

Development of Website-Based Airport Map for Optimizing Service Quality at Komodo International Airport Labuan Bajo

Almas Ghina Marzuqoh¹, Dr. Faoyan Agus Furyanto², Yudhis Thiro Kabul Yuniors³
Politeknik Penerbangan Surabaya, Indonesia

Corresponding Author: Almas Ghina Marzuqoh¹
Air Transportation Management Department
Politeknik Penerbangan Surabaya, Indonesia
Email: almasghinamarzuqoh@gmail.com

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Abstract

This research aims to design a web-based Airport Map information system to optimize service quality for users at Komodo International Airport, Labuan Bajo. The background of this study is the unavailability of a visual and digital information system accessible to passengers for locating important facilities within the airport area. As a result, users experience difficulties in mobility and wayfinding, which negatively affects service efficiency and user satisfaction.

The study adopts the Research and Development (R&D) method with the ADDIE development model approach (Analysis, Design, Development, Implementation, Evaluation). The data used includes maps of domestic and international terminals, and access routes to nearby tourist destinations around Labuan Bajo. The system was developed using HTML, Tailwind CSS, and JavaScript, and deployed via the Netlify platform. Validity testing was carried out by IT and subject matter experts, and usability testing involved 55 passenger respondents through questionnaires.

The results indicate that this web-based Airport Map system is feasible and rated highly in terms of usability and efficiency. It facilitates user access to location information and is expected to serve as an innovative digital solution to improve service quality at the airport.



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1 INTRODUCTION

Airports serve as gateways that connect regions and countries, playing a crucial role in facilitating transportation, boosting economic growth, and enhancing passenger experience. An ideal airport is not merely a transit point but also a public service hub that prioritizes comfort, accessibility, and efficiency. In line with International Air Transport Association (IATA, 2021) and International Civil Aviation Organization (ICAO) principles on smart airports, digital technology such as web-based applications can significantly improve passenger wayfinding, reduce confusion, and streamline movement within terminals.

Komodo International Airport in Labuan Bajo, as the main gateway to Flores Island and a prominent tourist destination, currently faces challenges in providing digital navigation solutions for passengers. Many passengers, particularly foreign tourists, report difficulties in locating essential facilities such as check-in counters, departure gates, restrooms, and baggage claim areas without relying on direct assistance from staff. Previous studies (Rakhman & Fitriani, 2022) show that 70% of passengers struggle to find facilities in airports lacking adequate visual or digital navigation systems.

This research addresses the gap by developing a website-based airport map designed to display interactive and accessible location information, provide accurate directions, and improve service quality through self-service access. The novelty lies in integrating facilities, terminal maps, transportation access, and nearby tourist attractions into a single web platform. The objectives are to (1) design a website-based airport map for Komodo International Airport, (2) develop interactive content tailored to passenger needs, and (3) evaluate its feasibility based on expert validation and usability testing.

2 METHOD

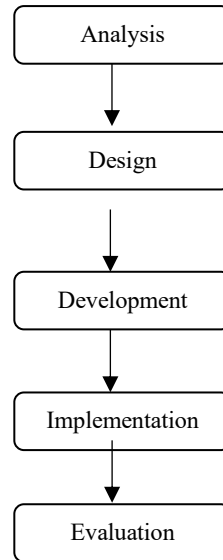


Figure 1. Model ADDIE

This study applies the Research and Development (R&D) methodology with the ADDIE model: Analysis, Design, Development, Implementation, and Evaluation (Sugiyono, 2019). The Analysis stage identified passenger needs and current limitations in navigation at Komodo International Airport using the PIECES framework (Performance, Information, Economy, Control, Efficiency, Service). The Design stage produced wireframes, use case diagrams, and menu structures for the web application. In the Development stage, the airport map was created using HTML, Tailwind CSS, and JavaScript, then deployed on Netlify for online access. The Implementation stage involved direct testing with passengers, while the Evaluation stage assessed usability and expert validation results.

Data collection methods included observation, documentation, interviews with airport staff, and questionnaires distributed to 55 passenger respondents. Expert validation involved two IT experts and two aviation service experts, evaluating aspects such as functionality, design clarity, and content relevance. Usability testing applied a Likert scale to measure ease of use, efficiency, and overall user satisfaction.

3 RESULTS

Based on direct observations at Komodo International Airport, Labuan Bajo, various obstacles were still found in conveying information and navigation facilities to service users.

Table 1. Observation Results of Website-Based Airport Map Design

Aspect	Findings	Status
<i>Performance</i>	There are no digital maps yet, user navigation is still manual	Needs improvement
<i>Information</i>	Facility location information is not available in visual or real-time form	Needs improvement
<i>Economy</i>	No promotional information or cost-saving services are available digitally	Not optimal yet
<i>Control</i>	There is no digital control system to update and manage information	Not optimal yet
<i>Efficiency</i>	Users have to ask/request directions manually, which is inefficient	Needs improvement
<i>Service</i>	Basic facilities are available, but they are not supported by interactive and disability-friendly guides	Needs improvement

Overall, the interview results indicate that a website-based airport map would significantly support users' information needs and facilitate their orientation within the airport area. Input from the interviewees provided a crucial foundation for designing a system that is responsive to user needs and supports optimal public service.

The questionnaire was distributed to 55 respondents consisting of passengers. The needs analysis revealed strong demand for a digital navigation system, with over 85% of respondents rating features such as interactive maps, facility search, and transportation information as 'very important'. Based on this, the prototype included: (1) an interactive terminal map covering domestic and international areas, (2) facility information such as check-in counters, gates, restrooms, and lounges, (3) transportation options including taxis, buses, and travel services, and (4) nearby tourist attraction details.

Table 2. Results of the Needs Questionnaire for the Design of an Website-Based Airport Map Komodo

No	Aspect	Percentage	Category	Description
1	Performance	93,45%	Very necessary	The system must have fast access time, be lightweight when used on various devices, and be able to display airport maps and other information in a complete and responsive manner without technical obstacles.
2	Information	93,44%	Very necessary	The system must provide airport map information that is easy to understand, accurate, and regularly updated, including the location of airport facilities, gates, and transportation routes.
3	Economy	90,90%	Very necessary	The system needs to provide price information features for transportation services to and from Komodo Airport, so that it can save users' travel costs.
4	Control	93,54%	Very necessary	The system is built on a secure and easy-to-manage platform, such as Netlify or other hosting that is integrated with the Google account authentication system so that it can be controlled and accessed securely.
5	Efficiency	91,63%	Very necessary	The system must be able to provide information on terminal maps at Komodo Airport, as well as integrate various transportation mode information (such as buses, taxis, and travel) in one website display, so that users can search and select services efficiently.
6	Service	92,90%	Very necessary	The system provides additional services such as information on nearby tourist locations that can support the user's travel experience.

All aspects scored above 90%, indicating a strong need to develop website-based airport map Komodo.

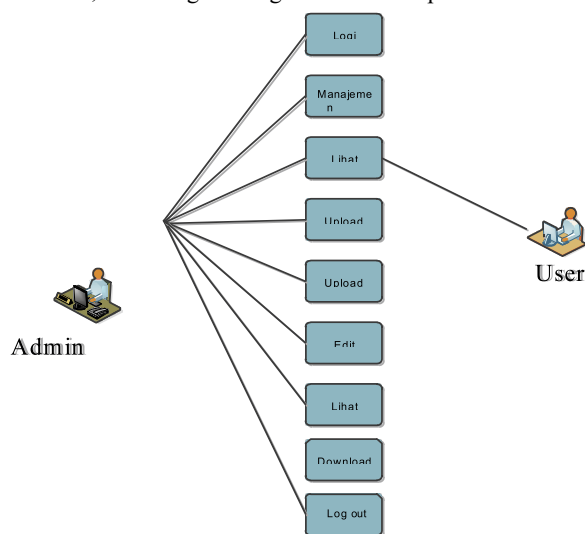


Figure 2. Use Case Diagram

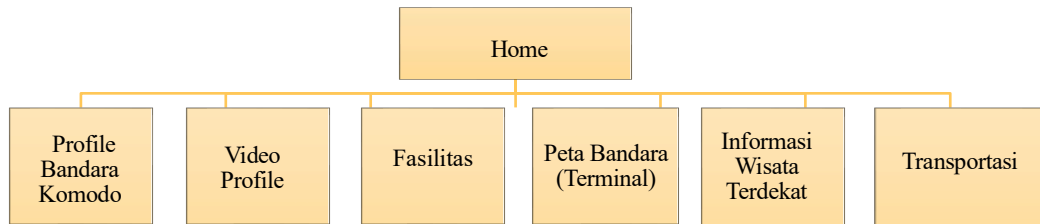


Figure 3. Website Menu Structure

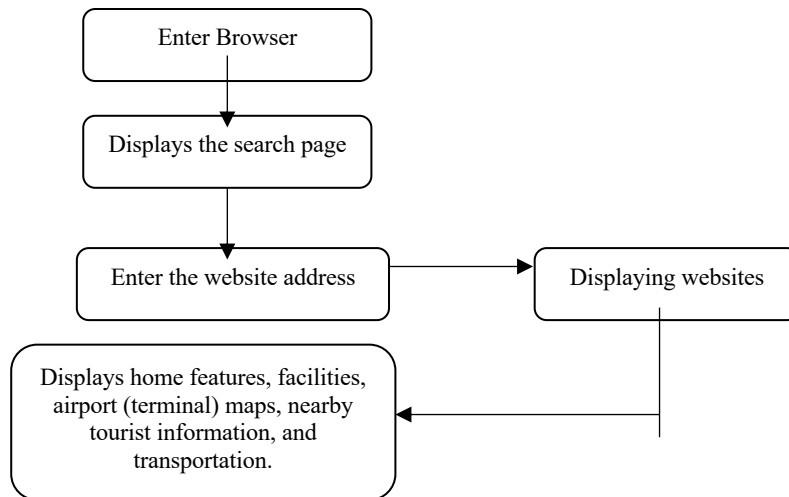


Figure 4. Flowchart Sistem

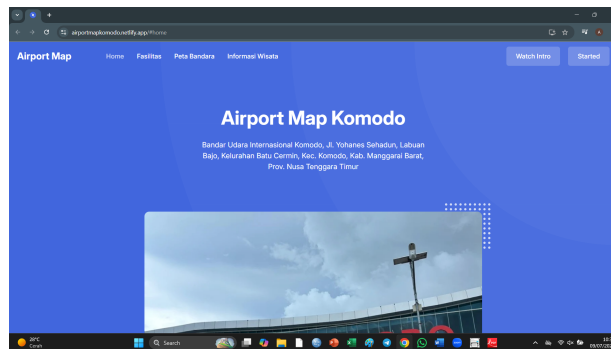


Figure 5. Homepage

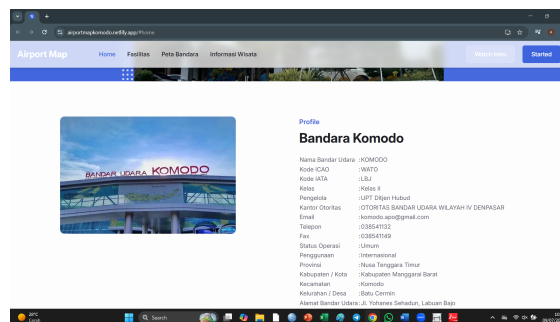


Figure 6. Profile Komodo Airport

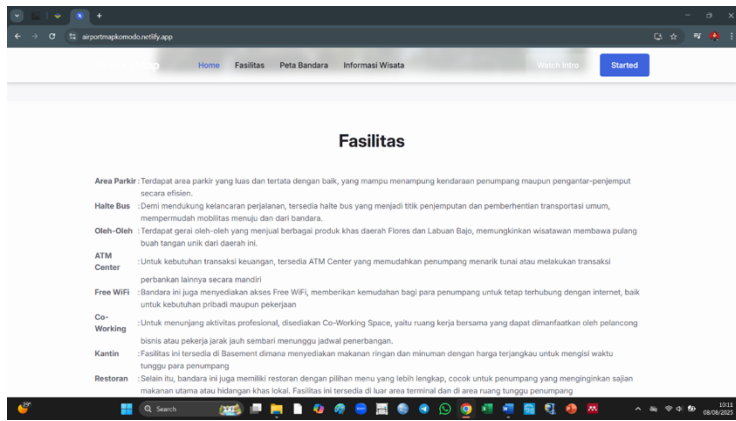


Figure 7. Facility

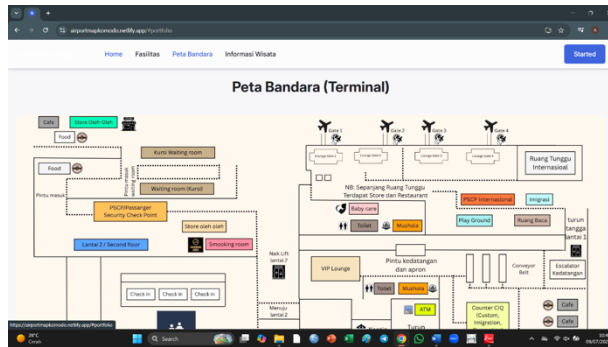


Figure 8. Airport (Terminal) Map

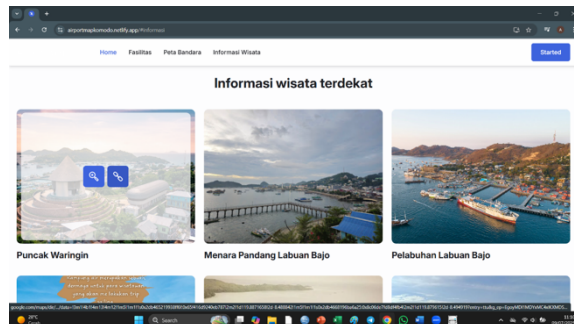


Figure 9. Tourist Information

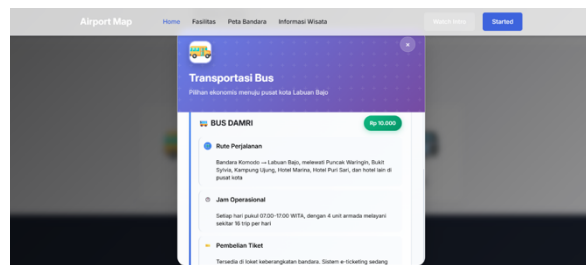


Figure 10. Transportation

The website-based airport map design developed using CSS tailwind. The feasibility test was conducted by two media experts (information technology) and two material experts (airport operations supervisor). The assessment includes aspects of functionality, ease of use, appearance, and content suitability using a Likert scale.

Table 3. Data From Expert Test Results

Assessment Aspect	Scores obtained from Subject Matter Experts				Max Score	Information
	Ahli IT (1)	Ahli IT (2)	Airport Operations Supervisor (1)	Airport Operations Supervisor (2)		
Media Engineering	19	19	19	19	20	Very fesiable
Visual Communication	24	23	23	25	25	
TOTAL	43	42	42	44	45	

Table 4. Expert Test Data Processing

Assessment Aspect	Percentage of Scores Obtained from Subject Matter Experts (%)				Accumulated Score Percentage	Information
	Ahli IT (1)	Ahli IT (2)	Airport Operations Supervisor (1)	Airport Operations Supervisor (2)		
TOTAL	95.55	93.3	93.3	97.77	94.98	Very fesiable

Expert validation results were: IT experts – 94.425% (very feasible), aviation service experts – 95,535% (very feasible), and then accumulated score percentage 94,98% (very fesiable). Indicating high acceptance and satisfaction among passengers. Respondents highlighted improved ease of navigation, reduced dependence on staff assistance, and faster access to facility information.

The results of the development phase are applied to the target device for user support facilities. The website-based airport map can be accessed by users online at <https://airportmapkomodo.netlify.app/>.

The feasibility percentage value of 92.5% is in the interval of 81 to 100% which indicates that the usability measurement results of the Komodo Airport website-based Airport Map are "Very Feasible". Based on the assessment data from users of the website-based Airport Map service, the researcher concluded that this system makes it quite easy for users to access the information contained in the information system and is expected to continue to be developed further to meet user expectations.

4 DISCUSSIONS

Based on the data collection and analysis conducted, the development of a web-based airport map at Komodo International Airport provides several significant benefits. These findings are reinforced by analysis using the PIECES framework (Performance, Information, Economics, Control, Efficiency, Service), commonly used in information system evaluations by Monica et al. (2024).

The findings confirm that the website-based airport map effectively addresses navigation issues at Komodo International Airport. Compared to conventional signage, the digital map offers greater accessibility, as passengers can use their own devices to obtain real-time location information. The integration of facility, transportation, and tourism data in one platform enhances service efficiency and passenger experience.

This aligns with previous studies (Rahmawati, 2022; Setiawan & Purnama, 2022) showing that digital airport maps improve operational efficiency and customer satisfaction. Furthermore, the deployment on Netlify ensures fast loading times, high availability, and scalability. Limitations include the absence of real-time flight data and indoor positioning, which could be considered for future development to align with advanced smart airport features.

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