Sangiran's Archaeological Tourism: A GIS-Integrated Transport System

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Abstract. This study aims to develop an information system for archaeological tourism in Sangiran, Central Java, and to integrate it with a transportation system through Geographic Information System (GIS). The study involves surveying the Sangiran Site area to identify an ideal transportation and communication system for the site, which is critical for providing visitors with necessary information about each location. The results show that transportation and communication systems must be developed from all directions and integrated into a single platform between the communication and transportation systems. The priority should be to build infrastructure for roads and highways that connect each location of attraction. This study's implication is to provide a practical solution for developing Sangiran as a significant archaeological tourism destination and a model for developing other similar sites in the future.

Keywords: Sangiran · archaeological tourism · GIS · transport system · integration

1 Introduction

Sangiran was declared a National Cultural Conservation by the Minister of Education and Culture in 1977 with Decree No. 070/0/1997. With this decree, the Sangiran site is estimated to occupy an area of 56 km^2 [1]. Then in 1999, UNESCO designated the Sangiran site as a World Heritage Site [1]. There are four clusters that function as museums as follows Cluster Gravel, Cluster Bukur, Manyar Cluster Rejo, and Cluster Dayu. Each has a distance that separates the other causing the location of the spread of a different area.

Sangiran as a tourist destination features many locations, many things, dioramas, homestays, crafts, home industries, local culture, museums, fossils, and panoramas and landscapes. All are not located in the same place but are spread to any area and any destination. To get to a location, a tourist must make sure whether or not there is a mode of transportation.

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Based on geographical conditions, the land consists of various types of rivers, hills, valleys, forests, and rice fields. This reflects the characteristics of the people living on this site. Many of them devote their time to the fields. Others make handicrafts to sell. Many also offer visitors to rent out homestays. Or They accompany tourists to visit the location by providing information related to the Sangiran site [2].

Many activities drive economic power in Sangiran. They try to formulate and take action to turn their village into a tourist destination to capture the economy and capital for prosperity. Acceleration can be seen from various levels of government. Lower local governments try to develop their villages by improving the economy or human resources based on local potential. Meanwhile, the Government of the Republic of Indonesia has developed a design that is connected to a policy in the tourism sector.

The problem is: How does the Sangiran site as an archaeological tourism destination develop a communication and transportation system so that visitors can easily find the location, the right thing to look for, and get and arrive there on time? To answer this, researchers have explored the area and then determined all the positions of the locations as tourist destinations. Many locations in Sangiran are presented as tourist destinations. For example, museums. At the Sangiran site, as mentioned above, there are four museums that are located separately and far from each other.

Another example is a house owned by a local community. Residential homes are organized by people personally. People can set up residences for multi-purposes such as research, pleasure, or family time. There is no data available that accurately informs the types of housing available, what type of housing, and at what price will be offered. It is centered around the Gravel Area. Meanwhile, Bukur, Dayu, and Manyar Rejo, no homes were found there stay.

If we look in more detail and carefully, we will find a location that is used to offer food and drinks. Tourists visiting the museum or strolling around the site, in turn, can be dropped off at this location for a drink or a meal on any menu. It's outside the Museum. It is also hosted by locals.

Many souvenir shops are also available in Sangiran. Handicrafts and souvenirs reflecting themes and materials related to fossils and antiquity or hominids are offered to visitors or tourists. These locations are close to the Gravel Museum.

By identifying all locations and situations in Sangiran, it is known that reaching the Sangiran site can be done in several ways and paths. First, tourists who come from East Sangiran. They can take a vehicle from Plupuh, Sidoarjo, and Tanon. Second, tourists who come from South Sangiran can use vehicles from Solo by passing through Gondangrejo and Kalioso. From the north, tourists can take transportation from Purwodadi and Gemolong. Meanwhile, tourists from the west can take a vehicle from Tingkir Salatiga and Kacangan Boyolali.

The complexity that exists in Sangiran is related to the communication system and transportation systems. Although the available information provides detailed information about the destination, at the same time, there is no transportation that can bring tourists arriving at Sangiran, which can reduce the motivation of tourists to come to the Sangiran site. At the initial stage, this study aims to identify possible uses for integrating communication systems and transportation systems. Why is this research classified as an early stage? Because building a communication system and a transportation system

cannot be realized at the same time. It could be that the communication system runs faster which builds a transportation system for the Sangiran site as a tourist destination or vice versa.

The second stage, trying to formulate the concept of integration of communication and transportation. The communication aspect focuses on the data and information provided to each location, while the transportation aspect provides the types of transportation available to transport tourists arriving at the location.

It is hoped that this process can be utilized by stakeholders to develop communication and transportation systems around the Sangiran location. It is also hoped that this can be used as a basis for policy-making regarding the Sangiran site as archaeological tourism. For any interest, many things around the Sangiran site have supporting resources that can enrich the quality of Sangiran's performance as archaeological tourism.

This is our point to show that communication systems and transportation systems are very important for the Sangiran site as archaeological tourism. Through this project, the factors and elements that are considered important and affect the performance of the Sangiran site will be explored more deeply and in turn provide insights into the progress of the Sangiran site.

The digital transformation of the Sangiran Site as an Archetourism Destination was triggered by the development of information technology. The industrial revolution 4.0 pushes the efforts of various sectors into the digital platform. In many ways, industrial practices that involve economic, social, cultural, and business dimensions can be done and presented digitally [3–5].

2 Literature Review

2.1 Digital Archeology

Traveler as customer something activity tourist To do many stages before To do trip. There are three processes carried out that is before purchase, consumption, and after consumption [6]. In the first process, tourists will identify and evaluate product tours or plan package trips offered. _ From this process, they will look for various Thing related products and services that will they get moment travel. Traveler will seek and obtain information related to fulfillment of his need when deciding for Becomes tourists. In stage second, tourists buy package service tours based on information that has been obtained [7]. A traveler will experience or get experience activity travel in an area destination travel. At stage this, various events will be attended by tourists who are part of fulfillment needs as tourists. In stage third, tourists have complete activity as a traveler with start evaluation process information obtained _ before buying a product or service tourism. Stage evaluation this related close with is traveler accepts service following what has _ been delivered through search information products and services. Impressions and recommendations positive to family or colleague work will be given when service tourists are by the information obtained. _ On the other hand, an impression negative could appear when the traveler has an experience that doesn't pleasant or his need no fulfilled.

The three processes above show that system information proper, fast, and accurate tourism could become determinant if travelers buy something product tourist or not [8].

A traveler will look for various related information _ with his journey, especially those related to transportation, accommodation, and activities During be in place purpose. In fact, in the era of technology information like now, the traveler will use various media, to get information by his needs. Because of that, system information digital based will become a bridge in access required information. If a destination tour is potentially capable give accurate information _ with convenience service tourists through the digital system, the then-candidate traveler could decide to buy the product and determine the chosen destination for his tour. That is, candidate traveler moment this more many use information digitals based for buy product tourist through the website and influence the decisions they for determining plan their journey. So the perception of travelers will change when getting information digital-based and convenience systems in System Information Geographical (GIS).

GIS is a system that utilizes the advantages of spatial data and defines a relationship with information. Information that could be in the form of location region, address office, and information other, saved in databases. An important part of GIS is data retrieval and storage. Spatial data from the data taken must be provided validly. Spatial data storage is usually in the formed vector, where the data is stored in the form of specific points, lines, and areas. Appearance or map presentation includes various forms from the printed map to the map on the device move [9].

System Information Geographical as navigation going to destination archeology of ancient sites Sangiran Android based with use Waterfall method, besides easy, applied, method this has advantages when all needs system could define by complete and correct at the beginning manufacture the project, so that planning or development applications could be done. walk with good and without obstacles. However, the weakness of the use method is when one Step is hampered, stage next no could be conducted with good. This digital map will make it easy for users surfing to look for information about the place travel because everything is integrated into one application. Development mobile GIS applications for tourism have also been developed in the district Gunungkidul. App features cover instruction directions to a destination, distance to location, and information general like route transport general and hotel list [10].

3 Methodology

This research method is a collaboration between the disciplines of Communication and Informatics and uses the Waterfall application development method. The models used are four Unified Modeling Language (UML) diagrams, namely: (1) use. diagrams cases; (2) Activity Diagram; (3) Sequence Diagram; and (4) Class Diagram. The resulting application is expected to be used as a promotional medium as well as a tour guide that can make it easier for tourists to plan tourist trips in the Archaeological site area Sangiran.

The researcher conducts a direct search of a situation to determine the location point and obtain information about the location. First, the researcher collects data at this location on what is available and what is offered in line with this location. This procedure is used to capture data and information related to the location presented as a tourism destination. To obtain data and information, the researcher directly observed and

conducted interviews with the people living in the location and the staff working in this area. This step will end until data and information have been collected. This procedure covers many locations on the Sangiran site which are classified as tourist destinations.

Second, by tracing locations in the Sangiran area, researchers try to understand the position of the location and determine what mode of transportation must be taken to get to that location. This does not mean that there is a mode of transportation available at this location. In fact, from various directions after being observed, there is no public transportation or vehicle available to get to the location. If someone wants to go to a location, he must use a digital application-based transportation mode such as Grab or Gojek. Many routes that may move to the Sangiran site have not been facilitated by public transportation. In this case, researchers identify reality and try to propose solutions related to transportation modes to improve the Sangiran site as archaeological tourism.

Third, integrate the collected data into system digital map design or known as *Geographic Information System* (GIS).

4 Results and Discussion

Based on the resources, at the Sangiran Site, many of the available resources can be classified into four types that can be used to improve and accelerate this site into archaeological tourism. First, the findings of fossils or archaeological findings at the Sangiran site. The discovery of fossils has been going on for a long time. These findings have created an interesting story from a historical, mythical, and scientific perspective. Fossil findings also encourage many scientists from abroad to be interested in visiting the Sangiran site. They intend and spend their time on research and investigation. This is implied for economic, scientific, social relations, and tourism policy. There are also those who want to visit the Sangiran site because it is interesting to see the uniqueness and antiquity of findings such as fossils and larger shapes. It is more motivated for fun or entertainment.

Second, the geography and the panorama around the Sangiran site. Many of the sights at the Sangiran site have a mix of contours that give an exotic impression. Geographical and panoramic potential can be offered to tourists and has a prospectus in an economic tone. With an area of 56 km, the Sangiran Site consists of valleys, rivers, rice fields, forests, hills, and wells. This potential can be designed to be more attractive so that tourists are interested in visiting this site.

Third, local culture and human resources at the Sangiran site. Culture, people, and activities are important components of the tourism industry. In the tourism industry, local authenticity and authenticity are needed even at the Sangiran site as archaeological tourism. Many tourists want to experience life and experiences that involve local activities and local culture. It can be separated from the myths, stories, and history presented in traditions, rites, and ceremonies.

Fourth, destination spots and public services and facilities at the Sangiran site. Every tourist who comes to the location at the Sangiran site, must consider any conditions and situations. When they arrive at a new location and a new setting, they have to think about whether or not their needs can be met. They will think again and reconsider visiting their destination if there is no bank, no telecommunications, no market, no transportation, no restaurant, and no guarantee of safety.

Fifth The digital map contains a database that contains data that must be displayed, such as information on archaeological sites, cultural tourism, tourism archeology, historical tourism, panoramic tours around archaeological sites, hotel locations, homestays, and lodging related to tourism. on the Archaeological site Sangiran. Information is displayed as a map or interactive map, with specific locations including information, images, videos, annual travel calendars, choice transportation, and other valuable media.

5 Conclusion

So far the communication system related to Ancient site information in the Sangiran area has not been integrated digitally. This condition results in tourists not having in-depth knowledge about the existence of all tourist objects in the area of Archaeological sites Sangiran along with available means and transportation. Convenience getting information very digitally _ tourists need to plan their tourist trips.

Through this GIS data-based digital tourist map application, tourists can get tourist information in just one application. The experience of surfing to various locations can be directly done just by opening this one application. In addition to making it easier for tourists, the information system This GIS-based system can also become a promotional event for tourism stakeholders.

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