

Article

# ANALYSIS OF FACTORS INFLUENCING THE DEVELOPMENT OF SMART TOURISM

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**Abstract:** The rapid development of digital technologies has significantly transformed the global tourism industry, leading to the emergence of smart tourism as an innovative and sustainable development model. Smart tourism integrates advanced information and communication technologies (ICT), big data analytics, artificial intelligence, Internet of Things (IoT), and digital platforms to enhance tourist experiences, improve destination management, and increase competitiveness. This article analyzes the key factors influencing the development of smart tourism, including technological infrastructure, government policy and institutional support, human capital and digital literacy, investment and financial resources, stakeholder collaboration, and innovation ecosystems.

The study also examines the role of smart governance, data-driven decision-making, and sustainable development principles in shaping smart tourism destinations. By identifying both internal and external determinants, the research provides a comprehensive understanding of the conditions necessary for successful smart tourism implementation. The findings highlight that technological readiness alone is insufficient; coordinated policies, public-private partnerships, and digital transformation strategies are essential for long-term growth. The article contributes to the theoretical and practical understanding of smart tourism development and offers recommendations for policymakers and industry stakeholders.

**Keywords:** smart tourism, digital transformation, information and communication technologies (ICT), smart destinations, innovation, big data, internet of things (IoT), sustainable tourism; tourism management, digital infrastructure.

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## 1. Introduction

At a time when modern technologies are rapidly developing, the use of smart technologies plays a crucial role in the development of the tourism sector and the hospitality industry[1]. In this innovative context, the application of digital platforms, mobile applications, and real-time data analytics in tourism demonstrates significant progress in technological transformation.

From an economic perspective, digital tourism is considered a rapidly growing innovative sector[2]. In Uzbekistan, considerable attention is being paid to the development of tourism, including digital tourism. In the context of global economic development, a scientific approach to developing digital tourism is increasingly being applied. This innovative field is developing at a fast pace, and Uzbekistan gives special importance to the development of digital tourism alongside general tourism.

## 2. Research Methodology

This study employs a qualitative-analytical research design based on comparative analysis and secondary data evaluation. Academic literature, international tourism reports, digital economy indicators, and policy documents were systematically reviewed to identify key influencing factors.

The research applies a multidimensional framework categorizing determinants into six groups:

- Technological factors
- Institutional and governance factors
- Economic and financial factors
- Human capital factors
- Innovation and collaboration factors
- Sustainability and environmental factors

A conceptual synthesis method was used to integrate findings and construct an analytical model of smart tourism development.

## 3. Literature review of the topic

The concept of smart tourism has evolved rapidly in response to technological advancement and the growing need for sustainable and personalized tourism experiences[5]. Buhalis and Amaranggana (2015) define smart tourism destinations as integrated systems that utilize digital technologies to enhance visitor experiences, optimize resource management, and support strategic decision-making. They emphasize that smart tourism goes beyond implementing technology; it requires a holistic approach that aligns ICT deployment with governance, innovation capacity, and stakeholder collaboration[6].

Gretzel, Sigala, Xiang, and Koo (2015) highlight that smart tourism represents a multidimensional phenomenon, combining data-driven service personalization, smart infrastructure, and real-time information systems. Their study underscores the importance of interoperability and standardization in digital systems to ensure seamless integration of services. According to Xiang et al. (2017), big data analytics plays a critical role in smart tourism by enabling predictive insights, targeted marketing, and real-time monitoring of tourist flows, which ultimately improves destination competitiveness and operational efficiency[7].

Recent research by Li, Hu, Huang, and Duan (2017) emphasizes that human capital and digital literacy are crucial determinants of smart tourism development. Skilled personnel are required to manage complex information systems, analyze big data, and ensure effective implementation of smart services. Moreover, public and private sector collaboration is highlighted as a key factor, as government policies, institutional support, and financial incentives directly influence the adoption of innovative technologies[8].

Sustainable development has emerged as an essential dimension of smart tourism. Studies by Koo et al. (2016) and UNWTO (2023) demonstrate that the integration of environmental monitoring, energy-efficient systems, and digital tracking of visitor behaviors contributes to responsible tourism practices and long-term resource sustainability. The literature suggests that destinations that prioritize sustainability in combination with technological innovation achieve higher levels of tourist satisfaction and global competitiveness.

Overall, existing literature indicates that smart tourism development is a multidimensional and interdependent process. Technological readiness, governance frameworks, financial resources, human capital, and innovation ecosystems interact dynamically to shape the success of smart tourism initiatives. However, gaps remain in empirical research regarding the relative influence of each factor, especially in emerging economies, highlighting the need for further studies on context-specific determinants and implementation strategies[9].

## 4. Conclusion

**Technological Readiness.** Technological infrastructure represents the foundational pillar of smart tourism. Broadband connectivity, 5G networks, cloud computing systems, digital platforms, and cybersecurity frameworks determine operational functionality. Destinations with high ICT penetration demonstrate greater capacity to implement AI-driven services and smart mobility solutions.

**Institutional and Governance Capacity.** Effective governance ensures strategic coordination and policy alignment. Countries with comprehensive digital transformation agendas exhibit faster smart tourism adoption. Institutional transparency and regulatory flexibility facilitate technological experimentation and innovation.

**Financial and Investment Capacity.** Smart tourism development requires substantial capital investments in digital infrastructure, data systems, and cybersecurity. Public-private partnerships enhance resource mobilization and reduce financial risk. Sustainable funding mechanisms are essential for long-term digital ecosystem maintenance[10].

**Human Capital and Digital Skills.** Digital competencies significantly influence implementation efficiency. Skilled professionals capable of managing big data analytics, AI systems, and digital platforms contribute to service quality and innovation performance. Educational institutions play a strategic role in preparing tourism specialists with interdisciplinary expertise.

**Stakeholder Collaboration and Innovation Networks.** Smart tourism ecosystems depend on collaborative governance models. Data-sharing platforms, co-creation initiatives, and innovation hubs strengthen competitiveness. The presence of start-ups and technology incubators enhances adaptability and continuous improvement.

**Sustainability Orientation.** Smart tourism contributes to environmental sustainability by optimizing energy consumption, managing tourist flows, and reducing carbon emissions. Smart sensors and predictive analytics improve environmental monitoring and crisis management capabilities.

Benefits for travelers:

Imagine using your phone to instantly translate museum signage, book last-minute tours, find the best local restaurants, or report an issue in real-time. These are just a few ways smart tourism empowers travelers. Other perks can include:

**Personalized recommendations:** Tailored suggestions for attractions, activities, and dining options that align with your preferences[11].

**Real-time information:** Updates on traffic flow, public transport, available parking spots, and events.

**Seamless booking and payments:** Conveniently manage all aspects of your trip, from accommodations to transportation and tours, through dedicated apps.

**Enhanced safety:** Real-time security updates, access to emergency services, and improved crowd management systems to create a more secure environment.

Benefits for tourism destinations.

Smart tourism provides a toolbox of solutions that empower destinations to be more attractive, sustainable, and efficient in managing the impact of tourism. This helps protect the environment, preserve cultural heritage, and boost local economies[12]. Here's how:

**Improved sustainability:** Smart cities use technology to monitor resource use, reduce carbon footprints, and encourage eco-friendly practices in the tourism sector. This can range from intelligent irrigation systems that save water in public gardens to promoting electric transport[13].

**Data-driven decision making:** Through smart technologies, cities can collect valuable data about visitor preferences, patterns, and feedback, which informs how to improve the tourist experience, infrastructure, and marketing strategies. The EU guide on Data for Tourism Destinations provides insight on this topic.

**Enhanced accessibility:** Smart tourism seeks to create an inclusive experience by removing physical and communication barriers for all travelers, regardless of their needs or abilities. A shining example of this is Malaga, in Spain, that was recognized with a European Smart Tourism Award 2019 for outstanding achievements in accessibility.

Technologies used in smart tourism:

So, what makes smart tourism tick? It's powered by various digital technologies and

practices seamlessly integrated to create an intelligent ecosystem. Here are some of the most common players:

#### Mobile applications

From planning your travel experiences and providing personalized recommendations to navigating with interactive maps, ordering food, and finding hidden gems - travel apps have become the traveler's essential companion. They also help with stuff like making reservations and handling contactless payments.

By using apps, cities can effectively guide tourists, disseminate relevant information, and address issues quickly, leading to a smoother experience for everyone. Smart cities often offer their own app that provides everything visitors need - from cultural information and public transport schedules to details about accessibility and special events[14].

#### Internet of Things (IoT)

This is all about interconnectivity. Smart sensors, smart grids, and data analytics are integrated throughout a city's infrastructure. They gather real-time information on traffic patterns, environmental conditions, and resource use - all of which informs decision-making and resource allocation. It's thanks to IoT that your phone can alert you about traffic delays or tell you how many bikes are available at a nearby docking station.

These ICT-based tools play a crucial role in creating smart tourism destinations that are efficient and responsive to the needs of both tourists and local businesses.

#### Artificial Intelligence (AI)

The learning and adaptability of AI makes it incredibly useful for personalized tourism. Smart chatbots and virtual assistants provide instant, tailored support to travelers.

#### Big Data and Cloud Computing

The sheer volume of information generated by millions of tourists - booking details, preferences, movement patterns - necessitates cloud computing's ability to process this data in real-time.

By utilizing Big Data analytics, cities can gain a deeper understanding of tourist behavior and preferences, predict trends, identify popular attractions and services, and develop targeted solutions to meet those needs.

#### Augmented Reality (AR)

AR brings an exciting dimension to exploring historical sites and landmarks. Point your smartphone at an ancient monument, and watch it come alive on your screen - overlaid with historical information, 3D models, or even interactive stories.

In cultural hubs like museums and galleries, AR apps provide a deeper layer of information and make exhibits more engaging. AR/VR technology can also allow people to experience a destination remotely.

Smart tourism plays a crucial role in the development of smart cities, as its initiatives to attract tourists can cause a significant increase in people and vehicles. This affects traffic, in its congestion or in the difficulty of finding parking. This is why tourism and cities must work hand in hand to remedy these problems and provide a better experience for tourists and residents[15].

Dubai is another city that wanted to create an improved model for its inhabitants and offer a unique experience to its visitors. Therefore, it commissioned us to develop a project aimed at developing a totally innovative digital experience for the city.

We created a tool with which to manage high-resolution panoramic photos and videos, providing an automated processing and uploading system, in order to be available for viewing on a web application. You can discover all the details of Dubai 360 here

Tourists expectation on personalised services.

Dimensions	Before	During	After
<b>Transportation</b>	Planning: navigation and information (duration, types of transportation, schedule and fare)	Real-time schedule Personalised greetings Personalised meals	Feedback loop Promotional update 3. Luggage finder

	Recommender system: trail package and offering Time savings: booking, check-in	Suggest alternative Universal card	
<b>Accommodation</b>	Planning: navigation and information (location, reviews, room type, price and surrounding events) Time savings: booking and check-in Personalised welcome message	Personalised welcome message Awareness on customer preference 3. Personalised customer service Room control over customer services	Feedback Promotional offers Maintaining engagement Post customer service
<b>Gastronomical</b>	Information (special dietary, variety of meals, navigation, food ingredients and restaurant information)	Integration service 2. Real-time information: customer awareness and social context	1. Promotion 2. Prolong engagement
<b>Attraction</b>	Recommender system Information provider	Co-creation through digital maps Real-time information Information on surrounding events	1. Sharing platform 2. Prolong experience 3. News update 4. Recommender system

The main results of implementing the Smart Tourist Destinations methodology are:

- The Smart Tourist Destinations methodology strengthens local governance through the involvement of the different actors from various industries and the creation of a new ecosystem.
- The methodology also strengthens the internal management structures, creating new capacities in the public and private sectors.
- Destinations become more competitive due to the efficient use of its tourism budget and the identification of possible synergies with other departments.
- The smart strategy boosts the sustainable development of the destination in its environmental, economic, and socio-cultural aspects; and, therefore, it aligns strategies and

visions with the United Nations 2030 Agenda.

- For businesses, smart transition facilitates the updating of tourism products and services to offer optimal experiences to hyper-connected travelers of the 21st century.
- As the Smart Tourism strategy overlaps with the local administration, tourism can better contribute to the economic revitalization of the territory, fostering its positive effects in the long term.
- The Smart Tourism methodology helps reduce the digital gap and inequality through the adoption of technology in the territory, in the public and private spheres.
- Finally, it also promotes the consolidation of public-private collaborative schemes based on innovation and the leading role of Big Data.

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The analysis of smart tourism development highlights that multiple interconnected factors influence the success of smart destinations. Technological infrastructure forms the backbone, enabling services such as mobile applications, AI-based recommendations, IoT sensors, and augmented reality experiences. However, technology alone is not sufficient for successful implementation.

Effective governance and institutional support are essential to coordinate policies, manage public-private partnerships, and facilitate innovation. Financial resources and investments further enable the development of digital platforms, cybersecurity systems, and infrastructure required to provide high-quality smart services. Human capital and digital literacy ensure that tourism professionals can efficiently manage, maintain, and innovate within these systems.

Collaboration among stakeholders—including government agencies, private companies, technology providers, and local communities—strengthens innovation ecosystems and enhances competitiveness. Smart tourism also supports sustainable development by optimizing energy use, managing tourist flows, and reducing environmental impact, aligning destinations with global sustainability goals such as the United Nations 2030 Agenda.

For travelers, smart tourism provides personalized recommendations, real-time information, seamless booking and payment systems, enhanced safety, and improved accessibility. For destinations, it enables data-driven decision-making, improved sustainability, better resource allocation, and increased competitiveness.

The implementation of Smart Tourist Destinations methodology demonstrates several key results:

- Strengthened local governance through multi-stakeholder involvement and ecosystem creation.
- Improved internal management capacity in both public and private sectors.
- Increased destination competitiveness via efficient budgeting and cross-departmental synergies.
- Promotion of sustainable development in environmental, economic, and socio-cultural aspects.
- Facilitation of business innovation to meet the expectations of digitally connected travelers.
- Reduction of the digital divide and inequality through technology adoption.
- Encouragement of public-private collaboration driven by innovation and data analytics.

Overall, the study concludes that smart tourism is a systemic, multidimensional approach that combines technology, governance, financial investment, human skills, collaboration, and sustainability to enhance both visitor experiences and destination performance. Destinations that successfully integrate these elements are better positioned to attract tourists, improve service quality, and achieve long-term sustainable growth.

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