

# Smart Tourism Concepts to be applied for the Lake Toba Tourism Area

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## Smart Tourism Concepts to be applied for the Lake Toba Tourism Area

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### ABSTRACT

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One way to improve tourism is to take advantage of information and communication technology advances. Smart Tourism is a tourism development that focuses on the application of Information and Communication Technologies (ICT) in an integrated manner with tourism programs. The purpose of the research is to study the concepts of smart tourism and how to apply them to the tourist area of Lake Toba, North Sumatra. The research method used in this study is a qualitative approach. The study on the concept of Smart Tourism was conducted using a literature review and discussion with several related resource persons. The city/district government in the Lake Toba tourist area of North Sumatra is now innovating to develop every tourism potential, both in terms of infrastructure development to smart branding as one of the smart tourism programs in promoting tourist destinations.

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### I. Introduction

The world of tourism has now shown a change in market behavior. These changes can be seen in how tourists seek information, plan and implement their trips, engage in activities at destinations, etc. The rapid development of information technology causes this behavior change. Changes in information technology from analog to digital ushered generations in society, from baby boomers to the alpha generation. The phenomenon of the transition of the era makes visitors more demanding and has trends that want convenience and instant ways. The tourism industry has now begun to show its dependence on information and communication technology (ICT) in creating, communicating, and delivering value to its visitors to make it more competitive. [16]

The tourism industry in various countries is trying to increase the selling value and tourist attraction in various ways to be more competitive. One way to improve the tourism industry is to take advantage of advances in information and communication technology (such as the internet of things, cloud computing, big data, and artificial intelligence). This method is known as smart tourism. The Smart Tourism concept is an application of the smart city concept in the tourism sector. The term smart tourism was first mentioned at the United Nations World Tourism Organization (UNWTO) meeting in 2009. In addition, the concept of smart tourism was also put forward by The Organization for Smart Tourism in England in 2011 [22]. In its application, "The smart tourism system includes several elements, namely the Information Exchange Center (IEC), Government, scenic zone, beauty and business [41]". Developed Asian countries such as South Korea, China, and Taiwan implement smart tourism to increase the selling value of their tourism industry [9][36][38].

According to Piu Liu & Yuan Liu [5], smart tourism is closely related to smart cities because the development of the smart tourism concept is based on the existence of the smart city concept first. It relies on infrastructure and strengthens the linkage of each subsystem to the smart city. Therefore, "currently, smart tourism is more widely applied in urban or regional tourist areas that already have complete basic infrastructure, a good transportation system, adequate information technology infrastructure, and a comprehensive service system [39]". There are two main elements in smart tourism in its application: smart tourism destinations and smart tourism tools.

Smart tourism is a platform used to increase the selling value of tourism by integrating Information and Communication Technology (ICT) which impacts the economy and improves tourism services. The application of the smart tourism concept in tourism development is still relatively rare. In the implementation in Indonesia, several regions are reviewing the readiness of their regions to apply the concept of smart tourism, such as Bali, Surakarta, Semarang, and Lake Toba Tourism. The application of smart tourism in several cities has goals such as making it easier for visitors to move (mobility), easier to access information, and easier to get other needs in tourist activities. And realizing a world-class tourism area with a competitive advantage that is not inferior to other areas. [32]

[5] examined the city of Surakarta and stated that Surakarta was somewhat ready to apply the concept of smart tourism. Components of tourism actors who are not ready to make tourist attraction services supported by transportation and tourism supporting facilities cannot run properly. It was knowing the level of readiness of the City of Surakarta to realize smart tourism.[38] show that information and communication technology through the smart tourist concept can be used optimally to help increase the value of tourism in a tourism area. By proposing that the government adopt the Smart Tourism concept as soon as possible better to increase the Lake Toba area's tourism potential. [32] found that the level of readiness for implementing Smart Tourism on coastal tourism objects in Teluk Pandan is somewhat ready.

It may apply smart tourism concepts in the development of Lake Toba Tourism, one of the tourist areas prioritized by the Indonesian government. Thus, this study aims to study the concepts of smart tourism and how to apply them to the tourist area of Lake Toba, North Sumatra. For example, by looking at promotions through websites that have been carried out and created.

## II. Methods

The study on the concept of Smart Tourism was conducted using a literature review and discussion with several related resource persons. The concept is a mental picture or perception that summarizes ideas, observations, or feelings similar to meanings that can differ from one another [32]. Literature studies on smart tourism from literature reviews are mostly theoretical or conceptual. Some of them by [4]; [10];[22]; [34]. [36] show that previous smart tourism studies have been carried out in various areas, namely: smart tourism and smart cities, smart tourism destinations, tourism applications on smartphones, smart hotels, smart cards, gamification, smart recommendations for tourists, as well as smart tourism. Guides. [38]. To further complement this study, the researcher also conducted several discussions related to the research with resource persons.

## III. Result and Discussion

### A. Smart Tourism Destinations

Destinations oriented to providing convenience using ICT as the backbone are called smart destinations. The smart word destinations come from two syllables: "smart" and "destinations." So basically, smart destinations are the implementation of smartness into tourism destinations, and the word smart starts from urban developments that provide various conveniences for visitors or smart cities. So it can postulate the science of smart destinations from smart cities [15].

Smart tourism destinations are defined as innovative tourism destinations built on technological infrastructure that can ensure the sustainability of the development of tourism areas. It can be accessed by anyone and can facilitate the interaction of tourists with the conditions, conditions, or situations of tourism around the tourist area. Thus it can improve the tourist experience and the resident's quality of life [24]. In addition, [4] argue that "smartness" in tourism destinations requires dynamic interconnection between stakeholders through a sophisticated digital platform. It can support the exchange of information related to tourism activities in real-time, with the main goal, namely maximizing tourist satisfaction and resource efficiency. [38]

Smart Tourism Destination is an initiative to improve the tourism experience, improve resource management efficiency and maximize competitiveness, in particular, to increase consumer satisfaction when implementing the sustainability aspects of tourist destinations. "The principles of Smart Tourism Destinations are to improve the tourist travel experience, provide more intelligent

platforms for collecting and distributing information within destinations, facilitate the efficient allocation of tourism resources, and integrate tourism suppliers at the micro and macro levels. It aims to ensure its benefits from this sector are well distributed to local communities. [4].” [32]

[20] add that "Tourism Destinations" are said to be smart when using intensive technology infrastructure. It is provided by smart cities to: "(1) Improve the tourist experience of visitors by personalizing and making them aware of both the tourism services and products available to them at their destination. And (2) By empowering destination management organizations, local agencies, and tourism companies to make decisions and take action based on the data generated within the destination, collected, managed, and processed through the technological infrastructure (Lamsfus, 2014)." So the main goal of smart destinations is "to take advantage of the system to improve the tourist experience and increase the effectiveness of resource management to maximize competitiveness and consumer satisfaction while demonstrating sustainability in the long term [19]" [4].

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Smart destinations, in principle, are to improve the visitor experience. "Provide a smart platform (model) to unify and distribute information within destinations, facilitate more efficient allocation of resources, integrate tourism suppliers at macro and micro levels so that the benefits obtained by local communities can be ensured [3]" [15]. The increase in tourists is expected in the form of experience obtained by providing reviews so that tourists who visit can choose the destination to be addressed based on reviews given by previous tourists. [41].

Smart destinations are divided into two categories: SoftSMARTness: collaboration, innovation, and leadership (human resources); and HardSMARTness: technology and infrastructure (the heart of smartness). According to him, he can interpret the soft and hard concepts in smartness that the destination does not only use technology in the environment but must be coupled with human resource expertise and intelligent decision making. Smart Destinations take advantage of The technological environment (e.g., internet of things, sensors, etc.); Response speed at macro and micro levels (e.g., intelligent services, etc.); End-user devices in multiple touch-points (smartphones, etc.); Bringing stakeholders together using dynamic platforms such as neural systems. [15]

"Smart Tourism Destinations focus on the needs of tourists by combining technology, information, and communication (ICT) with casual culture and tourism innovation industry to promote tourism, service quality, improve tourism management, and scale up the industry to a wider level. Three ICT forms are vital to establishing a Smart Tourism Destination, namely Cloud Computing, IoT and End-User Internet Service System [3]." [17] [2] "First, the Cloud Computing Service is designed to provide an easy way to access online data stores. Second, IoT can support Smart's goals in providing information and analysis as well as automation and control. As for automation and control, the system can control the number of visitors in a particular tourism site by using various sensors about the carrying capacity of each site [36]." "The third component is the End-User Internet Service System, which refers to the number of applications at various levels supported by a combination of Cloud Computing and IoT [21]." [32]

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Today the travel and tourism industry has at the forefront of technology and has taken advantage of the relationship between technology and tourism. Smart Tourism Destinations have the following characteristics: "(1) An environment that applies the use of technology; (2) Responsive processes at the micro and macro levels; (3) Distributed end-user devices; and (4) Engaging stakeholders who use the platform dynamically as a central system [19]." This Smart Tourism Destination comprises stakeholders from Tourism organizations, Government, residents/Local Communities, Tourists, and Environment [4]. [2]

The characteristics of smart destinations based on stakeholders have the following characteristics (Hidayah, 2018a) "[4]:

- 1) Tourism organization, with characteristics: Functioning as a smart hub that can coordinate all information and make it easy to access for users to access information in real-time; Digitizing core business processes; Optimizing energy use; Uniting with local communities, visitors, and the government in co-creating tourism experiences; Organizational agility, speed of decision making and responsiveness to customer needs in a just-in-time manner; Precision targeting & personalized service.

2) Government. With characteristics: Open information management; Personal data settings; Building public-private partnerships.

3) Local community; with characteristics: Constantly connected; Creative and empowered; Smart towards technology; Citizen journalism; Actively involved in building smart heritage/e-culture.

4) Visitors, with characteristics: Well-connected and well-informed; Active critics & buzz marketers; Demand personalized service; Engage socially and technologically; Dynamic discussion in social media; Co-create experiences; Contribute to content; Utilize end-users devices in multi touch-point.

5) Environment, with characteristics: Interconnected through the Internet of Things; Presence of cloud computing services; Ecosystem innovation; Sensor network through the environment; The combination of digital information and social context that will add to the geophysical reality; Can be operated against social platforms.”

#### B. Smart Tourism Tools

4 Entering a new era of Information and Communication Technology has also opened up many new tools for the tourism industry [4]. It can clarify Smart Tourism Tools as having been formed based on concepts derived from the combination of Smart with Tourism and Tools (ICT). In the context of tourism, tourists can use their mobile phones to explore destinations and activities in the tourist destination.[32]

Users are enabled by the technology in Smart Tourism Tools who can navigate their way through urban environments without using pre-existing maps or trend guides. Visitors can use technology through their cellphones to carry out various tourist activities, and they can find information about the tourist destinations they will visit through Smart Tourism Tools. These activities leave a huge amount of digital data known as Big Data (SOCAP International, 2013, cited in Buhalis & Amaranggana, 2013). By managing Big Data, tourism organizations are in a position to extract valuable insights from information that can provide tourists with a new dimension of customer experience. And improve the way destinations interact with customers, “Those who master this form of technology gain an abundant competitive advantage compare to competitors [4].”

Each destination area masters various matters related to this technology and will get a competitive advantage that can increase competitiveness compared to others. The development of mobile computing software and hardware has supported many applications, especially visual tagging of physical objects and Near Field Communication (NFC), which have contributed to and complemented the development of IoT (Borrego-Jaraba et al., 2011 in Trinanda, 2020).

It can conclude that Smart Tourism Tools is a concept that combines various elements. It includes smart, tourism, and tools (ICT) that can use in the form of applications on various smart devices that manage various big data from tourist destinations and aim to provide real-time information. And also make it easier for tourists to carry out tourist activities. [32]

#### C. Application of Smart Tourism in the Lake Toba Tourism Area

Lake Toba is one of the tourist objects in North Sumatra, Indonesia. This natural lake, formed by the eruption of the ancient Toba volcano about 74,000 years ago, has an area of about 1,130 km<sup>2</sup> and is the largest lake in Southeast Asia [1]. Some tourist areas around Lake Toba are famous for their natural beauty, including: Samosir Island, Sibandang Island, Parapat, Tongging, Bakara, Pusuk Buhit, Lumban Silintong Beach Bali, and others. Lake Toba was recently ordained as one of the priority tourism by the government. The Lake Toba Tourism Area Management Authority Agency (OPKPDT) was formed on June 1, 2016, which specifically has the task of supporting the acceleration and development of tourism in the Lake Toba area [40]

It can apply smart tourism applications to the Lake Toba Tourism Area [38]. It may apply several smart tourism applications may be applied, divided into 5 (five) categories, namely: 1) Provision of tourist information and services, 2) Ticket management, 3) Nature/environment monitoring, 4) Plant/animal monitoring, and 5) Facilities support. [8]; [23]. The explanation of each category is as follows [38]:

1) Tourist information services are: (1) Provide virtual maps (tourism maps) which are full of interactive information on the tourist areas of Lake Toba; (2) Provide suggestions regarding tourist destinations, food, activities/attractions/shows, schedules, wifi hotspots, accommodation, and services, such as vehicle rentals/information on public transportation; (3) Personalization of services, such as schedules, itineraries, and guides that can customize via mobile apps; (4) Special offers and discounts (tickets, hotels, restaurants, boats, etc.) which can access via mobile apps; (5) On-site discovery learning—studying the natural wealth in the surrounding area, culture, customs, and local culture around Lake Toba (6) Story Telling, for example, an explanation of the history, origin, and development of tourism Lake Toba from time to time. Or maybe a folklore legend. (7) Provide interactive media, augmented games, location-based service, and accurate GPS around Lake Toba.

2) Ticket Management: (1) Entrance tickets to tourist attractions with RFID (Radio Frequency Identification) or NFC (Near Field Communication) technology; (2) Processing and analyzing visitor data; (3) Setting the number of tourists in tourist attractions/attractions around Lake Toba (passenger flow management)

3) Natural/environment monitoring around Lake Toba (Intelligent monitoring): (1) Security Monitor around tourist areas (video surveillance, integrated CCTV 24 hours, seven days non-stop); (2) Forecasting weather conditions (rain, heat, etc.); (3) Air condition, temperature, wind direction, humidity, atmosphere, carbon dioxide level, and UV rays, and others; (4) Monitoring the situation and condition of roads/areas, traffic control, and management. Notifications when a road is closed or due to an accident. (5) Monitoring the state of lake water, water level, water quality, water discharge, and flow, etc. (6) Monitoring and early detection of forest fires.

4) Monitoring of plants/animals around Lake Toba: (1) Monitoring of plants, especially those with "step" status. (2) Monitoring of animals, for example, birds (watching birds), fish, wild animals, etc.

5) We are supporting Facilities and others: (1) Monitoring and calculating the availability of car/motorcycle parking spaces; (2) Monitoring and tracking of commercial boats sailing on Lake Toba.

It can use information and communication technology through the concept of smart tourism optimally to help increase the value of tourism in a tourism area. Smart tourism can significantly change the behavior of tourists, the number of visits, and the function and structure of the tourism industry. The main element in its application is using the concept of smart tourism destinations and smart tourism tools, which can be seen in the table below:

Table 1 Main Elements in implementing Smart Tourism Destinations and Smart Tourism Tools

Dimension	Variables to Pay Attention to	Sub Variable
Smart Destination	Basic Infrastructure	1. Transportation Conditions and Quality (Roads, Wharves, Modes of Transportation) 2. Source and Quality of Clean Water Supply 3. Quality of Electric Network Service 4. Waste Treatment System
	Attractions	1. Availability of ICT to support attractions 2. Quality of Service of Tourist Attractions
	tourism support facilities, availability, Quality, Ease of reach and application of technology	1. Availability and Application of Technology in Security Facilities 2. Availability and Application of Technology in Accommodation Facilities 3. Availability and Application of Technology in Restaurant Facilities 4. Availability and Application of Technology in Shopping Facilities 5. Availability and Application of Technology in Health Facilities 6. Availability and Application of Technology in Bathroom/Toilet Facilities 7. Availability and Application of Technology in Parking Facilities 8. Availability of Worship Facilities 9. Availability and Application of Technology in Banking/ATM Facilities. 10. Availability and Application of Technology in Information Facilities and Tourism Services
Smart	Big Data System	1. Current tourism data management system

<b>Tools</b>	ICT	<ol style="list-style-type: none"> <li>1. Availability of ICT Infrastructure</li> <li>2. Internet service availability</li> <li>3. Tourism support application</li> </ol>
	Information and Promotion	<ol style="list-style-type: none"> <li>1. Tourism destination marketing strategy</li> <li>2. How to disseminate information that has been implemented</li> </ol>
	Provision of tourist information and services	<ol style="list-style-type: none"> <li>1. Virtual Map Availability</li> <li>2. Availability of travel agent information, advice regarding tourist destinations, and various services that can access through the application</li> </ol>

The following is an example of a website promoting the Lake Toba Tourism Area, which is one part of smart tourism.

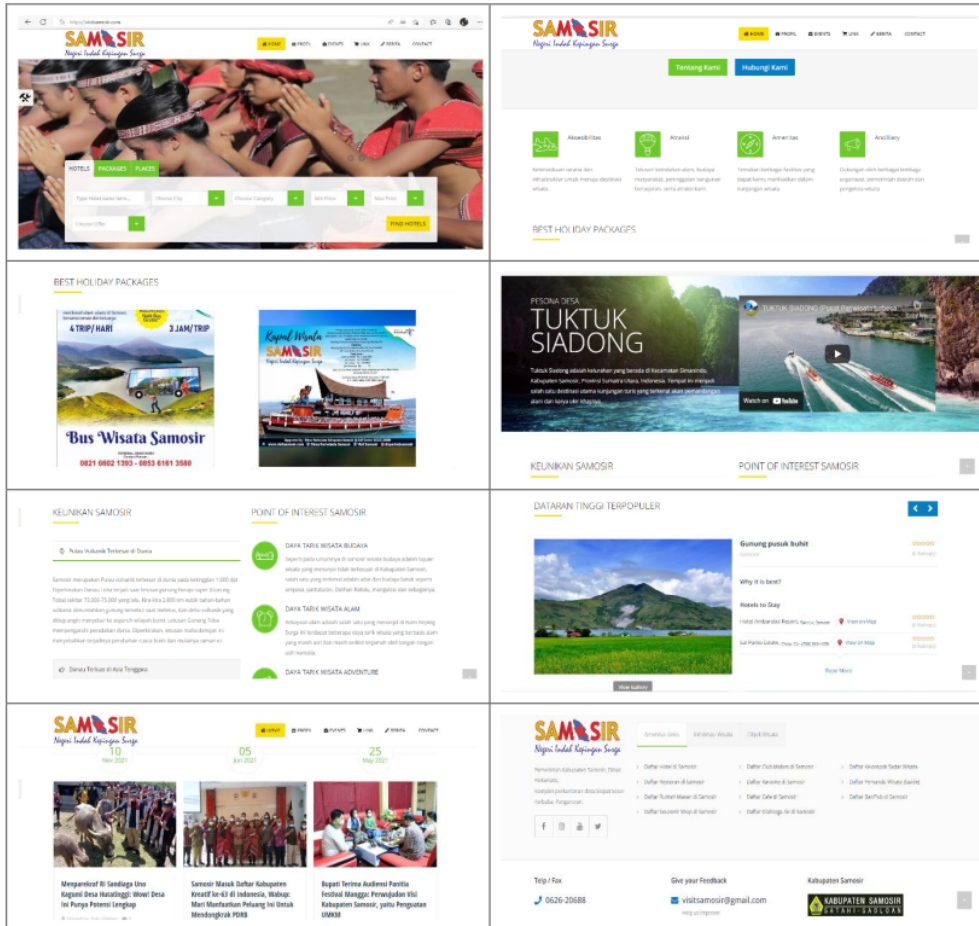


Figure 1 Example Website from <https://visitsamosir.com/>

#### IV. Conclusion

Smart Tourism discusses the availability and application of technology, information, and communication (ICT) in infrastructure, attractions, transportation, and supporting facilities. This study was conducted on smart tourism, where the tourism area must prepare various devices. There are two main elements in smart tourism in its application: smart tourism destinations and smart tourism tools. Smart tourism destinations are initiatives to improve the tourism experience, improve resource management efficiency and maximize competitiveness, especially to increase consumer satisfaction when implementing sustainability aspects in tourist destinations. Smart tourism tools are

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4 instruments in the tourism industry for developing tourist destinations by improving service quality and ease of information in tourism activities.

1  
In 2 alizing the smart village movement with the development of smart tourism in the Lake Toba area, an active role is needed from all parties to be able to support Lake Toba as a tourist destination known by national and international tourists. It can optimally use information and communication technology through smart tourism to help increase tourism's value in this region. It can implement smart tourism applications in the Lake Toba tourism area. Several websites that fully inform this tourist area have started to exist and have been prepared, for example, "visitsamosir.com".

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