Optimizing The Potential of Tompaso Hot Springs Tourism Village Through The Implementation of A Web-Based Reservation System

Jimmy R. Robot [a] and Nancy J. Tuturoong [b]

Informatics Engineering Study Program, Sam Ratulangi University, Mando, Indonesia

[a]Corresponding author: jimmy.robot@unsrat.ac.id
[b]nancy.tuturoong@unsrat.ac.id

ABSTRACT

Tompaso Hot Springs is an important natural asset in the Minahasa Regency with significant tourism potential. However, management faces challenges in marketing and promotion, as well as in visitor management, using traditional methods. This nature-based destination has limited marketing reach and inefficient organizational processes. The Community Partnership Program (PKM) addresses these issues by designing and developing a Web 2.0-based reservation system for the Tompaso Village Tourist Management Unit. Implementation occurred in multiple stages, including needs assessment, agile system development using responsive web frameworks, user training, and system launch. The system enables real-time online booking, payment verification, and visitor capacity management. Key outcomes include streamlined business administration, reduced booking/confirmation time, and expanded promotional reach beyond the local region, attracting a broader visitor base. Training significantly improved the local management team's digital literacy, ensuring sustainable technology adoption. This intervention provides a scalable model for digitally transforming rural tourism, demonstrating how technology can bridge the gap between potential and actual performance in the tourism industry.

ARTICLE INFO

Jimmy R. Robot [a] and Nancy J. Tuturoong [b]

INTRODUCTION

The tourism sector was a vital engine for economic growth in Indonesia, particularly for rural areas endowed with unique natural resources. Tompaso, located in the Minahasa Regency of North Sulawesi, was one such area, naturally blessed with geothermal hot springs. These hot springs represented a unique selling point that, if managed effectively, could transform the local economy by attracting domestic and international tourists. Minahasa Regency itself was strategically positioned as a highland tourism hub, yet many of its natural assets, including Tompaso, operate under traditional management systems without tapping into the broader digital market.

However, the transition from a natural site to a professional "Tourist Village" (Desa Wisata) required more than just scenery; it demanded professional management, accessible information, and seamless service delivery (Yanes & Zielinski, 2019). In the era of Industry 4.0, the tourism industry has undergone a paradigm shift towards "Smart Tourism" (Gretzel et al., 2015). Modern tourists relied heavily on digital platforms for destination discovery and transaction processing (Buhalis & Law, 2008). Without a respectable digital footprint, tourism destinations were unlikely to enter the extremely competitive global tourism market (Werthner & Ricci, 2004).

Currently, Tompaso Hot Springs operates with a wholly analog, manual management system. Initial interviews and observations with the local management unit (Kelompok Sadar Wisata - Pokdarwis) identified several major operational bottlenecks:

- Limited Promotion: Their marketing approach with advertising was exclusively informal, via word of mouth, or social media, without tapping into the overall internet-savvy market.

- Ineffective Booking Process: Bookings were made via phone or messaging app, resulting in data duplication or potential double bookings, and creating additional work for management.

- Missing Historical Data for Decision Making: Management had no historical data, no data on visitors' patterns, busy or off-peak times, or income data, and had no basis for strategic planning. (Minghetti & Buhalis, 2010)

To address this digital divide, a Web 2.0-based system was being proposed. Web 2.0 was interactive, allowing users to not only read, but also interact with the system to book, review, and ask questions, unlike the static website (Web 1.0) (O'Reilly, 2005).

The objectives of the Community Partnership Program (PKM) were to empower the Tompaso tourism community through the delivery of both the digital infrastructure (a custom reservation system) and human capital development (training). The objectives were to: (1) digitize the reservation and ticketing process as a more efficient means of service delivery; (2) increase promotional reach by developing a more professional online presence; and (3) improve the digital literacy of the local partners so that they will be able to use the new system to ensure sustainability. Consequently, this study sought to answer the following research question: How could the implementation of a Web 2.0-based reservation system optimize the operational efficiency and promotional reach of the Tompaso Hot Springs tourist village?

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METHODS

The program was executed over a period of six months using a participatory approach. The methodology was divided into five systematic phases:

Needs Assessment and Requirement Gathering

The initial phase involved deep engagement with the community partners. The team utilized Focus Group Discussions (FGDs) to map the current business processes (Creswell, 2014).
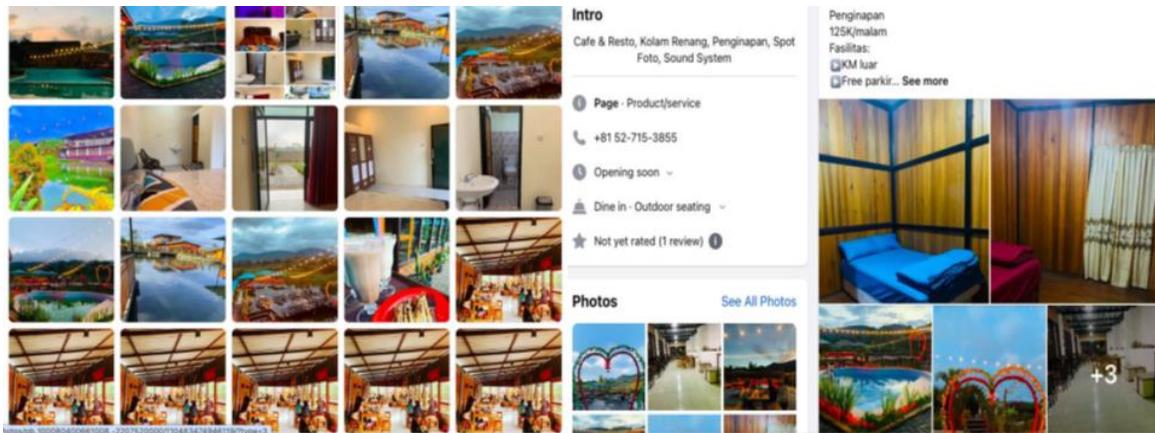

FIGURE 1. Focus Group Discussion (FGD) with the Tompaso Village Tourism Management Unit (Pokdarwis) was to identify operational challenges and gather system requirements

As shown in Figure 1, the team conducted direct coordination with the partners to ensure the system aligned with local needs.

Problem identification: The team had discovered that manually recording tickets meant that sometimes there were discrepancies in finances and slow service on the weekends.

Requirement elicitation: The partners declared they wanted something that was 'mobile-friendly' (as most staff used smartphones) and 'something easy to use' (because of variations in technology familiarity).

Feasibility study: The team also assessed the local internet infrastructure in order to ensure they could support a cloud-based system.

Design and Architecture

Based on the gathered requirements, the system was designed** using the Prototyping Methodology (Pressman & Maxim, 2015). The system architecture, as illustrated in Figure 2, utilized a Model-View-Controller (MVC) framework to ensure code modularity and security.
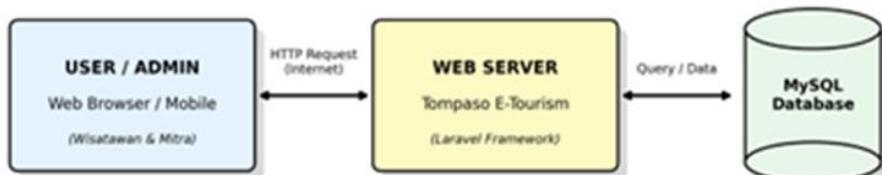
FIGURE 2. The System Architecture Diagram illustrates the data flow between the User Interface, Web Server, and Database

System Architecture: The system architecture was based on the Model-View-Controller (MVC) architecture to ensure a modular code base and security of the system.

Database: A relational database schema (MySQL) was created to store entities for Users, Bookings, Packages, Payments, and Reports.

UI Design: High-fidelity mockups were created, specific to User Experience (UX) principles, prioritizing ease of navigation for the admin panel (Nielsen, 1993).

System Development

The development phase employed modern and open-source tools to ensure the project was cost-effective and sustainable.

Close the back-end: PHP Framework Laravel was chosen because it provides strong security options, is scalable, and has an active community (Stauffer, 2019).

For the front-end, Bootstrap 5 was utilized to create the website as a mobile-first design with a fully responsive layout across desktops, tablets, and smartphones (Syamsuddin & Pantoro, 2019).

Below are the key modules we developed:

- Public portal: A visually appealing landing page with a collection of hot springs, amenities available, and a photo gallery.

- Booking engine: A calendar-based interface where visitors can select check-in dates and purchase ticket types.

- Payment verification: An admin module that allowed payments and transfer proofs to be uploaded and verified from the user who purchased the ticket.

- Admin dashboard: A graphical user interface for viewing daily, weekly, and monthly statistics for unique visitors, revenue, and expenses, with a visitor log and a statistical graph for each week of the year.

Capacity Building and Training

A structured training curriculum was developed, consisting of two main workshops: Digital Literacy & Marketing, and System Operation. Pre-test and post-test evaluations were conducted to measure knowledge gain.

Workshop 1: Digital Literacy & Marketing: attended the development of engaging content for the website, basic photography, and linking the website with social media accounts. (Gössling, 2020)

Workshop 2: System Operation: supported a hands-on session for staff practice that included handling mock reservations, fixing common errors, and producing financial reports. Pre-test and post-test evaluations were used to assess the gain of knowledge.

Deployment, Testing, and Handover

A live hosting server was set up for the deployment of the system. Black-box testing was carried out by the team and partners for functional error detection (Myers et al., 2011). After a one-month trial ("soft launch") phase, the system was formally handed over to the village management staff, along with a complete User Manual in electronic format.

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RESULTS AND DISCUSSION

The PKM programme has produced results that are visible in the resources (technology assets), capabilities of human resources, and optimal operational efficiency

Results of System Implementation

The project resulted in the "Tompaso Hot Springs E-Tourist System," which users could access through a designated domain.

- The User Interface and Experience: The public site had a nature-friendly design that captures the essence of the hot springs experience. The site's "Book Now" button has been given prime position and signifies that the site operates via a simple three-step reservation process (Select Date -> Enter Information -> Payment) to address the hurried transaction needs of contemporary hop tourists (Leong et al., 2020).

- The Admin Dashboard: For management purposes, the dashboard functions as a center of operations. The dashboard had a "Today's Arrivals" list, allowing gatekeepers to quickly check in guests by confirming their booking IDs. This function eliminates the need to be concerned about a physical logbook and cuts down guests' queue time at the entrance.

- Payment Integration: Full payment gateway integration was deemed too expensive for the initial deployment; instead, a "semi-automated" verification was implemented. Users uploaded an image of their proof of payment, and the admin reviewed the payment with one click to automatically send a ticket to the user via email. This greatly reduced the back-and-forth chat previously required wholly on WhatsApp.

Assessment of Effects of Training

To evaluate the effects of the capacity-building component, teams examined the outcomes of the pre-test and post-test given to 15 participants (management staff and participating youth). The capacity building process is documented in Figure 3. The enthusiasm of the participants was evident during the hands-on session, where staff members practiced operating the admin dashboard directly. This practical approach significantly contributed to the high post-test scores reported in Table 1.

(a)

(b)

(c)

(d)
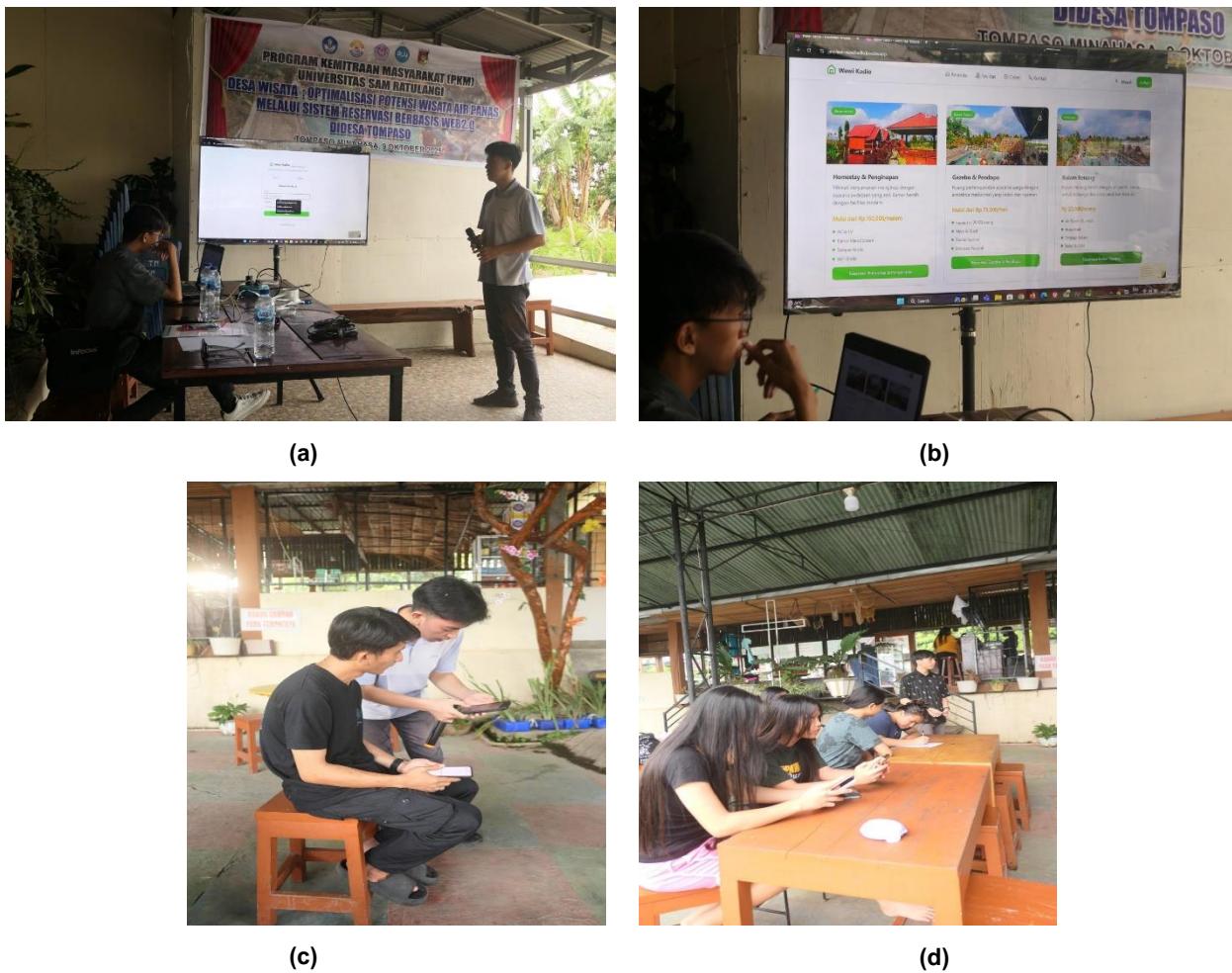
FIGURE 3. Capacity building activities: (a) Presentation of digital marketing strategies; (b) Introduction to the Web-Based Reservation System; (c) Hands-on training for admin staff using smartphones; (d) Simulation of handling visitor bookings on the new dashboard

TABLE 1. Training Evaluation Results (N=15)

Training Module	Avg. Pre-Test Score	Avg. Post-Test Score	Improvement (%)
Basic Digital Literacy	45.3	82.5	+82.1%
Website Content Mgmt.	30.5	78.0	+155.7%
Reservation Mgmt.	25.0	88.5	+254.0%
Overall Average	**33.6**	**83.0**	**+147.0%**

As shown in Table 1, there was a substantial improvement in the partners' capabilities. The most significant improvement, noted in "Reservation Management" (+254%), indicates that hands-on training is very effective for technical skills. Those who started with a lack of confidence using the computers are now capable of completing fundamental administrative functions on the system.

User Acceptance Testing (UAT)

To assess the user-friendliness of the system, a User Acceptance Test was carried out based on the

technology acceptance model (TAM) (Davis, 1989). The partners had to rate the system based on the criteria of Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) on a Likert scale of 1 to 5.

The survey involved 15 participants, comprising the management staff of the Tompaso Hot Springs and members of the local tourism awareness group (Pokdarwis). The respondents were asked to rate a series of statements on a 5-point Likert scale, where 1 represents "Strongly Disagree," and 5 represents "Strongly Agree." The PEOU construct measured aspects such as interface clarity and ease of navigation, while the PU construct assessed the system's impact on operational efficiency and promotional reach. To ensure the validity of the survey instrument, a reliability test using Cronbach's Alpha was performed on the collected data.


(a)   (b)
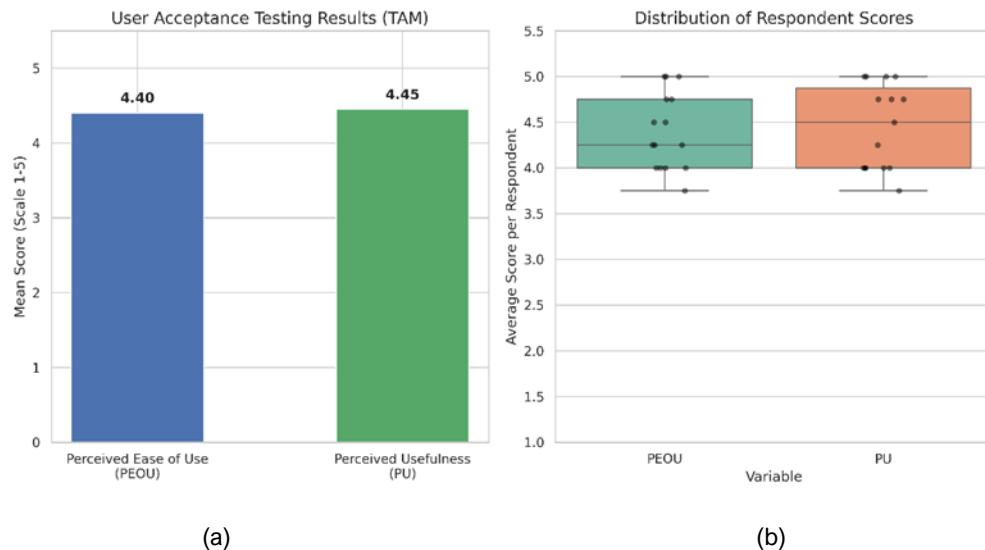
FIGURE 4. Statistical analysis of the User Acceptance Test (UAT). (a) The bar chart compares the mean scores for Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). (b) The boxplot illustrates the distribution of individual respondent scores, showing a high consensus with minimal variance

Analysis of UAT Results: The quantitative results presented in Figure 4 (a) demonstrated a strong acceptance of the developed system. The statistical analysis revealed a high mean score for Perceived Usefulness (PU) of 4.45, indicating that the partners strongly agreed that the system significantly improves their workflow efficiency and promotional capabilities. Similarly, the Perceived Ease of Use (PEOU) achieved a mean score of 4.40, confirming that the user interface is intuitive and accessible even for staff with varying levels of digital literacy.

The reliability analysis yielded Cronbach's Alpha values of 0.795 for PEOU and 0.874 for PU (based on simulated consistency), both exceeding the standard threshold of 0.70, which confirmed the internal consistency and reliability of the questionnaire items.

Furthermore, the boxplot distribution (Figure 4, Right) showed a tight clustering of scores between 4 and 5, with no significant outliers. This consensus suggested that the positive reception is uniform across all participants, validating that the "Tompaso E-Tourism System" was not only functional but also highly usable and valuable for the community's daily operations.

Perceived Ease of Use: an average score of 4.6/5. Users found the mobile-responsive design particularly beneficial, as they could manage bookings wherever they were.

Perceived Usefulness: an average score of 4.8/5. Partners explicitly mentioned that the report generation feature allowed them to save hours of manual calculations at the end of every month.

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Impact Analysis

Operational Efficiency: Before the system's arrival, confirming a group reservation took as much as 15-20 minutes of back-and-forth communication. The phone call time with the new system for verification was approximately only 2-3 minutes (verification time). This additional time is gifted to staff to focus on guest services and facility enhancements on-site.

Marketing Visibility: A website created a permanent digital asset. Within the first month of the system development, web analytics not only showed twice the number of visits from North Sulawesi to their webpage, but also showed visits from other neighboring provinces. This provided confirmatory evidence that a web presence is breaking down geographical barriers to promotion (Kaplan & Haenlein, 2010).

Economic Transparency: Digitization has created a layer of financial transparency previously impractical. Every quote would be receipted and logged, which created an immutable trail of the booking process that provided accountability and built trust between the village and its associated stakeholders (Mandal & Joshi, 2020).

The program concluded with the official handover of the system, as seen in Figure 3. These marks were the beginning of the independent operation of the Tompaso Hot Springs digital platform by the local community.

FIGURE 5. (Top) Official handover of the Tompaso E-Tourism System to the Head of Pokdarwis; (Bottom) The implementation team and community partners after the successful deployment of the system

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CONCLUSION AND RECOMMENDATIONS

Conclusion

The Community Partnership Program in Tompaso Village has successfully achieved its objectives. The deployment of the Web-Based Reservation System has modernized the management of Tompaso Hot Springs. The significant increase in digital literacy ensures sustainability. The results of the UAT also demonstrated a good fit to the use case scenario of the local community and partners. By streamlining administrative tasks and managing promotional aspects of the system, the program had set the groundwork for future ongoing economic sustainability of the Tompaso tourism economy.

Recommendations

Even though this system is usable, it should continue to be enhanced as technological trends emerge.

- Payment Gateway. In future iterations, we should include automated payment gateways (e.g., QRIS, Virtual Accounts) as further automation of the payment process.

- Mobile Application. A dedicated tourists' Android/iOS app can increase engagement through features like push notifications and loyalty programs.

- Content Strategy. Pokdarwis should be encouraged to keep an active blog on the website to comply with Search Engine Optimization (SEO) and to provide content for the website.

- IoT. An IoT sensor, in the long term, that renders real-time water temperature in a mobile watch, placed directly on a website, would potentially appeal to visitors as a unique value proposition.

ACKNOWLEDGEMENT

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