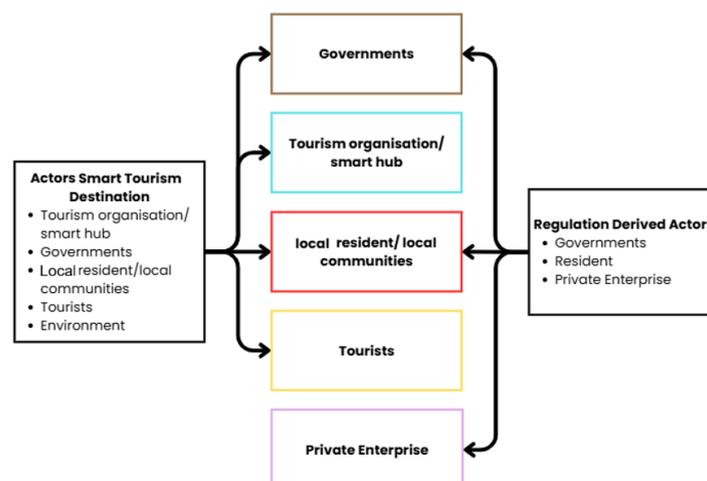

Figure 1 STD local actor variable.

4. The Role of Local Actors

In the context of Smart Tourism Destinations (STD), STD actors encompassed all elements that were affected by and involved in the planning and development process. The implementation of STD took place within an environment or implementation space that served as a platform for establishing supporting systems and infrastructure, both physical and digital. Within this space, the main STD actors consisted of government, smart hubs or tourism organizations, local communities, and the business sector, each of which played interrelated roles in supporting the integrated management and development of the destination [27,28].

4.1. Government.

The government played a role as a regulator and facilitator through policy formulation, planning, infrastructure provision, and cross-sector coordination. The government's role in the development of Smart Tourism Destinations was viewed through Law No. 23 of 2014 on Regional Government, which granted regional heads the authority to enact regional regulations during their term of office. Law No. 25 of 2009 on Public Services stated that the government, as the provider of public services, was obligated to provide facilities to ensure convenience and accessibility for the community. In the development of Smart Tourism Destinations, the government acted as both a regulator and a facilitator. It ensured the equitable provision of basic utilities and mitigated disaster vulnerability, particularly tidal flooding, through the construction of the Mberok River pumping station.

As shown in Figure 2, government intervention was reflected in urban beautification initiatives (Figure 2a) and public service digitalization (Figure 2b), which supported the smart tourism ecosystem. As a facilitator, the government was responsible for providing tourism systems and basic infrastructure, as reflected in efforts to revitalize the Semarang Old Town area as a tourism destination and to develop and digitalize tourism platforms.
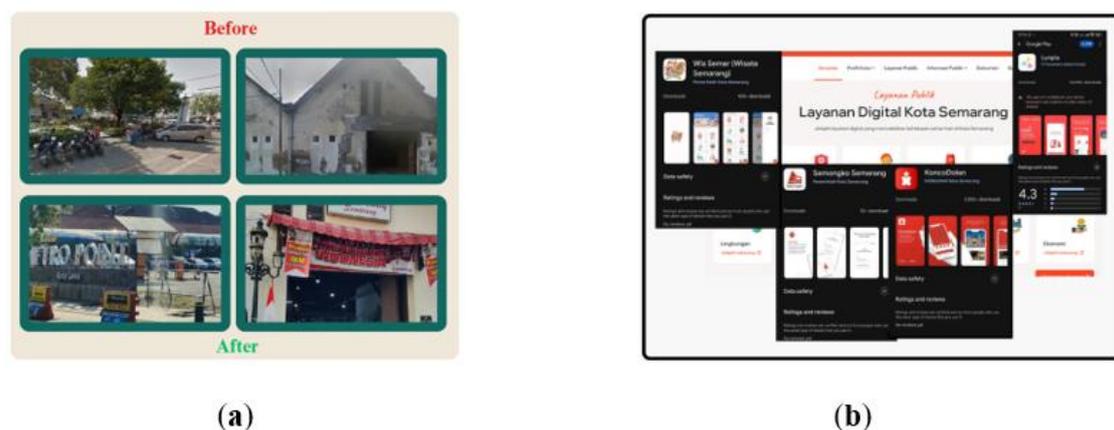

Figure 2. Urban beautification (a); Public service digitalization (b).

The innovative features offered by government-developed Smart Tourism Destination (STD) platforms were essentially also available on social media and various competing digital platforms. However, weak consistency in system updates and maintenance resulted in low user adoption of government platforms, with users preferring alternative services. This condition arose from the government's limited attention to risk analysis related to competing platforms, leading to suboptimal innovation in STD platform development. Similar challenges regarding digital governance consistency and platform competitiveness have been identified in recent

smart tourism studies [29,30]. Meanwhile, as a regulator, the government determined the direction and policy framework for the development of Semarang Smart City by positioning the Semarang Old Town Strategic Tourism Area (Kawasan Strategis Pariwisata/KSP) as a key representation of Semarang City.

4.2. Tourism organizations/smart hub.

In the ideal framework of a Smart Tourism Destination (STD), tourism organizations were positioned as smart hubs that functioned to disseminate real-time information on destination conditions to the public, while also projecting future development needs as a basis for formulating management recommendations and strategies [27, 31]. However, in practice within the Semarang Old Town area, this function had not been fully implemented. The Semarang Old Town Site Management Agency (Badan Pengelola Situs Kota Lama Semarang/BPSKL) had management objectives aligned with the smart hub concept; however, it did not fully meet the key STD criteria, particularly in broadcasting real-time situational information and utilizing data for development projections. These limitations were closely related to the region's limited fiscal capacity to adopt technological innovations, especially those based on the Internet of Things (IoT). In addition, uneven understanding among actors regarding the Smart Tourism Destination concept and Smart City dimensions further constrained the optimization of tourism organizations' roles. As a result, the smart hub function within the STD system was not fully realized. Comparable structural and technological constraints in emerging smart destinations have also been discussed in recent literature [30, 31].

4.3. Local community/citizen.

Local communities were actors who interacted directly with tourism destinations and therefore held a strategic position in determining the sustainability of the area. This close relationship placed local communities at the forefront of preserving the original characteristics of the destination, particularly the social and cultural values that had been historically embedded and formed the identity of the area. This awareness of the importance of area preservation led to the establishment of the Oen Semarang Foundation as a local community initiative that emerged from concerns over historic buildings that had been abandoned or merely used as warehouses. The community viewed heritage buildings not only as physical assets but also as carriers of social and cultural meanings that needed to be revitalized through more appropriate forms of utilization. Semarang Old Town inherently possessed a strong historical narrative as a former VOC-era residential settlement known as "Feel Like Home, Netherlands," a statement reflected in its architectural character and spatial structure. In 2012, the community and government initiated the Semarang Old Town Festival as a means of reactivating the area. This initiative marked a turning point in transforming the image of Semarang Old Town from a relatively passive area into an active public space. The Semarang Old Town Festival subsequently evolved into an annual event that reinforced the area's role as an event-based tourism destination and as a space for social interaction.

4.4. Tourist.

Tourists were key actors in tourism dynamics, as their interactions with other stakeholders constituted the primary objective of destination activities. Their experiences, perceptions, and digital footprints contributed significantly to shaping the destination's image and influencing future visitation patterns [32, 33]. As presented in Figure 3, sentiment analysis of Google Maps reviews conducted using Google Colab revealed predominantly positive perceptions of the destination. A total of 330 reviews explicitly described the place as good, beautiful, or attractive. Regarding visitation patterns, 69 visits occurred on weekdays, 270 on weekends, and 1,056 reviews did not specify the timing of visits. Additionally, 66 reviews mentioned that the location was crowded or dense, while 25 reviews expressed complaints about relatively high prices.
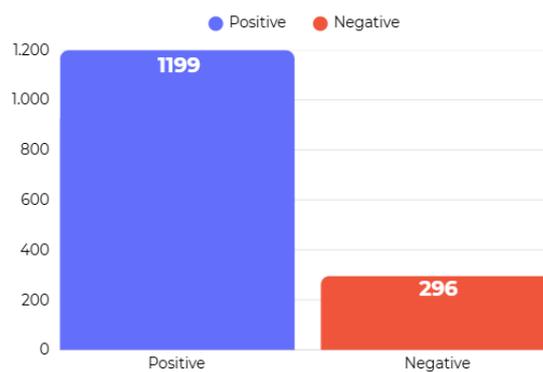

Figure 3. Tourist sentiment analysis.

Validation through interviews with randomly selected visitors to the Kota Lama Semarang area confirmed the predominance of positive perceptions toward the destination. These perceptions shaped the image of the area as a space for leisure, photography activities, and a venue for festivals and public events. This evidence indicated a shift in the meaning of the area from a formerly neglected or "dead" city into a vibrant tourism destination, aligning with government and community efforts to improve the area's image [34]. However, the study also identified the emergence of deviant behavior related to tourist activity patterns. Illegal parking practices, which had previously been addressed through the provision of designated parking areas, re-emerged due to the car-centric habits of visitors who preferred to park their private vehicles as close as possible to their intended destinations. This behavior reflected ongoing challenges in aligning tourist mobility with sustainable urban tourism management, echoing similar findings in recent smart tourism research that noted the influence of behavioral patterns on destination sustainability [33, 35].

4.5. Private enterprise.

Outside of event-based activities, tourism in Kota Lama Semarang relied heavily on the area's commercial appeal. Following the revitalization program implemented between 2017 and 2022, which included the regulation and centralization of street vendors within the Creative Industry Gallery (GIK), spatial order in the area improved. However, visitation levels to Micro, Small, and Medium Enterprises (UMKM) operating within the GIK remained relatively low. According to UMKM stakeholders, the dominance of cafés and restaurants concentrated along the main corridor gradually reduced the competitiveness of small-scale enterprises. Although the GIK was located relatively close to the main corridor, tourist movement patterns did not

fully extend to the area. This condition indicated that spatial proximity alone was insufficient to guarantee economic integration within a tourism destination, particularly when visitor flows were strongly influenced by visual attraction and activity concentration [36].

Digital platform–based private developers were also classified as private enterprises, including social media providers and tourism-supporting applications. Platforms such as Traveloka, Moovit, Gojek, and similar services contributed to the Smart Tourism Destination (STD) ecosystem through the development of user-experience-oriented services. Continuous innovation driven by user feedback enhanced levels of comfort and perceived security among local actors when utilizing these digital services. Consequently, these privately developed platforms were more widely adopted than government-managed platforms. This pattern aligned with recent studies indicating that platform usability, personalization, and responsiveness significantly influenced digital adoption in smart tourism ecosystems [37, 38].

4.6. Actors interrelation.

The concept of Smart Tourism Destination (STD) represented an effort to optimize information technology in integrating tourism activities among destination actors into a unified digital platform. STD innovations that were oriented toward the needs of destination stakeholders constituted a key prerequisite for ensuring that the developed systems were able to endure and evolve over time [39]. As illustrated in Figure 4, actor roles overlapped in relation to each other's needs and objectives, resulting in dynamic patterns of interaction within the real-world space of the tourism destination. The solid lines represented interactions that had already been established among actors, while the dashed lines symbolized interactions that had not yet occurred and were expected to emerge alongside the ongoing development of the Kota Lama Semarang tourism destination. A detailed explanation of these stakeholder relationships was presented in Table 2.
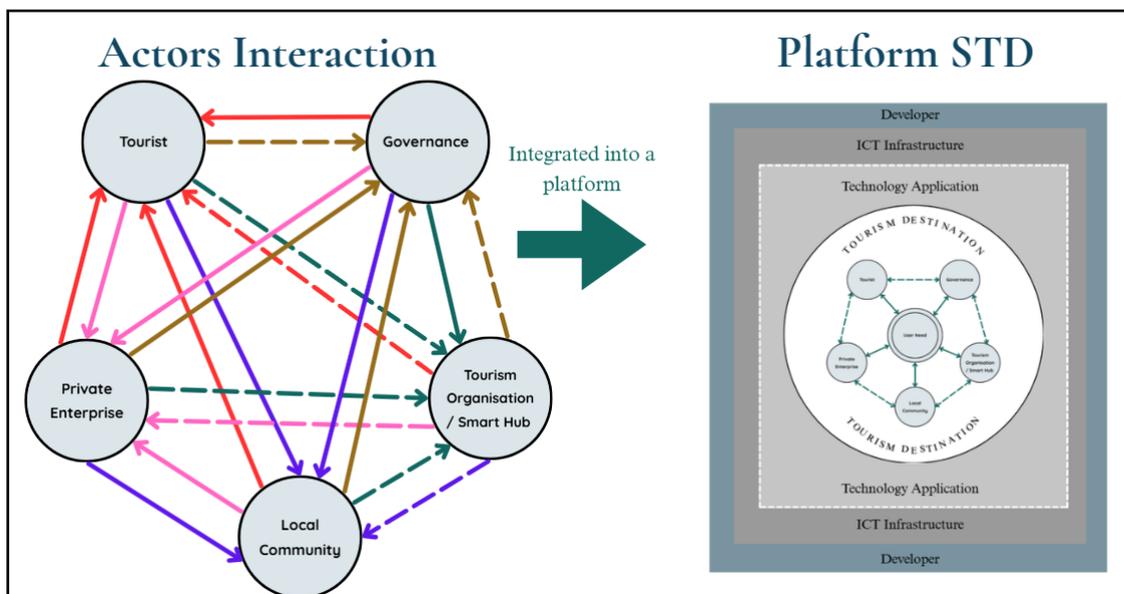

Figure 4. Conceptual actor interaction into platform STD.

Smart Tourism Destination essentially represented the optimization of information technology to manage and integrate interactions among actors within a tourism destination. Its development was oriented toward stakeholder needs and collaborative governance mechanisms

[38, 39]. The flexibility of technological innovation entering urban space made the understanding of Smart City dimensions increasingly ambiguous. Various forms of interaction among actors could be digitalized, even by a single dominant actor. This situation sometimes led to the misconception that information technology alone constituted the primary solution to diverse urban problems. However, recent smart tourism studies emphasized that governance capacity, stakeholder collaboration, and contextual adaptation remained equally important in ensuring sustainable implementation [25, 29]. Therefore, identifying actors and clarifying their roles at the initial stage of smartness implementation was essential in preventing technology-driven but socially detached development processes.

Table 2 Interaction matrix between local stakeholders.

From/To	Tourists	Governments	Tourism organisations / Smart Hub	Local communities	Private sector
Tourist	-	User Services; Input for priorities and development	Realtime public access to all destination related information	Consumption of destination attractions; social and service interactions.	Consumption of private sector products & services
Government	Facilitator of basic utilities; environmental safety & comfort	-	Development direction; tourism destination monev	Activity support; providing space for creativity & social interaction	Support for MSME, startups, and creative economy development
Tourism organisations / Smart Hub	Real-time destination data; Tourism destination customer service	Projection based on IoT and socio-cultural data analysis	-	Spatial use permits; control of deviant behavior	Control of deviant behavior; service digitalization
Local communities	Providers of destination attractions and content	Adding festival events into tourism attractions	Spatial space use permits; partner in tourism activity implementation	-	Creating economic spaces in festivals; consumption of products and services
Private sector	Demand fulfillment; product & service customization	PPP collaboration; service digitalization	Orderly use of destination space; service digitalization	Demand fulfillment; network expansion and information access	-

Based on the description of stakeholder roles discussed earlier, there are indications of role ambiguity on the part of the government in understanding and implementing the Smart Tourism Destination concept. A dedicated institution is needed to manage technological platforms and conduct risk assessments related to competitors in order to enhance long-term platform sustainability. Within the existing institutional structure, the Smart Hub domain falls under the authority of the Department of Communication and Digital Affairs (Komdigi). However, in the current workflow, sectoral agencies submit or coordinate digital licensing aspects with Kominfo for the innovations they develop, while operational management is then returned to each respective agency. This arrangement creates the potential for innovation redundancy (Figure 5).
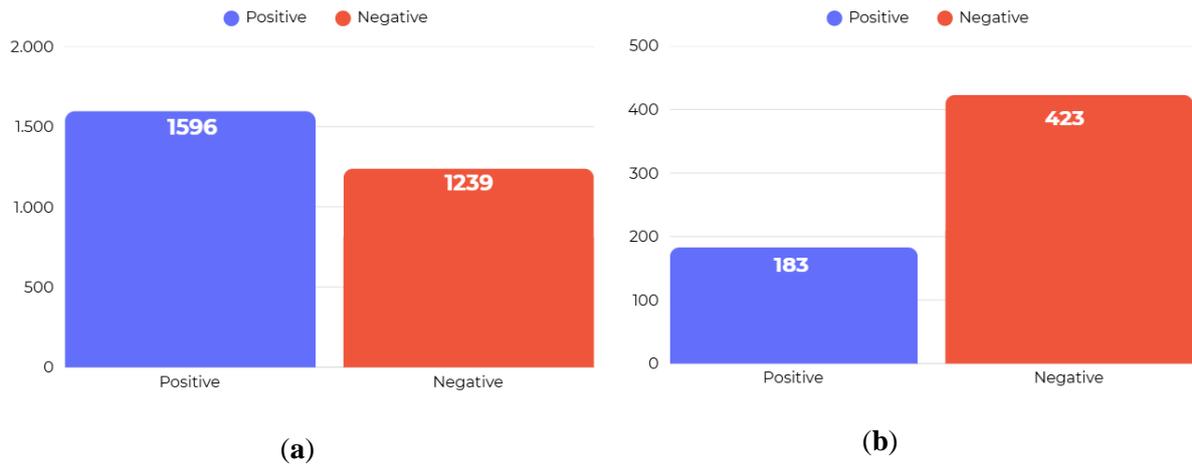
Figure 5. Sentiment Analysis Moovit (a); Sentiment Analysis Trans Semarang (b).

Moovit had a rating of 3.0 with more than 100 million downloads and offered features such as bus and train route information, nearby bus detection, and cross-country coverage including services in 15 cities in Indonesia. Sentiment analysis showed that user perception of Moovit was generally positive in terms of functionality and service coverage [33, 34]. Although the free version was considered less comfortable due to advertisements, users remained satisfied with the platform's reliability and breadth of network support. Trans Semarang had a rating of 4.6 with over 100 thousand downloads and provided more comprehensive features, including e-ticketing, route information, nearby bus tracking, free Semarang city tour bus booking, AR bus stop features, and service coverage limited to Semarang City. Despite the higher rating and richer feature set, a notable phenomenon appeared in user feedback: many users gave high ratings as a form of support for government innovation, while their written reviews often contained complaints and criticism regarding BRT Semarang operations and app performance. As a result, discussion frequently shifted away from evaluating the innovation platform itself toward broader operational issues such as routes and service performance [36, 37].

This involvement led to overlapping roles by entering the domain of digital startup competition in the process of public service digitalization. This condition became a key factor contributing to the low level of adoption of government-developed platforms, as their development had not been accompanied by adequate risk analysis of competing platforms or sufficient attention to user experience customization. A more feasible approach for the government, therefore, was not to compete directly with startups but to provide a collaborative planning platform. Such a platform would enable local actors in Semarang City to participate by offering input, development direction recommendations, and priorities for budget allocation. In addition to strengthening participatory planning processes, this mechanism also had the potential to enhance public trust through the transparency embedded in digital governance systems [38, 39].

5. Conclusions

This study identified that the development of the Smart Tourism Destination (STD) in Kota Lama Semarang was strongly influenced by the presence and roles of local actors involved in

tourism activities. A clear understanding of who the local actors were and the specific roles they played was essential for streamlining and optimizing the development process of Smart Tourism Destination initiatives. The success of STD dimension implementation did not rely solely on digital platform innovation and Internet of Things (IoT) sensor technologies to address urban challenges. An analysis of local actors within the STD ecosystem was necessary to understand development priorities and to guide more targeted and effective implementation strategies. All local actors within a Smart Tourism Destination were interconnected and constituted an inseparable system. The successful implementation of STD strongly depended on the alignment of understanding and development directions among actors. If one actor failed to understand or was not optimally involved in the system, the tourism activity chain was at risk of disruption, and the implementation of the Smart Tourism Destination remained merely a normative concept without tangible outcomes. The development of a Smart Tourism Destination should be carried out in stages, with initial emphasis on strengthening stakeholder roles and optimizing digital platforms before advancing to the adoption of Internet of Things (IoT) technologies to support data-driven planning. Since the core objective of STD was to enhance the quality of the tourism experience, development priorities in Kota Lama Semarang should focus on maximizing the performance of STD platforms and improving the physical environment of the area. The Smart Place stage could only be implemented once both stakeholder capacity and IoT systems were adequately prepared, enabling smart ecological management and real-time data-based projections as a tangible manifestation of the smart city concept.

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Author Contribution

Whildhan Win Aghany: Methodology, data collection, data analysis, and writing of the manuscript (original draft and revisions) and Achmad Djunaedi: Conceptualization and supervision.

Competing Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

References

[1] Smart tourism: A path to more secure and resilient destinations. (accessed on 1 December 2025) Available online: https://www.itu.int/dms_pub/itu-t/opb/tut/T-TUT-SMARTCITY-2022-07-PDF-E.pdf.

[2] Taylor, R.; Group, F. (2024). Book review: Routledge Handbook of Trends and Issues in Tourism Sustainability, Planning and Development, Management, and Technology. *Tourism and Hospitality Management*, *30*, 147−148. https://doi.org/10.20867/thm.30.1.11.

[3] Noori, N.; de Jong, M.; Hoppe, T. (2020). Towards an integrated framework to measure smart city readiness: The case of Iranian cities. *Smart Cities*, *3*, 676–704. https://doi.org/10.3390/smartcities3030035.

[4] Al-Saidi, M.; Zaidan, E. (2024). Smart cities and communities in the GCC region: from top-down city development to more local approaches. *Frontiers in Built Environment*, *10*, April.

https://doi.org/10.3389/fbuil.2024.1341694.

[5] Ivars-Baidal, J.A.; Vera-Rebollo, J.F.; Perles-Ribes, J.; Femenia-Serra, F.; Celdrán-Bernabeu, M.A. (2023). Sustainable tourism indicators: what's new within the smart city/destination approach? *Journal of Sustainable Tourism*, *31*, 1556–1582. https://doi.org/10.1080/09669582.2021.1876075.

[6] Korstanje, M.E. (2021). A process-based perspective of smart tourism destination governance. In Tourism Destination Management: A Post-Pandemic Context Global Issues Destination Management Solutions; Gowreesunkar, V.G.B., Maingi, S.W., Roy, H., Micera, R., Eds.; Emerald Insight: Leeds, UK. https://doi.org/10.1108/978-1-80071-511-020211025.

[7] Arintoko, A.; Ahmad, A.A.; Gunawan, D.S.; Supadi, S. (2020). Community-based tourism village development strategies: A case of Borobudur tourism village area, Indonesia. *Geojournal of Tourism and Geosites*, *29*, 398–413. https://doi.org/10.30892/gtg.29202-477.

[8] Roslan, Z.B.; et al. (2021). Reflections on local community identity by evaluating heritage sustainability protection in Jugra, Selangor, Malaysia. *Sustainability*, *13*, 68705. https://doi.org/10.3390/su13168705.

[9] Collado-Agudo, J. (2023). The adoption of a smart destination model by tourism companies: An ecosystem approach. *Journal of Destination Marketing and Management*, *28*, May. https://doi.org/10.1016/j.jdmm.2023.100783.

[10] Akbar, M. (2024). Kekhasan penerapan konsep smart city pada wilayah kabupaten: The peculiarity of application of the smart city concept in regency areas. *Region*, *19*. https://doi.org/10.20961/region.v19i1.71313.

[11] Clark, J. (2020). Uneven Innovation: The Work of Smart Cities. Columbia University Press: New York City, USA.

[12] Kinasih, W.; Zauhar, S.; Domai, T.; Said, M. (2025). The Role of Local Community in Cultural Tourism Development. *ICOPAG*, *3*. https://doi.org/10.4108/eai.30-10-2024.2354771.

[13] Adikampana, I.M. (2024). The Strategy for Local Community Participation in Tourism Planning Around Conservation Areas in Indonesia. *South Asian Journal of Social Studies and Economics*, *21*, 109–113. https://doi.org/10.9734/SAJSSE/2024/v21i2778.

[14] Reindrawati, D.Y. (2023). Challenges of community participation in tourism planning in developing countries. *Cogent Social Sciences*, *9*, 1. https://doi.org/10.1080/23311886.2022.2164240.

[15] Baswarani, D.T.; Novianto, U. (2025). Community Participation in Sustainable Cultural Heritage Tourism in The Braga Tourism Village. *ASEAN Journal of Hospitality and Tourism*, *23*, 168–182. https://doi.org/10.5614/ajht.2025.23.2.06.

[16] Tussyadiah, I.; Campo, S.; Rubio, N.; Cerd, E. (2024). Smart destinations: A holistic view from researchers and managers to tourists and locals. *Tourism Management Perspectives*, *51*, February. https://doi.org/10.1016/j.tmp.2024.101223.

[17] Vaz, R.; De Carvalho, J.V.; Teixeira, S.F.; Castanho, R. (2025). Smart tourism destination advances through qualitative research and further research avenues: a systematic literature review. *Discover Sustainability, 6*, 682. https://doi.org/10.1007/s43621-025-01590-2.

[18] Yang, Y.; Bing, S. (2025). Integrating smart technologies and artificial intelligence to build smart tourism destination ecosystems: A model for smart destination management. *Tourism Management Perspectives, 58*. 101380. https://doi.org/10.1016/j.tmp.2025.101380.

[19] Herliani, S.; Rosita. (2025). Integrasi Pariwisata Cerdas dan Manajemen Destinasi Berkelanjutan: Tinjauan Literatur Sistematis tentang Bukti Interdisipliner. *Journal of Interdisciplinary Tourism Sciences*, *1*, 39–45. https://doi.org/10.71094/jitours.v1i2.118.

[20] Alsharif, A.; Isa, S.M.; Alqudah, M.N. (2024). Smart Tourism, Hospitality, and Destination: A Systematic Review and Future Directions. *Journal of Tourism Services*, *15*, 72–110. https://doi.org/10.29036/jots.v15i29.746.

[21] Zvaigzne, A.; Mietule, I.; Kotane, I.; Vonoga, A. (2023). Smart tourism: the role and synergies of stakeholders. *Worldwide Hospitality and Tourism Themes*, *15*, 5. https://doi.org/10.1108/WHATT-06-2023-0079.

[22] García Revilla, M.R.; Perogil Burgos, J.; Einsle, C.S.; Martinez Moure, O. (2022). Proposal of New Strategies for Smart Tourism Destinations in the Challenging New Reality: A Commitment to the Technology–Sustainability Binomial. *Sustainability*, *14*, 5867. https://doi.org/10.3390/su14105867.

[23] Coelho de Souza Filho, J.J.; dos Anjos, S.J.G.; dos Anjos, F.A.; Kuhn, V.R. (2025). Tourism Innovation Ecosystems: Insights from Theory and Empirical Validation. *Tourism and Hospitality*, *6*, 272. https://doi.org/10.3390/tourhosp6050272.

[24] Gretzel, U.; Sigala, M.; Xiang, Z.; Koo, C. (2020). Smart tourism destinations: A systematic literature review. *Sustainability*, *12*, 5938. https://doi.org/10.3390/su12155938.

[25] Bastidas-Manzano, A.B.; Sánchez-Fernández, J.; Casado-Aranda, L.A. (2021). The past, present, and future of smart tourism destinations: A bibliometric analysis. *Sustainability*, *13*, 12739. https://doi.org/10.3390/su132212739.

[26] Buhalis, D.; Leung, R. (2023). Smart hospitality and tourism: Digital transformation and innovation. *Information*, *14*, 112. https://doi.org/10.3390/info14020112.

[27] Koo, C.; Shin, S.; Gretzel, U.; Hunter, W.C.; Chung, N. (2021). Conceptualization of smart tourism destination competitiveness. *Sustainability*, *13*, 5657. https://doi.org/10.3390/su13105657.

[28] Li, Y.; Wang, Y.; Xu, H. (2021). Integrating sentiment analysis of online travel reviews for smart tourism destinations. *Sustainability*, *13*, 12345. https://doi.org/10.3390/su131312345.

[29] Mariani, M.; Di Felice, M.; Mura, M. (2022). Tourist behavior and online sentiment: A cross-country analysis for sustainable tourism planning. *Sustainability*, *14*, 1589. https://doi.org/10.3390/su14031589.

[30] Wang, D.; Li, X. (2023). Exploring residents' and tourists' perceptions for smart tourism governance: A comparative study. *Sustainability*, *15*, 6702. https://doi.org/10.3390/su15186702.

[31] Guttentag, D.; Smith, S.L.J.; Charbonneau, É.; Sirakaya-Turk, E. (2024). Behavioral drivers of tourism mobility and implications for destination sustainability. *Information*, *15*, 213. https://doi.org/10.3390/info15040213.

[32] Rasoolimanesh, S.M.; Seyfi, S.; Hall, C.M.; Hatamifar, P. (2021). Understanding memorable tourism experiences and tourist behavioral intentions in heritage destinations. *Sustainability*, *13*, 4264. https://doi.org/10.3390/su13084264.

[33] Pai, C.-K.; Liu, Y. (2020). The impact of platform quality on user satisfaction and behavioral intention in smart tourism applications. *Sustainability*, *12*, 9360. https://doi.org/10.3390/su12229360.

[34] García-Milon, A.; Olarte-Pascual, C.; Juaneda-Ayensa, E. (2022). Assessing the moderating effect of user experience on smart tourism technology adoption. *Sustainability*, *14*, 10245. https://doi.org/10.3390/su141610245.

[35] Boes, K.; Buhalis, D.; Inversini, A. (2020). Smart tourism destinations: Ecosystems for tourism destination competitiveness. *Information*, *11*, 538. https://doi.org/10.3390/info11110538.

[36] Del Chiappa, G.; Baggio, R. (2021). Knowledge transfer in smart tourism destinations: An ecosystem perspective. *Sustainability*, *13*, 11330. https://doi.org/10.3390/su132011330.

[37] Coca-Stefaniak, J.A. (2023). Beyond smart tourism: Governance, resilience and sustainability in destination development. *Sustainability*, *15*, 7201. https://doi.org/10.3390/su15097201.

[38] Torres, E.C.M.; Picado Santos, L.G. (2025). Sentiment Analysis and Topic Modeling in Transportation: A Literature Review. *Applied Sciences*, *15*, 6576. https://doi.org/10.3390/app15126576.

[39] Chen, X.; Wang, Z.; Di, X. (2023). Sentiment Analysis on Multimodal Transportation during the COVID-19 Using Social Media Data. *Information*, *14*, 113. https://doi.org/10.3390/info14020113.