

ADDIE-BASED WEB BOOKING SYSTEM FOR RURAL TOURISM

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Abstract

Digital transformation plays a crucial role in fostering innovation within community-based tourism services, particularly in rural areas of Indonesia. This study aims to develop a Web-Based Travel and Car Booking Application using the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as a systematic framework to support the digital transformation of tourism transportation services in Rembitan Village, Central Lombok Regency. A mixed-method approach was employed to integrate user needs analysis, user-centered design, system development, and functional evaluation. The black-box testing results indicated that all system modules operated according to specifications with a 100% success rate. A quantitative evaluation using the System Usability Scale (SUS) was conducted on ten key participants, representing the entire population of active transport operators in the village. The results yielded an average score of 91.5 (Excellent category), indicating high usability and ease of use for non-technical users. Qualitative findings revealed improvements in operational efficiency, faster booking and payment confirmation, and greater transparency through the integration of the WhatsApp API and AI Chat Integration modules. The findings confirm that the ADDIE model effectively produces a digital system that is scientifically rigorous, technically reliable, and socially impactful. The developed application serves as a practical prototype for Smart Tourism Village implementation, promoting sustainable digital transformation and local economic empowerment within rural tourism sectors in Indonesia.

Keywords : ADDIE Model, AI Chat Integration, Community-Based Tourism, Digital Transformation, Smart Tourism Village.

Abstrak

Transformasi digital memainkan peran penting dalam mendorong inovasi layanan pariwisata berbasis komunitas di wilayah pedesaan Indonesia. Penelitian ini bertujuan mengembangkan Aplikasi Pemesanan Travel dan Mobil Berbasis Web dengan menggunakan model ADDIE (Analysis, Design, Development, Implementation, dan Evaluation) sebagai kerangka sistematis untuk mendukung transformasi digital transportasi wisata di Desa Rembitan, Kabupaten Lombok Tengah. Pendekatan mixed-method diterapkan guna mengintegrasikan analisis kebutuhan pengguna, desain berpusat pada pengguna, pengembangan sistem, serta evaluasi fungsional. Hasil pengujian black-box menunjukkan seluruh modul sistem berfungsi sesuai spesifikasi dengan tingkat keberhasilan 100%. Evaluasi kuantitatif menggunakan System Usability Scale (SUS) terhadap 10 partisipan kunci menghasilkan skor rata-rata 91,5 (kategori "Excellent"), menandakan tingkat kegunaan tinggi dan kemudahan bagi pengguna non-teknis. Temuan kualitatif menunjukkan peningkatan efisiensi operasional, percepatan konfirmasi pemesanan dan pembayaran digital, serta peningkatan transparansi melalui integrasi WhatsApp API dan AI Chat Integration. Penelitian ini membuktikan bahwa model ADDIE secara efektif menghasilkan sistem digital yang ilmiah secara akademik, andal secara teknis, dan berdampak sosial nyata. Aplikasi yang dikembangkan berfungsi sebagai prototipe implementatif Smart Tourism Village, yang mendorong transformasi digital berkelanjutan dan pemberdayaan ekonomi lokal di sektor pariwisata pedesaan Indonesia.

Kata kunci : Model ADDIE, Integrasi AI Chat, Pariwisata Berbasis Komunitas, Transformasi Digital, Desa Wisata Cerdas.

1. INTRODUCTION

Digital transformation has significantly improved tourism services, particularly in rural community-based destinations that depend on tourism for local economic sustainability. Technologies such as IoT, cloud computing, and web-based platforms have enhanced efficiency and information accessibility, supported by national initiatives like Smart Village and Digital Tourism [1], [2], [3]. Despite this progress, many rural areas still rely on manual booking processes, resulting in slow confirmations, inconsistent fleet records, and limited access to tariff information [4].

Previous research highlights the potential of digital platforms to improve transparency and operational performance. Web-based systems have been shown to accelerate transactions [5], e-booking tools enhance service quality [6], and digital rental solutions increase efficiency even though real-time synchronization remains a challenge [7]. User-centered design also contributes to improved usability [8], while ICT readiness plays a crucial role in supporting digital adoption within community-based tourism [9], [10].

In Rembitan Village, Central Lombok, transportation bookings are still managed manually with no integrated system for payments or fleet management [11]. Insights from ten purposively selected local stakeholders further confirm these limitations.

This study aims to develop a web-based travel and car booking system using the ADDIE model, integrating real-time fleet and fare updates, automated WhatsApp communication supported by AI, and digital payment features. The research question guiding this study is:

“How can the ADDIE model support the development of a web-based tourism transportation booking system to enhance digital transformation and service efficiency in rural destinations?”

The novelty of this research lies in applying the full ADDIE framework within a community-based tourism context to create an adaptive and sustainable digital solution. The remainder of this article is organized into the methodology (Section II), system development and discussion (Section III), and conclusions (Section IV).

2. METHOD

This study employed the ADDIE instructional development model-Analysis, Design, Development, Implementation, and Evaluation-as

the core framework for developing the web-based travel and car booking system. The model was selected for its structured yet adaptable workflow, which supports iterative refinement and ensures that user needs remain central throughout the development process [12], [13], [14].

A mixed-method approach was used, integrating qualitative insights from field observations and semi-structured interviews with quantitative assessments derived from system testing and the System Usability Scale (SUS). The research process included identifying user needs, designing system flows and interface prototypes, developing iterative versions of the application, piloting the system in Rembitan Tourism Village, and evaluating its performance and usability. Figure 1 summarizes the overall methodological flow.

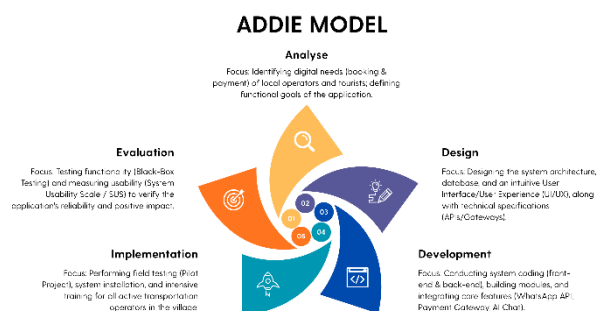


Figure 1. Research Framework

2.1. Research Design

The ADDIE model guided all stages of system development due to its suitability for structured, iterative, and user-centered digital system design [12], [13], [14]. Qualitative data were collected through observations and interviews with transport operators, tourism providers, and local guides [15], [16], [17], while quantitative evaluation employed the SUS instrument, which is widely validated for web-based applications and interprets scores above 75 as indicative of strong usability [18].

Reflective thematic analysis was used to interpret the qualitative findings, supported by methodological references that validate the use of ADDIE in digital system development [19], [20]. The study involved ten purposively selected participants in Rembitan Village, with data collection conducted from August to September 2025, encompassing needs assessment, design validation, SUS testing, and field observations.

2.2. Analysis Phase

The analysis phase identified key issues—unclear pricing, slow confirmations, inconsistent fleet data, limited financial records, and low digital literacy—based on observations, interviews, and literature review [21]. Thematic analysis produced four dominant categories: operational inefficiency, data inconsistency, low technological readiness, and lack of integrated digital management [22].

These insights were organized into a Needs-Assessment Matrix (Table 1), which aligned user problems with field evidence and proposed solutions. Recommended features included real-time pricing, automated WhatsApp-based communication supported by an AI module,

centralized dashboards for vehicle and financial management, and analytical tools for performance monitoring. These findings formed the foundation for the system architecture and ensured that the solution addressed efficiency, transparency, and community empowerment in rural tourism transportation.

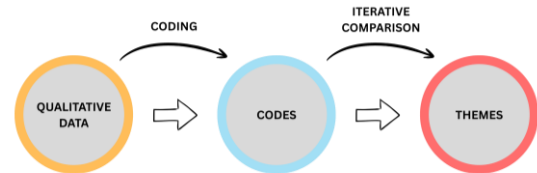


Figure 2. Thematic Analysis Process Flow in Qualitative Research

TABLE I. NEEDS-ASSESSMENT MATRIX

User Problems	Field Findings	Proposed System Solutions
Unclear pricing information	No standardized price list available at rental stations	Development of a real-time pricing module based on vehicle data and service category
Delayed booking confirmation	Manual communication between users, admins, and drivers causes delays	Integration of WhatsApp API with AI Chatbot for automated booking confirmation
Inconsistent vehicle data	Fleet data not regularly updated; no centralized record-keeping	Vehicle Management Dashboard module with a centralized database system
Limited financial management	Revenue recording is done manually without digital summaries	Financial Management Module with automated transaction graphs and CSV-PDF export
Lack of business monitoring system	No tools available for performance tracking or visual reporting	Analytical Dashboard that visualizes transaction trends and driver activities
Low digital literacy	Some operators are not familiar with online systems	Digital training sessions and user guides based on community-driven learning

2.3. Design Phase

The design phase translated the analysis findings into the system architecture and interface specifications using a Use Case Diagram (Figure 3) to map interactions among customers, administrators, and drivers. The interface design followed User-Centered Design principles, Nielsen’s heuristics, and WCAG 2.1 accessibility guidelines. Prototypes were developed using Figma and Draw.io and validated through participatory testing with local users [23], [24], [25]. The detailed prototype visuals are not presented in this section, as the complete application outputs are shown directly in Chapter III, while this phase focuses on structuring user

access levels and defining the system’s interaction flow.

In addition, an automated communication module was designed using an AI-driven workflow on the n8n platform, integrating the OpenAI Chat Model, SerpAPI, and the WhatsApp API. This module handles message detection, differentiation between information inquiries and booking requests, contextual response generation, and automated message delivery through WhatsApp (Figure 4). User feedback from the validation process informed refinements to navigation, booking flow, and information clarity, ensuring alignment with the needs of community-based digital tourism [26].

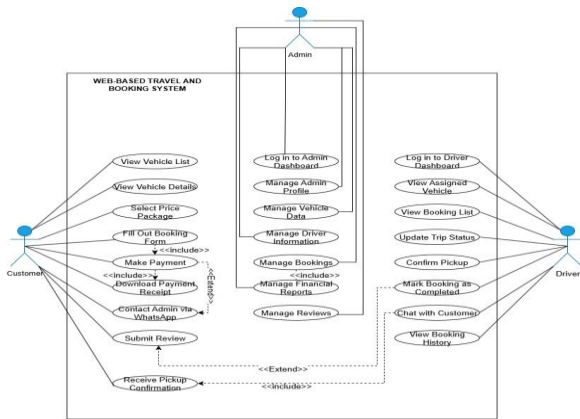


Figure 3. Use Case Diagram of the Web-Based Travel and Vehicle Booking Application

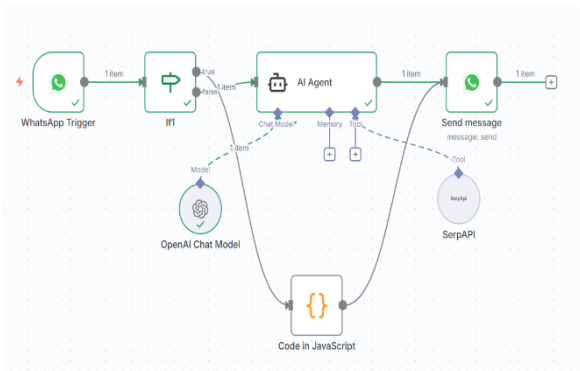


Figure 4. Workflow of the WhatsApp AI Chatbot System for Automated Booking Services

TABLE II. ITERATIVE PROTOTYPE DEVELOPMENT PROCESS

Prototype	Main Features Developed	Description and Purpose
Prototype 1	Vehicle booking form, vehicle listing, one-way WhatsApp API integration	Focused on developing the core booking module that allows users to make reservations directly without registration. Bookings are confirmed via WhatsApp or bank transfer.
Prototype 2	Two-way WhatsApp API integration, automated payment validation via bank transfer	Added two-way communication between users, admins, and drivers for automatic notifications and digital payment validation through the admin panel.
Prototype 3	Separate login pages for admin and driver, transaction dashboard, booking verification module, vehicle management, and travel status tracking	Improved transparency and operational efficiency by adding reporting, data verification, and trip management modules.

2.5. Implementation Phase

The implementation phase involved pilot deployment at the Rembitan Tourism Village

2.4. Development Phase

System development followed an iterative prototyping approach within an agile workflow, allowing continuous enhancement of features, usability, and stability based on iterative feedback [27]. The system was implemented using Laravel 11 with MVC architecture, Tailwind CSS and Bootstrap for responsive design, JavaScript for interactive components, and MySQL for real-time data handling.

Across three prototype cycles (Table 2), the application evolved from a basic booking form into a fully integrated digital platform featuring automated WhatsApp communication, secure digital payments, and real-time reporting dashboards. Each version underwent black-box testing and peer review to verify functional accuracy and alignment with user requirements. Progressive improvements in confirmation speed, data reliability, and system responsiveness indicated readiness for real-world implementation and supported sustainable digital transformation in community-based tourism.

Office to assess system performance under real operational conditions. Participants received briefings on system features, including booking,

WhatsApp-based AI confirmation, and digital payment options.

Data collection drew from system analytics (e.g., login activity, booking duration, confirmation speed, payment success), field observations of user behavior, and structured questionnaires evaluating effectiveness, efficiency, and clarity. Table 3 outlines the indicators, data sources, and

measurement methods. Comparative pre- and post-implementation analysis showed clear improvements in booking confirmation time, input accuracy, communication consistency, and administrative reporting-aligned with evidence from existing research on rural tourism digitalization [28].

TABLE 3. DATA SOURCES FOR EACH INDICATOR

Indicator	Data Source	Data Collection Method	Remarks
Booking confirmation time	Field observations & system logs	Recorded from the time of booking form submission until the WhatsApp notification is received	Based on 10 random transactions
Data entry errors	Admin records & dashboard logs	Counted from the total number of input errors before and after the system activation	Manually validated by the operator
Revenue reporting time	Interviews & system reports	Before: manual input via Excel; After: automatic report generation via dashboard	Estimated by operators and verified using system logs
Number of notifications sent	WhatsApp API logs	Comparison between successful and failed message delivery counts	Real-time system data (Meta API)

2.6. Evaluation Phase

The evaluation phase assessed the system's effectiveness and usability after deployment using the System Usability Scale (SUS), which is widely recognized for its reliability in web-based application evaluation [18]. The SUS questionnaire was administered to transport operators, tourism providers, and local guides, and the resulting scores-converted to a 0-100 scale-were triangulated with open-ended feedback and field observations to ensure alignment between usability perceptions and actual system performance.

The system demonstrated stable functionality, high confirmation success rates, improved operational efficiency, and a SUS score above 75, indicating strong usability even for users with limited technical skills. These findings validate the effectiveness of the ADDIE model in developing community-oriented digital systems. Participation was voluntary and anonymized, and detailed evaluation results are presented in Chapter III.

3. RESULTS AND DISCUSSION

3.1. System Development Results

The development of the web-based travel and vehicle booking application resulted in four integrated modules:

1. a booking and digital payment module,
 2. an automated WhatsApp-AI communication module,
 3. an administrative dashboard for real-time monitoring, and
 4. a vehicle and financial management module.
- These modules were validated through pilot deployment involving transport operators, tourism service providers, and local guides in Rembitan Village.

Compared with similar studies, the modular structure aligns with Sarja [5], and Vlahović et al. [6], who emphasize the importance of integrated booking and e-communication tools in improving operational transparency. The addition of WhatsApp-based AI automation extends the work of Firmansyah et al. [7], offering real-time responsiveness that was previously limited by

manual synchronization. Figures 5–11 illustrate the main system outputs for user, admin, and driver roles.

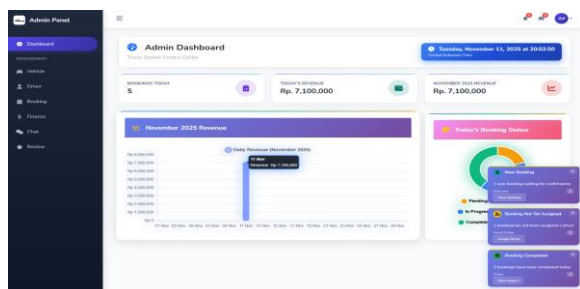


Figure 5. Admin Dashboard Page

The Admin Dashboard provides a consolidated view of bookings, revenue, and transaction status, enabling administrators to monitor operations in real time. This integrated visibility directly addresses earlier issues of fragmented record-keeping and delayed confirmations. By supporting timely decision-making and automated notifications, the dashboard enhances workflow efficiency and aligns with prior studies emphasizing the importance of centralized digital monitoring in tourism service management [5], [7].

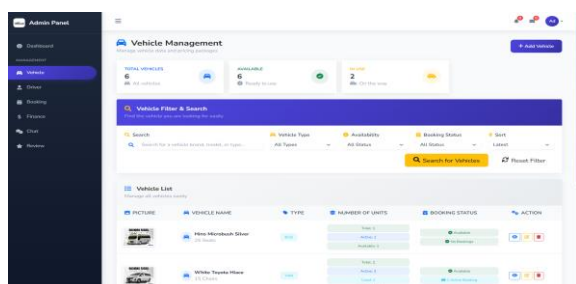


Figure 6. Vehicle Management Module

The Vehicle Management Module provides a unified interface for tracking fleet availability and operational status. By centralizing vehicle data, pricing, and booking readiness, this module addresses earlier issues of inconsistent records and manual verification delays. The integrated search and filtering features support faster decision-making and ensure that fleet allocation remains accurate and responsive to tourism demands. This design aligns with prior studies highlighting the importance of real-time asset visibility in optimizing rural transportation services [6], [7].

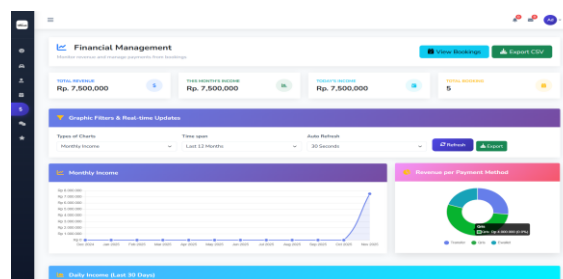


Figure 7. Financial Management Module

The Financial Management Module provides centralized, real-time visibility of revenue trends and transaction performance. By integrating automated reporting, period-based filters, and CSV export, the module resolves earlier issues of fragmented manual bookkeeping and limited financial oversight. These features support transparent monitoring and data-driven decision-making, aligning with prior studies emphasizing the role of digital financial dashboards in improving accountability and service reliability within community-based tourism systems [7], [9].

Figure 8. Booking Form Page

The Booking Form streamlines the reservation process by consolidating personal data entry, schedule selection, and payment options into a single, structured interface. This integrated workflow reduces manual errors and accelerates booking completion, addressing earlier issues of fragmented communication and inconsistent data collection. The form design reflects UCD principles by minimizing cognitive load and guiding users through clear step-by-step inputs, consistent with findings that structured digital forms enhance accuracy and reliability in tourism booking systems [6], [24].

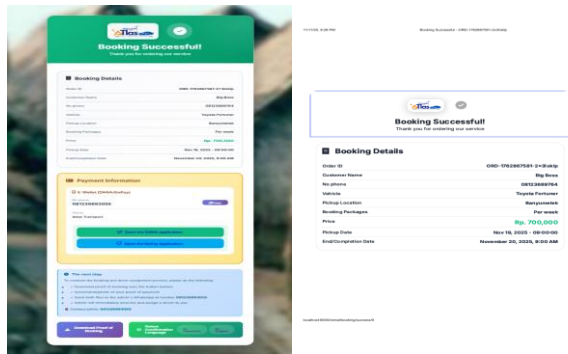


Figure 9. Automatic Booking Confirmation Page

The automatic booking confirmation page provides immediate verification of successful transactions and generates a downloadable receipt, ensuring transparency across the entire booking workflow. This automated confirmation process minimizes the delays and communication gaps typically found in manual systems, reinforcing user trust and reducing administrative workload. The feature aligns with prior studies highlighting that instant digital confirmations enhance perceived reliability and overall user satisfaction in e-tourism platforms [6], [25].

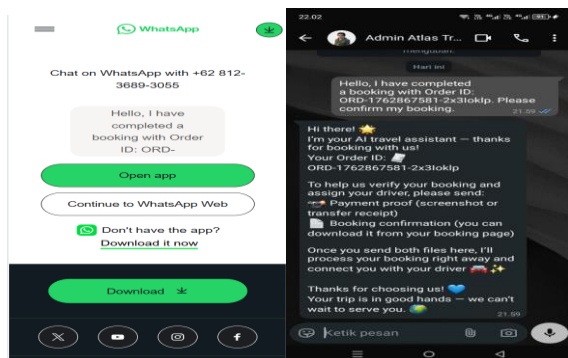


Figure 10. WhatsApp Chatbot Integration for Booking Confirmation

The WhatsApp chatbot integration automates booking confirmation and payment guidance, ensuring immediate and consistent communication between users and administrators. By eliminating the delays and

3.2. System Testing

TABLE 4. RESULTS OF BLACK-BOX TESTING FOR THE TRAVEL CAR APPLICATION

No	Module/Feature Tested	Testing Scenario	Expected Result	Actual Result	Status
1	Home Page & Vehicle List	The user opens the main page and selects a vehicle	The complete list of vehicles is displayed correctly	As expected	✓ Passed
2	Booking Form	The user fills out the booking form and submits data	Data is saved successfully with the status "Pending"	As expected	✓ Passed

inconsistencies typical of manual messaging, this AI-supported workflow improves service responsiveness and reduces administrative burden. This approach aligns with existing studies demonstrating that automated conversational systems enhance reliability, speed, and user engagement in digital tourism services [6], [25].

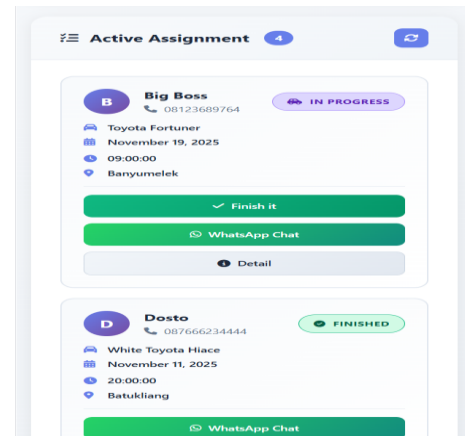


Figure 11. Driver Assignment Page

The Driver Assignment Page centralizes trip schedules, task status, and direct communication channels, enabling more efficient coordination between administrators and drivers. By integrating assignment updates and real-time messaging in a single interface, the system reduces miscommunication and delays that previously occurred in manual coordination workflows. This streamlined process reflects findings from earlier studies emphasizing that synchronized digital communication significantly improves operational clarity and service reliability in tourism transportation systems [6], [7].

3	WhatsApp Confirmation	The user clicks the Confirm via WhatsApp button	WhatsApp opens automatically and sends a confirmation message to the admin	As expected	✓ Passed
4	Digital Payment	The user makes a payment via bank transfer or e-wallet	Payment is detected and the booking status updates automatically	As expected	✓ Passed
5	Automatic Booking Receipt	After payment confirmation	The system generates and sends a booking/payment receipt to the user	As expected	✓ Passed
6	Admin Notification & Driver Assignment	The admin receives an automatic notification and assigns a driver	The booking status updates to "Driver Assigned"	As expected	✓ Passed
7	Driver-Passenger Communication	The driver contacts the passenger via WhatsApp	Communication proceeds smoothly	As expected	✓ Passed

Black-box testing confirmed that all core modules operated according to functional specifications, achieving a 100% success rate (Table 4). The accuracy and stability of key workflows-booking submissions, payment verification, automated confirmations, and driver assignment-demonstrate strong system reliability.

These outcomes are consistent with Deshmukh & Chalmeta [18], who validated the importance of simple workflow structures in ensuring usability for mixed-digital literacy contexts. The system's consistent real-time responses further support the argument that low-complexity automation is highly effective in rural community-based settings.

3.3. Field Implementation Results

Field implementation produced measurable improvements in operational performance (Table 5):

- Average booking confirmation time decreased from ± 120 minutes to 5 minutes (-95.8%)
- Data input errors decreased from 12 cases to 1 case per month (-91.7%)
- Revenue reporting improved from 3 days to real time
- User participation increased from 60% to 90%

These results reinforce earlier findings by Braunerhielm & Hoppstadius [28], which demonstrated that digital interfaces can enhance transparency and reliability in rural tourism systems. The improvements reflect not only system efficiency but also increased community readiness, supported by digital literacy training.

TABLE 5. COMPARISON OF INDICATORS BEFORE AND AFTER SYSTEM IMPLEMENTATION

Indicator	Before Implementation (Manual)	After Implementation (Digital)	Change (%)	Remarks
Booking confirmation time	± 120 minutes (average)	5 minutes	↓ 95.8%	Automated confirmation via WhatsApp API
Data input errors	12 cases/month	1 case/month	↓ 91.7%	Automatic validation through digital form
Revenue reporting time	3 days	Real-time	↑ 100%	Data automatically synchronized on the dashboard

User participation rate	60%	90%	↑ 30%	Improved after community digital literacy training
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3.4. Qualitative Results

Qualitative analysis revealed three major themes reflecting the system's impact on local tourism transport operations: technological readiness, operational efficiency, and community digital empowerment.

1. Technological Readiness.

Participants reported that although they were initially unfamiliar with digital tools, brief training enabled them to adapt effectively. One transport operator noted:

"Previously, we recorded all bookings manually, often forgetting or making mistakes. Now everything is stored in the system-we can instantly check schedules and payment status." (Operator 1)

2. Operational Efficiency.

The automated WhatsApp confirmation and integrated dashboard significantly improved communication and reduced delays. A tourism provider shared:

"With the automated WhatsApp feature, guests receive confirmations instantly. It helps us serve out-of-town visitors more confidently." (Tour Provider 2)

3. Community Digital Empowerment.

Participants expressed increased confidence in managing bookings digitally, illustrating a shift toward greater digital participation. As a local guide noted:

"At first, we weren't used to online systems, but after a short training session, we learned how to check bookings and communicate via the dashboard." (Guide 3)

These qualitative insights support the earlier thematic analysis and are consistent with Astuti et al. [26], who highlight the role of digital empowerment in strengthening community participation in tourism management.

Overall, participant feedback confirms that the automated system effectively addressed prior operational challenges, particularly inconsistent communication and manual record-keeping.

3.5. Quantitative Results

Figure 12 displays the item-wise SUS distribution, showing consistently high ratings on positive statements and lower ratings on negative statements.

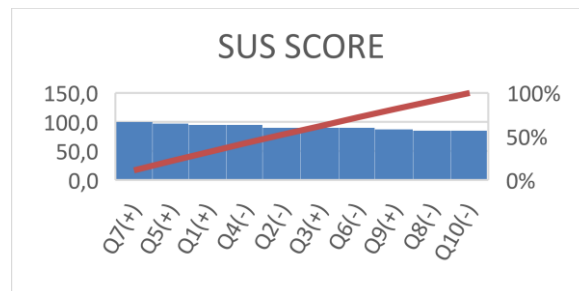


Figure 12. Distribution of SUS Scores per Item

The SUS evaluation produced a mean score of 91.5 (Excellent) with a standard deviation of 4.9 (Table 6). This result falls within the highest usability category according to Brooke's benchmark [18] and is consistent with findings from Ismail et al. [24] and Williams et al. [25], who emphasize that User-Centered Design (UCD) significantly enhances navigation clarity and interaction experience.

The low score variation indicates that the system is easy to use across different user groups, including those with limited digital literacy. These results align with field observations, where participants demonstrated quick adaptation to core features such as booking, automated WhatsApp confirmations, and digital payment monitoring.

TABLE 6. SUS CALCULATION RESULTS

Statistic	SUS Value
Mean	91.5
Minimum	85.0
Maximum	100.0
Standard Deviation	4,9
Interpretation	Excellent

3.6. Discussion and Comparative Analysis with Similar Applications

Compared to existing platforms such as go-travel.my.id, MyTripPlanner, and EasyTour Booking, the developed system provides several advantages:

- AI-powered WhatsApp automation
- Real-time analytics dashboards

- Community-based access model
- Automatic driver assignment and integrated financial tracking

These features are not fully supported in comparable applications (Table 7), indicating system novelty and clear alignment with Indonesia's Smart Tourism Village framework.

TABLE 7. DATA SOURCES FOR EACH INDICATOR

Feature / Aspect	Research Application (Rembitan Village)	go-travel.my.id	MyTripPlanner	EasyTourBooking
Automated Booking and Payment	✓ Yes	✓ Yes	✓ Yes	✓ Yes
WhatsApp API Integration with AI Chatbot	✓ Yes	✗ No	✗ No	✗ No
Vehicle Management Dashboard	✓ Yes	✓ Yes	✗ No	✓ Yes
Financial Module (Transaction & Revenue Graphs)	✓ Yes	✗ No	✗ No	✓ Yes
Automatic Driver Assignment	✓ Yes	✗ No	✗ No	✗ No
Digital Payment Verification (E-Wallet & Bank Transfer)	✓ Yes	✓ Yes	✗ No	✗ No
Analytical Dashboard (Real-Time Statistics)	✓ Yes	✓ Yes	✓ Yes	✓ Yes
Community-Based Access (Village Integration)	✓ Yes	✗ No	✗ No	✗ No

3.7. Summary of Analytical Insights

Overall, the results demonstrate that:

- Digitalization significantly reduces operational latency, supporting prior research in e-booking systems.
- AI-WhatsApp integration enhances real-time communication, bridging low-literacy gaps.
- UCD-based design ensures strong usability, validated through SUS 91.5.
- Community empowerment emerges naturally, as digital adoption aligns with local workflows.

These findings emphasize that the ADDIE model is effective not only as a technical design framework but also as a community-oriented digital transformation approach.

4. CONCLUSION

This study successfully developed a Web-Based Travel and Car Booking Application using the ADDIE model to support community-based digital tourism transformation in Rembitan Village. The system demonstrated strong performance through 100% functional success in black-box testing and a SUS score of 91.5, indicating excellent usability even among users with limited digital literacy. Qualitative findings further confirmed improvements in booking speed, data accuracy, and service transparency.

Despite these promising results, the study has several limitations. First, the system was tested only within a single village context with a relatively small number of participants, limiting generalizability to broader rural tourism environments. Second, not all features—particularly those requiring high network stability—were evaluated under heavy operational loads. Third, the AI-WhatsApp communication module is currently limited to predefined scenarios and requires further enhancement for more adaptive conversational capabilities.

Even with these limitations, the findings confirm the effectiveness of the ADDIE model in guiding

community-oriented digital system development and highlight the potential of lightweight automation technologies for rural tourism services.

5. RECOMMENDATIONS / FUTURE WORK

Based on the study's limitations, several directions for future development are recommended:

1. Multi-Village Testing - Conduct trials across additional villages to validate system scalability and adaptability.
2. Improved AI Chatbot - Enhance the WhatsApp-AI module with natural language understanding (NLU) for more flexible interactions.
3. Mobile App Development - Create Android/iOS versions to increase accessibility for mobile-dependent users.
4. Stress and Load Testing - Evaluate system stability under peak usage conditions to ensure reliable performance.
5. GPS and Route Optimization - Add real-time geolocation and route optimization for more efficient driver assignment.
6. System Interoperability - Integrate the system with Smart Tourism Village platforms or regional tourism databases to support ecosystem-wide adoption.

6. ACKNOWLEDGMENT

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The author is profoundly thankful to the academic supervisor and the Research Committee of STMIK Lombok for their continuous guidance, constructive feedback, and scholarly insights that greatly enhanced the quality of this study.

This research is dedicated to supporting the vision of sustainable digital tourism and the technological empowerment of local communities as part of Indonesia's broader digital transformation agenda.

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