



Implementation of IoT-Based Smart Tourism Destination Tools as Tourism Leisure 5.0

Andi Supriadi Chan^{1,*}, Rezha Destiadi², Annalisa Sonaria Hasibuan³, Alvendo Wahyu Aranski⁴ & Luky Ardiansyah⁵

^{1,3,4,5}Departement of Computer, Politeknik Negeri Medan, Medan, Indonesia.

²Department of Computer, Institut Teknologi Batam, Batam, Indonesia.

Email address:

andisupriadi@polmed.ac.id

*Corresponding author

To cite this article:

Chan, A. S., Destiadi, R., Hasibuan, A. S., Aranski, A. W., & Ardiansyah, L. (2024). Implementation of IoT-Based Smart Tourism Destination Tools as Tourism Leisure 5.0. *International Journal of Research in Vocational Studies (IJRVOCAS)*, 3(4), 13–18. <https://doi.org/10.53893/ijrvocas.v3i4.105>

Received: 09 14, 2023; **Accepted:** 10 20, 2023; **Published:** 01 29, 2024

Abstract: Due to its ability to create commercial opportunities that local communities can manage, tourism is a well-known industry with significant development potential. Information technology has had significant advancements in its application within the tourism industry, and its implementation is now commencing in Indonesia. The use of IoT technology in the tourism industry necessitates a series of sequential stages, culminating in the establishment of a comprehensive information platform that facilitates the monitoring and administration of tourism activities. Utilizing IoT technology to construct a tourist platform helps expedite the process of integrating information and infrastructure while effectively leveraging smart technology in the tourism sector. The research methodology employed is a hybrid approach. The data outputs are processed and evaluated using a strategy that caters to the interests of the community and parties involved in the collaborative development of smart tourism, both qualitatively and quantitatively. The analysis stage uses the theory of visual perception as a way to understand what the desired implementation of IoT-based smart tourism looks like. This is shown in the selection stage. Meanwhile, this investigation concluded with a technological readiness level of five. The research was conducted without any prior investigation that aligned with the themes, tools, and objects employed by the researchers, representing the current state of the art. Furthermore, the research team comprises specialists in the domain of information systems, including two members who possess expertise in information systems and languages. This ensures a comprehensive grasp of the tools utilized in model development, collaboration, and the potential for technological advancement. In addition to the desired outcome, this is an Internet of Things (IoT)-based intelligent tourism system that may be utilized as a tool in many tourist destinations across Indonesia.

Keywords: Smart Tourism, IoT, Travel, Tourism

1. Introduction

Tourism is a prominent industry that holds great strategic importance for development. It has the potential to create business opportunities that local communities can effectively manage, thereby improving their economic

well-being and general quality of life (Alamanda et al., 2019). and improve. The pandemic is expected to cause a change in the types of tourists and their choices in the tourism and creative economy sectors. Due to the impact of

COVID-19, three significant trends are shaping the future of tourism. These trends include a growing inclination towards sustainable tourism, the integration of technology, and a heightened focus on cultural immersion and engagement with local people (resulting in more memorable tourist experiences). The significance of digitalization for tourism actors and Micro, Small, and Medium Enterprises (MSMEs). The significance of content and context in social media promotion cannot be overstated. By combining compelling material with a relevant context, the creation of an event is likely to generate widespread popularity and engagement. This represents a single instance of smart tourism.

The utilization of information technology in the tourism sector has experienced significant advancements (Gao, 2021). Presently, the implementation of smart tourism is being initiated in Indonesia. Internal factors like travelers' financial situation, health, familiarity with tourist attractions, and attitude all have an impact on how many tourists arrive at a destination (Roy & Sharma, 2021). Additionally, external influences, such as public opinions and perceptions of tourist locations, tourism media marketing, and political influence within an area, can also play a significant role (Ramanathan & Meyyappan, 2019).

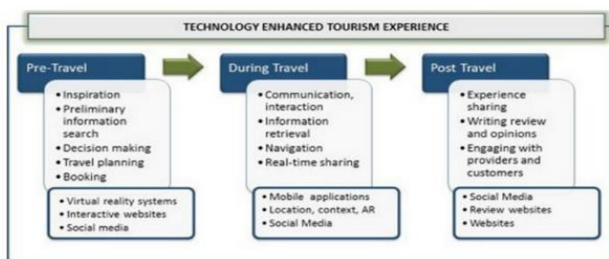


Figure 1. Tourist Experience Technology

Smart tourism refers to a location that uses information and communication technology (ICT) devices to make it easier for tourists to access tourism and hospitality products, services, venues, and experiences (Wang et al., 2020). An example of this is the creation of Smart Tourism Destination Tools (STDT). The Smart Tourism Destination Tools (STDT) initiative aims to leverage digital technology and innovation in order to enhance the overall tourist experience, optimize operational efficiency, and promote sustainability in tourism destinations.

The implementation of IoT technology in the tourism industry necessitates a sequential progression through many stages, culminating in the establishment of a comprehensive information platform capable of facilitating automated monitoring and administration of tourism activities. Utilizing IoT technology to construct a tourist platform can expedite the process of integrating information and infrastructure while maximizing the utilization of intelligent technology in the tourism sector.

The IoT-based smart tourism destination tool will employ NFC (Near Field Communication) technology to provide essential information to travelers, particularly those visiting from other countries. The given information might manifest in various formats, such as hotels, infographics of tourist attractions, guides, and more. The integration of IoT and NFC technology facilitates user interaction by allowing them to conveniently touch on designated signs using their smartphones, instantly granting access to the desired tourist information.

Prospects for the advancement of the Internet of Things (IoT) in the context of Smart Transportation and Traffic Management Systems (STDT). To effectively apply this, it is necessary to employ various methods for gathering information on visitors' experiences and requirements when visiting tourist destinations (Zhang et al., 2022). Additionally, it is important to consider the feedback from travelers themselves regarding their experiences with the smart tourism services available at these destinations. Experience itself serves as a management service product that enhances the value of a tourism location (Kuhzady & Ghasemi, 2019).

2. Literatur Review

2.1. Tourism

Tourism is the act of repeatedly traveling from one site to another (Triani et al., 2018). Tourism is a complex phenomenon that involves interactions between visitors, businesses, government officials, and the local community. These interactions give rise to many consequences and effects in the process of attracting and serving tourists and other visitors. Tourism refers to the interconnectedness of events resulting from travel activities and the behavior of those who are not seeking long-term residence or livelihood.

2.2. *IoT*

The Internet of Things (IoT) is a network of interconnected electronic devices that are connected to the internet and have the ability to communicate with each other and share data.

In the realm of the Internet of Things (IoT), these gadgets encompass sensors, measuring devices, and other electronic devices that are interconnected to the internet and possess the ability to autonomously process data. Hence, the Internet of Things (IoT) has the capability to gather and scrutinize vast quantities of data from diverse origins, including the environment, individuals, and machinery.

The objective of the Internet of Things (IoT) is to offer users convenience and advantages, including health monitoring, home security, environmental regulation, and more. The Internet of Things (IoT) enables the connection and communication between several devices through the internet (Fauzi et al., 2019). This connectivity allows for the generation of data that can be utilized to enhance energy efficiency, minimize manufacturing expenses, and improve operational effectiveness, among other benefits.

Nevertheless, the utilization of IoT necessitates diligent consideration of data security, as it entails the potential for data breaches and cyber assaults that may jeopardize user confidentiality and safety. Hence, it is imperative to establish stringent rules and security protocols for the utilization of IoT.

2.3. *Smart Tourism*

Smart tourism is a tourism concept that integrates information and communication technology (ICT) with conventional tourism experiences to enhance quality, safety, efficiency, and tourist contentment. Smart tourism utilises advanced technologies such as sensors, the Internet of Things (IoT), artificial intelligence (AI), data analysis, and social media to enhance the overall visitor experience. Some instances of intelligent tourism applications comprise:

1. A comprehensive and user-friendly tourism information system that is seamlessly integrated and readily available.
2. Travel applications that customise and offer suggestions depending on individual user preferences.

3. Augmented reality (AR) and virtual reality (VR) technology enhance the travel experience by offering a more engaging approach.
4. A convenient and secure digital mechanism for placing orders and making payments.
5. Intelligent sensors for monitoring and controlling visitor flow.
6. Implementation of facial recognition and body temperature sensing devices to enhance the safety and well-being of tourists.

Smart tourism has the potential to enhance the quality of tourist experiences, boost the competitiveness and productivity of tourism destinations, and minimise adverse effects on the environment and security.

2.4. *Tourism Leisure*

Tourism leisure refers to the aspect of tourism that emphasises vacations, recreational pursuits, and activities undertaken for the goal of entertainment or enjoyment rather than for business or educational objectives. Tourism leisure encompasses a wide range of activities that tourists engage in during their leisure time, including swimming, sunbathing, mountain trekking, golfing, cycling, and simply strolling around to appreciate the scenery.

Leisure tourism prioritises the visitor experience rather than solely focusing on the destination or tourist spot (Yasmien et al., 2021). Hence, the advancement and endorsement of recreational tourism necessitate a distinct strategy wherein greater importance is given to the calibre of the visitor encounter. The government, tourism organisations, and entrepreneurs in the tourism industry aim to enhance the appeal and excellence of tourist experiences. This is achieved through the establishment of tourist facilities, ensuring security and comfort, improving service quality, and leveraging technology to facilitate tourist engagement with tourism destinations.

It is crucial to acknowledge that tourism and leisure can also exert an influence on sustainability and the environment. Consequently, tourism destination management must also prioritise these factors to guarantee the attainment of sustainable tourism.

3. Method

3.1. Method Research

The research on the Medan City tourist attraction as a Pilot Project commenced with a literature review, which revealed a deficiency in the current tourism management, particularly in terms of information and access. Additionally, the observation was made that smart tourism was not being effectively utilised to meet the demands of tourists.

Upon the completion of the design and implementation phases, user testing is conducted on the outcomes, specifically targeting tourists.

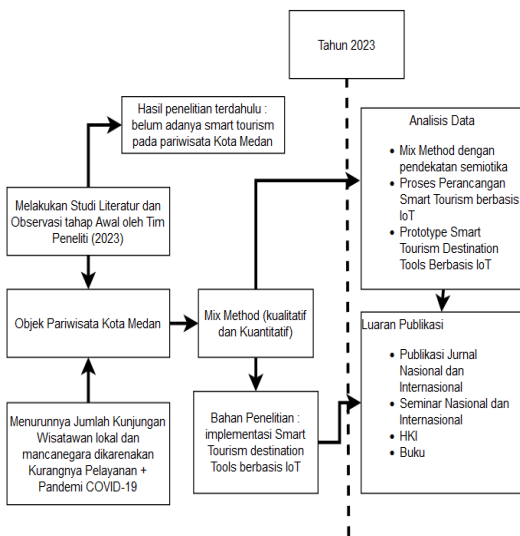


Figure 2. Stages of Smart Tourism Research

A hybrid approach is employed to gather and analyse both qualitative and quantitative data. This study surveyed both inhabitants and tourists in Medan City to assess their attitudes regarding the necessity of tourism information in the city. Medan City served as the focal point of the research. The obtained data can be used as input for the fundamental concept of developing tools for smart tourism destinations based on the Internet of Things (IoT). Meanwhile, the qualitative outcomes of literature data, observations, and interviews serve as references in the development of IoT-based smart tourism utilising NFC technology.

4. Result

4.1. Designed System

The implementation of Smart Tourism Destination Tools (STDT) is necessary in the Karo Regency area to serve as a platform for disseminating information to the public or tourists seeking information about the natural and cultural tourist attractions in Karo Regency. In addition to serving as a means of transmitting information, STDT can also be used as a means of promoting or advertising. In addition, this technology will enhance the comprehension and utilisation of tourism destinations in the Pemalang Regency by both local and external groups. In addition to facilitating the administration of tourism sites by local governments.

In the proposed analysis, the result obtained is to create an information website as a replacement for brochures and advertisements so that visitors can easily see the information on the website provided.

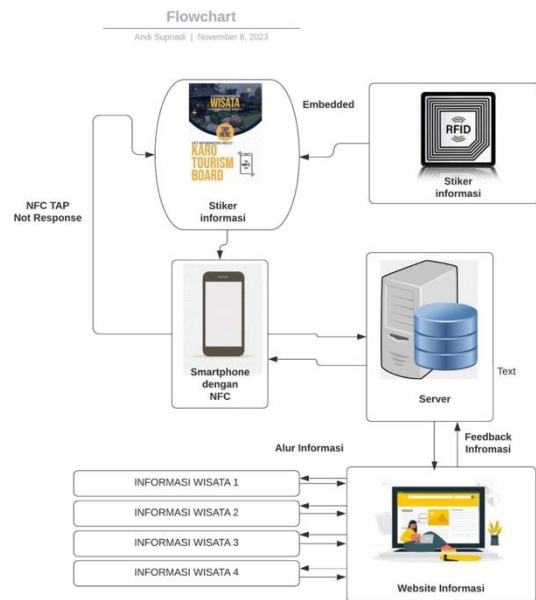


Figure 3. Flowchart model for providing tourism information in Karo Regency

The current phase involves the development of stickers that incorporate RFID technology to fulfil information requirements pertaining to district tourism. Refer to the figure below for the representation of Karo.



Figure 4. RFID Embedded Stickers

When a smartphone equipped with NFC Destination Tour technology is scanned using NFC, it will promptly display the website of the tourist destination in the corresponding district. The user can select Karo according to their preferences. When the user clicks on "show information" on the website, it will instantly load the desired tourist information on their Android cellphone.



Figure 5. Karo Regency Tourism Information Web Page

The information presented is tailored to the requirements of visitors who have been scanned using NFC technology on their devices. In order to ensure that the information acquired aligns with the specific requirements of the user, as depicted in the figure provided.

TUJUAN WISATA

Danau Toba



Danau ini merupakan suatu keajaiban karena berlokasi di atas dataran tinggi lebih kurang 800 m dari permukaan laut yang merupakan asset nasional menduduki ranking ke 2 (dua) sebagai danau terbesar di dunia dan memiliki keindahan alam yang sulit mencari tandangnya. Danau tersebut dikalilingi oleh bukit yang ditumbuhi hutan pinus dan air berwarna biru. Dari Desa Tongging dapat dilakukan

Figure 6. Karo Regency Tourism Information Web Information

5. Conclusion

Based on extensive research, it can be inferred that the design of IoT-based smart tourism destination tools was created using a framework that utilises NFC and the web to present information pertaining to district tourism. This design is intended for visiting tourists. Next, deploy Internet of Things (IoT) technology to create intelligent tools for tourism destinations. This may be achieved by creating tourist information stickers that are equipped with Radio Frequency Identification (RFID) technology. These stickers can be programmed to access tourist information via Near Field Communication (NFC).

Acknowledgements

Gratitude is extended to the Medan State Polytechnic for their provision of DIPA 2023 financing help through the P3M Unit, enabling the smooth execution of this research.

References

- [1] Gao, H. (2021). Big Data Development Of Tourism Resources Based On 5G Network And Internet Of Things System. *Microprocessors And Microsystems*, 80(November 2020), 103567. <https://doi.org/10.1016/J.Micro.2020.103567>
- [2] Hanum, F. (2020). Konsep Smart Tourism Sebagai Implementasi Digitalisasi Di Bidang Pariwisata. *Tornare*, 2(2), 14–17. <https://doi.org/10.24198/Tornare.V2i2.25787>
- [3] Kuhzady, S., & Ghasemi, V. (2019). Factors Influencing Customers' Satisfaction And Dissatisfaction With Hotels: A Text-Mining Approach. *Tourism Analysis*, 24(1), 69–79. <https://doi.org/10.3727/108354219X15458295631972>
- [4] Ramanathan, V., & Meyyappan, T. (2019). Twitter Text Mining For Sentiment Analysis On People's

- Feedback About Oman Tourism. 2019 4th MEC International Conference On Big Data And Smart City, ICBDSK 2019, 1–5. <https://doi.org/10.1109/ICBDSC.2019.8645596>
- [5] Roy, G., & Sharma, S. (2021). Analyzing One-Day Tour Trends During COVID-19 Disruption—Applying Push And Pull Theory And Text Mining Approach. *Tourism Recreation Research*, 46(2), 288–303. <https://doi.org/10.1080/02508281.2020.1858614>
- [6] Triani, A. R., Adriyanto, A. R., & Faedhurrahman, D. (2018). Media Promosi Bisnis Potensi Wisata Daerah Bandung Dengan Aplikasi Virtual Reality. *Jurnal Bahasa Rupa*, 1(2), 136–146. <https://doi.org/10.31598/Bahasarupa.V1i2.215>
- [7] Wang, W., Kumar, N., Chen, J., Gong, Z., Kong, X., Wei, W., & Gao, H. (2020). Realizing The Potential Of Internet Of Things For Smart Tourism With 5G And AI. *IEEE Network*, 34(6), 295–301. <https://doi.org/10.1109/MNET.011.2000250>
- [8] Yasmien, B., Putri, B. Y., Chandra, N., & Zuhdi, R. (2021). Konsep Sustainability Tourism Dengan Tema Smart Cultural Tourism Pada Desa Penglipuran, Bali The Concept Of Sustainability Tourism With The Theme Of Smart Cultural Tourism In Penglipuran Village, Bali. 2, 06–15. <https://jurnal.unej.ac.id/index.php/MATRAPOLIS/index>
- [9] Zhang, T., Li, B., & Hua, N. (2022). Chinese Cultural Theme Parks: Text Mining And Sentiment Analysis. *Journal Of Tourism And Cultural Change*, 20(1–2), 37–57. <https://doi.org/10.1080/14766825.2021.1876077>