Designing a Website-Based 360-degree Camera as a Medium in Choosing Tourists' Strategic Position on the Mahakam Tourism Ship in Samarinda City

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Abstract. The Mahakam River, one of the longest rivers in Kalimantan and Indonesia, is now recognized as a potential water tourism destination. Initially serving as an essential transport route for Borneo's natural resources, the river has evolved into a tourist attraction, particularly with the arrival of the Mahakam tour boat. These boats offer a unique and refreshing tourist experience in Samarinda, with the theme of exploring the city through the river. However, behind the appeal of the Mahakam tour boats, several challenges arise regarding access to information for potential tourists. In particular, travelers find it difficult to get an initial overview of the experience before visiting due to the limited number of boats and the departure schedule that only takes place every Saturday and Sunday night. To address this, a Virtual Tour simulation was designed using a 360-degree camera at one of the strategic points along the river to showcase its beautiful scenery. This design provides a convenient and immersive option for tourists to preview the tour before visiting in person. The aim is to attract tourists who specifically seek the natural beauty of the Mahakam River. This research uses the Multimedia Development Life Cycle (MDLC) method, which consists of six stages: design, material collection, assembly, testing, distribution, and concept development. The hypothesis is that the use of a 360-degree camera will provide a new experience for users and serve as an initial reference to understand the virtual riverboat tour before they enjoy the tourist attraction directly.

Keywords: 360 Camera; Mahakam Tourist Boat; Samarinda; Tourism; Virtual Tour

1. Introduction

The Mahakam River is the longest in East Kalimantan, Indonesia, spanning approximately 980 km. It plays an important role in Borneo's tropical rainforest ecosystem and provides natural resources to the surrounding communities. The Mahakam is also a major transport route for local trade and transport, connecting from village to village. Currently, the Mahakam River is the second longest river in Indonesia after the Kapuas River.

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In addition to being a vital community transport on the trade route and connecting villages, it has now begun to mobilise water attraction tours in the form of Mahakam Tourism boats that operate along the river from Mahkota Bridge to Mahakam Bridge on Saturdays and Sundays. Of course, this invites foreign and local tourists to make one of the choices to explore the Mahakam River. Tourism in Samarinda is growing rapidly with many new destinations, as expressed by the Deputy Governor of East Kalimantan, Hadi Mulyadi. [1]

Fig 1. The flow of the Mahakam Tour Boat journey
(**Source:** Google Earth and Author)

Although it is still fluctuating, tourists who come to visit Samarinda start from 2021-2023, with the highest number of tourist visits occurring in April, reaching 195,498 people and the lowest in August, namely 46,830 people. Tourists in Samarinda City are still dominated by domestic tourists [2]. The presence of the Mahakam Tourism Ship certainly provides a new colour and contributes to the increase in the number of tourists visiting Samarinda. In addition, the role of service is very important in coordinating tourists on this water attraction tour, which is very satisfying because it has started to be able to go through social media. When choosing a popular destination, tourists consider ease of service, as well as guarantees of cleanliness, smoothness, and safety, as determining factors in visiting decisions [3]. Service quality is the main factor that influences tourists' decisions to visit. Tourists are looking for friendliness, punctuality, cleanliness, and ease of accessing the destination to be visited. The trust and liking of local and foreign tourists will increase because when a tourist trusts an icon/brand/service, the tourist has the intention of returning and having a

positive experience with the icon/brand/service. It is even possible that a consumer will make a return visit with the things they like [4].

Based on the results of observations in the field, the research team of Mahakam Tourist Ship tourists, in this case, the Mahkota Pesut Tourist Ship, is divided into two, namely first tourists who want to do family/office gathering (in terms of work) and second tourists who really want to enjoy the scenery, both local tourists in Samarinda and outside Samarinda who are visiting for the first time. This research focuses on the second point, namely tourists who have just visited and want to enjoy the view of the Mahakam River.

In the context of boat tourism, the strategic position of travellers while enjoying the view is an important factor affecting their satisfaction. Travellers tend to choose the position that offers the best view and the most satisfying visual experience. Therefore, the design of a web-based 360-degree camera on the Pesut Mahkota tour boat aims to provide a more interesting and interactive experience for tourists. Virtual tours are immersive technologies that place the user inside the image, enabling significantly increased situational awareness and providing the highest level of features for viewing, capturing and analysing virtual data [5]. With the 360-degree camera, travellers can see the scenery around the ship from various viewpoints, both in person and through the web platform. This not only enhances their visual experience but also helps determine strategic positions to enjoy the best views. The main advantages of using new technologies and virtual tours, especially in the tourism industry, are significant [6]

By carrying out Smart City, which uses information technology to make it easier and closer to the community, and applying one of the principles of Smart City, namely Smart Branding in providing Amenities or designing tourist comfort infrastructure on the Mahakam Tourism Ship by implementing virtual tours on a 360-degree basis. In accordance with Samarinda City Regional Regulation Number 4 of 2020 concerning the REGIONAL TOURISM DEVELOPMENT INDUCTION PLAN 2019-2025, it states that the vision of Samarinda City is proclaimed to be a Leading Tourism Destination City Based on Creative Economy. Strategy. To realise this vision, one of them is through the development of the regional area as a tourist area for the natural charm of the mahakam river as a recreation-based tourist area, water tourism, and ecotourism [7]. Following up on this vision, the research team will create a virtual tour simulation to make it convenient for tourists to choose a seat position on the Mahakam tour boat to get the expected scenic experience.

Table 1. Previous research

No	Researcher	Title	Year
1	Wendy Aditya Rahma	Perancangan Virtual tour 360 sebagai Media Pengenalan Wilayah Sekitar Ibu Kota Negara Baru Indonesia	2023
2	Arya Harditya	Desain Dudukan Kamera 360 Derajat dalam Kegiatan Konservasi Burung di Indonesia	2023
3	Donny Laga Biantoro	IMPLEMENTASI SISTEM VIRTUAL REALITY PADA OBJEK WISATA DI JATIM PARK	2019

This research is based on previous studies that have applied visual technology and virtual tours to enhance tourism experience and promotion. Wendy Aditya Rahma (2023) emphasized the effectiveness of 360 virtual tours in introducing new tourist destinations. In addition, Arya Harditya's (2023) research on using 360-degree cameras in bird conservation shows the potential application of this technology in a broader context. The interconnectedness of these studies strengthens the foundation of this research in utilizing web-based 360-degree camera technology to provide an interactive and informative experience for Mahakam Tourism Ship tourists while increasing visitation interest through more attractive and strategic visualization.

2. Method

This research uses the Multimedia Development Life Cycle (MDLC) method, a systematic approach to developing multimedia applications, such as 360-degree camera-based virtual tour simulations. MDLC consists of six main stages: Concept, Design, Material Collecting, Assembly, Testing, and Distribution [8]. The following is a detailed explanation of each stage:

1. Concept
   This stage is an initial analysis to determine the purpose of the research and how 360-degree camera technology will be applied as an additional media for tourists. At this stage, it was determined that this technology was designed to help tourists obtain clearer visual information about the Mahakam Tour Boat and choose a strategic position to enjoy the view. The resulting virtual tour is expected to provide an interactive experience before traveling.

2. Design
   At this stage, the design of the virtual tour interface is carried out. The design is made to be user-friendly and easily accessible through desktop and mobile devices. Strategic positions on the ship were determined through field observations, and areas that provided the best views were identified. An interactive navigation design for the virtual tour was conceived, where users can click and rotate the 360-degree view along the tour boat, with easy on-screen controls. The design also includes an interactive display miming the experience during the ship's tour.
3. Material Collecting
   All the materials needed to create the virtual tour are collected at this stage. The material collection process includes taking pictures and videos with a 360-degree camera in various strategic locations on the Mahakam Tourism Ship, such as the front, middle, and back. Each position was chosen based on observation to provide the best view of the scenery along the journey along the Mahakam River. Other materials, such as tourist destination information, visual guides, and descriptive texts, were also collected to complete the virtual tour experience.
4. Assembly
   The collected materials are processed and combined into a complete virtual tour in the assembly stage. The editing process uses software such as 3D Vista, which enables the collation of 360-degree images into a format that can be accessed through a web platform. Navigation controls were added during this process, allowing users to move between locations quickly. In addition, additional features such as interactive maps, tourist information, and explanatory audio are included to enhance the quality of the virtual tour experience.
5. Testing
   After the assembly, the built virtual tour is tested to ensure its functionality runs correctly. Testing was conducted on various devices, including laptops and smartphones, to ensure the virtual tour could be accessed smoothly on multiple platforms. In addition, testing was also conducted to evaluate whether users could efficiently operate the virtual tour and whether the visual display matched reality. Feedback from early users was also used to improve certain aspects of the navigation and display.
6. Distribution
   The final stage of the MDLC is distribution, where the finished virtual tour is uploaded and published through web hosting. This research uses Niagahoster as a platform to upload the virtual tour of the Mahakam Tourism Ship, which can be accessed through a predetermined web address. At this stage, the virtual tour is ready to be used by potential tourists to explore the ship virtually and gain initial experience before making a physical trip. Visitors who have never visited can get a clear picture of the journey and location on the Mahakam Tourism Ship by seeing the results of this virtual tour.

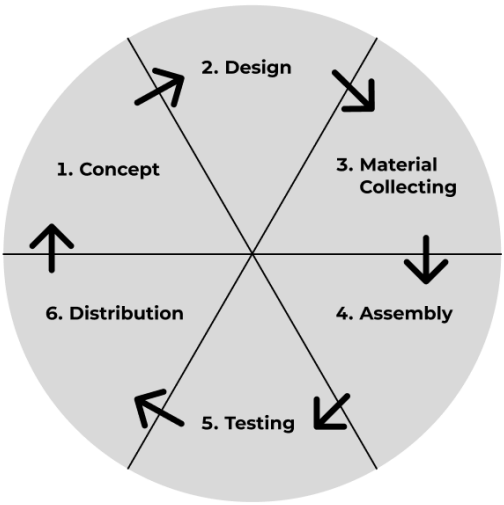

Fig 2. MDLC Research Analysis Flow
(**Source:** Mustika, 2018, [8])

3. Result

3.1 Concept & Design

It is a system analysis to determine the objectives to be achieved, namely as an additional media for tourists to see conditions before choosing a seating position according to their needs. The goal is to make it easier for tourists to consider the position of natural beauty and the village environment around the Mahakam River.
The strategic position that the research team determined was in front of the 2nd-floor ship canopy; according to the results of observations, the front of the ship is where most tourists gather and take turns seeing the view throughout the trip. So that the spot is not comfortable for tourists who want to relax and enjoy the view quietly. Then, there is the mid-ship spot, which is not a strategic position because the canopy poles block it, and the roof covers the top view. While at the back of the ship, it is also not strategic to enjoy the view because the area is quite narrow and filled with many tourists as well; on the other side, the view obtained is quite limited and blocked by the ship's canopy.

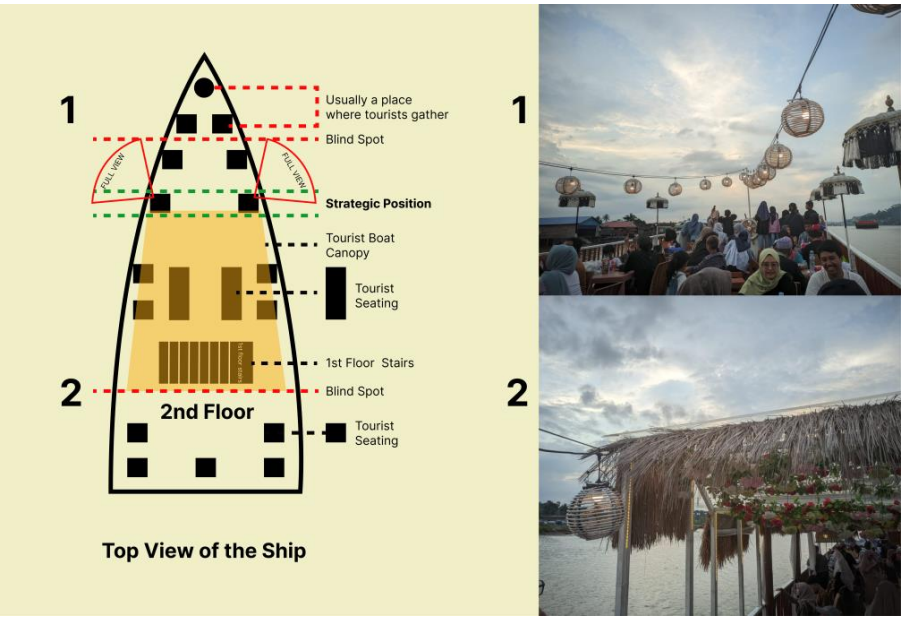

Fig 3. Determining the strategic position of travellers
(**Source:** Research Team, 2024)

1. **Material Collecting & Assembly**
   The process of collecting materials according to the needs of the project being worked on. The material collected includes information about the objects in the Mahakam Tourism Ship area. Activities at this stage include taking pictures, which start from the gate entering the dock area to the trip on the ship. Virtual tour access is made like that to make it easier for tourists to access arrival information to strategic positions and enjoy the view of the Mahakam River cruise.

Fig 4. Taking pictures from the Pier Gate
(**Source:** Research Team, 2024)

The image and video footage collection is designed simply like Google Maps, which allows tourists to click the forward button to move from one place to the next. During the moving process, tourists can see the overall situation by swiping left or right on the smartphone or laptop screen.

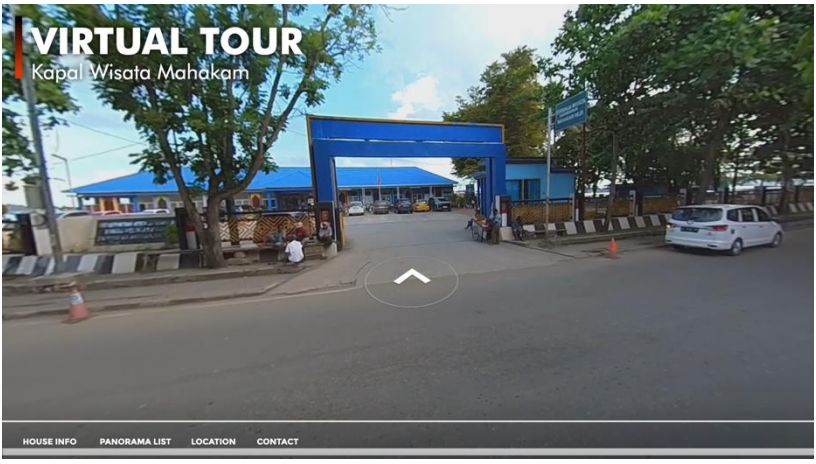

Fig 5. Signs leading to the next location on the virtual tour
(**Source:** Research Team, 2024)

Fig 6. Taking pictures at strategic positions
(**Source:** Research Team, 2024)

The process of taking footage adapts to the position of human height when standing in order to get a wider view. It also accents the experience of being on location. Then, the editing process uses the 3D Vista application to adjust all footage from beginning to end. The editing process takes quite a long time because there are several additional points for visitor information and back sound, which makes it more varied.

Fig 7. Workflow of 360 Virtual Tour Creation
(**Source:** Research Team, 2024)

2. Testing & Distribution

At this stage, the enhanced virtual tour is uploaded to a publicly accessible hosting server. The hosting platform used in this research is Niagahoster. It was chosen because it offers reliable hosting services and supports access to web-based applications with sufficient bandwidth to handle user traffic. Once uploaded, the virtual tour web address is disseminated through various promotional media, including social media, the official website of Mahakam Tourism Ship, and other promotional channels. Users can access this virtual tour easily through the link provided, allowing them to explore the tour boat interactively before traveling physically. The result of this distribution stage is expected to increase the engagement of potential travelers with Kapal Wisata Mahakam and provide them with more complete and in-depth

information regarding the tour experience offered. The results can be enjoyed at the link http://kapalwisatamahakam.site/

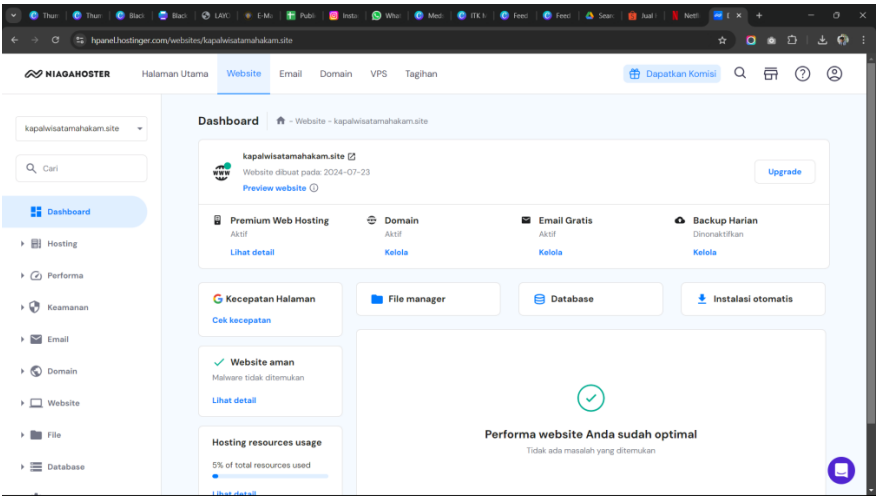

Fig 8. Publish HTML
(**Source:** Research Team, 2024)

4. Conclusion

Some key conclusions can be drawn:

1. Enhanced Traveller Experience: 360-degree cameras allow travelers to view the scenery around the ship from various vantage points. This not only enhances their visual experience but also helps them strategically position themselves to enjoy the natural and cultural beauty on offer.
2. Interactivity and Engagement: Implementing this technology creates more significant interaction between travelers and their surroundings. With the ability to view the scenery virtually before traveling, travelers can plan the best position to enjoy their experience, potentially increasing their level of satisfaction.
3. Development Recommendations: This technology could be further developed by adding additional interactive features, such as audio guides or information regarding points of interest along the route, which would further enhance its attractiveness to tourists.

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