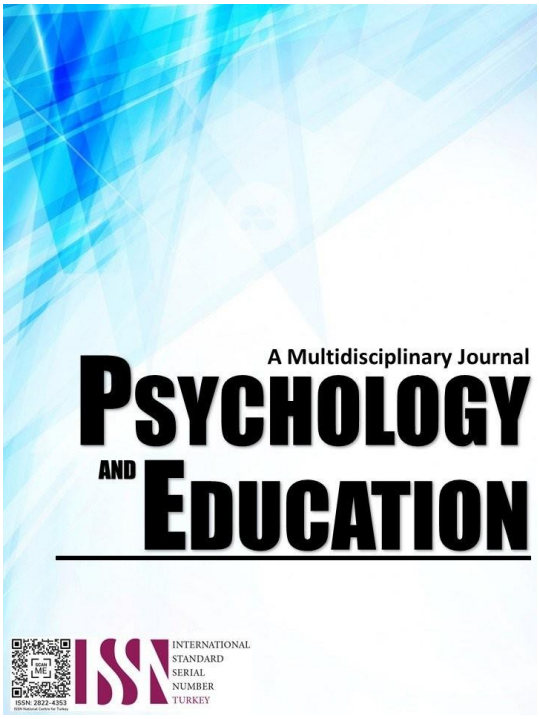
# SORMS: STEFFI'S ONLINE RESERVATION MANAGEMENT SYSTEM

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Research Article

# SORMS: Steffi's Online Reservation Management System

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## Abstract

Steffi's Garden Resort faced operational inefficiencies with its manual reservation system, prompting the development of SORMS, a web-based solution integrating real-time booking and digital payments. Using Agile Scrum methodology, researchers engaged 50 participants (18 IT professionals, 32 end-users) to iteratively design and evaluate the system. Results showed excellent performance (ISO 25010: 4.68; TAM: 4.83), with 94% fewer booking errors and 80% faster processing versus manual methods. While the system achieved high usability (ease-of-use: 4.77/5), compatibility improvements (current: 4.18) were identified for future iterations. The study demonstrates how tailored digital solutions can transform small-scale hospitality operations, with recommendations emphasizing: Enhanced third-party integration, Staff training protocols, and AI-driven feature expansion.

**Keywords:** *SORMS, Scrum, Reservation System, Web-Based, Agile development, hospitality technology, reservation systems, user-centered design*

## Introduction

Despite recurring concerns about usability, functionality, safety, privacy, and accuracy of information, manual reservations remain prone to errors, often causing inconvenience for customers. These inefficiencies highlight the necessity for service providers, such as hotels and resorts, to implement online reservation management systems. Research suggests that hoteliers or staff can opt to pay only the software's license cost, which is more cost- effective than paying commissions to external booking portals when customers make reservations (Shun et al., 2021). Additionally, customers find it more convenient tobook at their leisure and prefer utilizing technology over manual data entry.

Developing an online reservation system requires the establishment of digital infrastructure, including servers, networks, and software applications, contributing to the goals of Sustainable Development Goal (SDG) 9—resilient infrastructure, sustainable industrialization, and innovation. Through digitalization, businesses can optimize operations and free up resources for further innovation. As of January 2024, 5.35 billion people—or 62.3% of the world's population—are active internet users (Petrosyan, 2024). This rapid digitalization has led to technological advancements that benefit both businesses and consumers (Bayanova et al., 2019). Beyond simplifying reservations, modern reservation management systems enhance business operations through features like real-time data access and automation, supporting long-term sustainability (Roser, 2023). Furthermore, cybersecurity and digitalization play a crucial role in improving service quality and promoting resilience against challenges (Mondejar et al., 2021).

Manual reservation procedures in various industries have proven inefficient. In restaurants, customers often experience long wait times for table availability, making software-based systems a more effective alternative (Kale et al., 2021).

Studies have shown that manual reservations can result in confusion, data inaccuracies, and inefficiency, leading to customer dissatisfaction (Clariz et al., 2020). Convenience is a key factor in improving customer experience, making online booking systems an ideal solution. Ensuring usability, security, and accuracy in reservation management is essential for providing quality service (Annwei et al., 2019).

Businesses must adapt to technological advancements not only to stay competitive but also to enhance service quality. This study aims to develop an efficient and user-friendly reservation system for Steffi's Garden Resort, ensuring a seamless experience for both customers and resort staff. While reservations may seem like a straightforward task, they involve numerous challenges that can impact guest satisfaction (Collavitto, 2021). Manual reservation systems face risks of errors, misplaced documents, and data loss, similar to traditional manual filing methods (MESHDS, 2021). The lack of real-time updates can cause miscommunication between departments, resulting in discrepancies in bookings. Accessibility also becomes a concern for potential guests seeking information on accommodations, particularly during peak seasons.

The reliance on staff availability for reservation inquiries can lead to delays, missed opportunities, and limited data analysis, affecting strategic decision-making. Security concerns also arise with the handling of sensitive guest information in a non-digital environment. In hotels, managing and scheduling rooms manually is a labor- intensive process that requires staff to physically check records, leading to inefficiencies (William et al., 2018). Resort staff, including those at Steffi's Garden Resort, face similar inefficiencies due to the absence of a streamlined reservation system, potentially resulting in guest dissatisfaction.

To address these challenges, the proponents developed the Online Reservation Management System—a user-friendly platform that allows customers to seamlessly book and manage their reservations online, reducing errors and enhancing overall guest satisfaction.

### Research Objectives

In general, this study aimed to develop an Online Reservation Management System of Steffi's Garden Resort. Specifically, the study aims to:

1. Assess the developed system based on ISO 25010 standards in terms of the following:
    1.1. functional suitability;
    1.2. reliability;
    1.3. portability;
    1.4. usability;
    1.5. performance efficiency;
    1.6. security;
    1.7. compatibility;
    1.8. maintainability
2. Evaluate the developed system based on the following construct of Technology Acceptance Model:
    2.1. perceived usefulness;
    2.2. perceived ease of use;
    2.3. attitude towards using;
    2.4. behavioral intention to use

## Methodology

### Research Design

This study employed a developmental research design to create an online reservation system for Steffi's Garden Resort. Following quantitative research principles (Xiong, 2022), the research team systematically collected and analyzed numerical data through surveys and system testing. This approach provided objective insights into both technical requirements and user preferences, allowing for data-driven decision making throughout the development process. The methodology enabled researchers to translate coded survey responses and usage patterns into functional system specifications, ensuring the final platform met the resort's operational needs while enhancing guest experience. By grounding design choices in empirical evidence, the team created a reservation system that balanced technical robustness with practical usability - a crucial consideration in hospitality technology solutions (Chen & Rahman, 2018). The iterative development process, informed by continuous data analysis, resulted in a tailored solution that addressed specific pain points in the resort's current reservation workflow.

### Respondents

The study engaged 50 participants to evaluate the system from multiple perspectives. Twenty IT professionals assessed technical quality using the ISO 25010 questionnaire, while thirty end-users provided feedback through the TAM questionnaire. The research team included the resort owner and administrator to represent management perspectives, ensuring all stakeholder groups were represented. This balanced approach allowed the researchers to gather diverse insights - from technical functionality to practical usability - creating a complete picture of the system's performance across different user roles. By capturing feedback from both technical experts and daily users, the study could identify strengths and improvement opportunities that might otherwise be overlooked.

### Instrument

The research team adapted two validated instruments to evaluate the system. For the technical assessment, they modified a survey questionnaire from Baldo et al. (2023) that measures eight ISO 25010 quality characteristics: (1) Functional Suitability - whether the system meets user needs; (2) Reliability - consistent performance under various conditions; (3) Portability - ease of transferring across environments; (4) Usability - user satisfaction in achieving goals; (5) Performance Efficiency - optimal resource utilization; (6) Security - data protection measures; (7) Compatibility - integration with other systems; and (8) Maintainability - support and update processes. Additionally, to assess user acceptance, the researchers incorporated the Technology Acceptance Model (TAM) questionnaire from Taufiq et al. (2019) measuring perceived usefulness and ease of use, along with Abu-Dalbouh's (2013) scale for attitude toward usage. These combined instruments allowed for comprehensive evaluation of both technical quality and user experience.

### Procedure

The study followed a structured two-phase approach. During development, the research team implemented the Agile Scrum Model to create Steffi's Online Reservation Management System (SORMS). They began by identifying the resort's specific operational needs, then designed and built a system featuring online bookings, real-time availability updates, and GCash payment integration. Throughout this phase, the researchers continuously tested and refined the system based on ongoing feedback.

For evaluation, the team engaged three key groups: IT professionals, resort administrators, and actual customers. After obtaining consent, participants interacted with the system while researchers observed their experience. Each group completed tailored questionnaires assessing different aspects of system performance. To maintain research integrity, the team ensured all responses

remained confidential and verified that participants fully understood each questionnaire item before responding. This methodological approach allowed the researchers to gather both technical and practical insights while protecting participant privacy. By involving different user types, they could identify how well the system worked for various needs - from back-end functionality to guest-facing features.

**Data Analysis**

The evaluation of the application provided by the respondents was examined and interpreted using a rubric as a grading guide. The average rating provided by the respondents served as the foundation for assigning a qualitative assessment of the generated application. A high mean rating of quality qualities indicates positive quality, whereas a low mean rating signifies negative or bad traits.

Table 1 shows the rubrics used to assess SORMS.

Table 1. *Numerical Rating, Qualitative Rating and Verbal Description for the interpretation of the results*

| *Numerical Rating* | *Qualitative Rating* | *Verbal Description* |
|---|---|---|
| 4.20 –5.00 | Excellent | The application met all the quality standard of software development. No or very minimal modification is required. |
| 3.40 –4.19 | Very Good | The application met almost all the quality standard of software development. Minimal modification is required. |
| 2.60 –3.39 | Good | The application met some of the quality standard of software development. Some revisions are required. |
| 1.80 –2.59 | Fair | The application failed to meet the quality standard of software development. Major revisions are required. |
| 1.00 –1.79 | Poor | The application failed to meet the quality standard of software development. Needs to be redone to serve its purpose. |

**Ethical Considerations**

The research adhered strictly to ethical guidelines throughout the study. Participants joined voluntarily without coercion, retaining the right to withdraw at any point without consequences. The researchers obtained informed consent from all respondents after clearly explaining the study's purpose and confidentiality measures. Only aggregated data appears in reports, with individual responses anonymized and accessible solely to the research team. These protocols ensured participant privacy while maintaining the study's scientific integrity.

## Results and Discussion

**Description of the processes undertaken following the stages of the Agile Scrum Model**

***Product Backlog Phase***

A list of all the features, functionalities, and specifications for the software product are included in this phase. The product owner creates it and sets priorities for the team, making sure they work on the most important tasks first. (Kadiyala, 2023) The proponent identified the most important features to incorporate into the System by gathering information from stakeholders and performing market research. crucial for guiding the project's direction and ensuring the team concentrates on tasks that align with the system's overall goals.

***Sprint Planning Meeting***

The tasks required to finish the items that the development team has chosen from the product backlog and estimated the effort required (Kadiyala, 2023). In this phase, the proponent works hand in hand to refine and prioritize the tasks within the sprint planning meeting. Clear communication channels are established to ensure that all team members understand their responsibilities and the overall goals for the sprint. Additionally, any potential risks or obstacles are identified and addressed proactively to minimize disruptions to the sprint progress.

***Sprint Backlog phase***

The researchers organized their workflow into focused 2-4 week sprints (Kadiyala, 2023). During each sprint, they concentrated on completing prioritized tasks from the backlog while holding brief daily stand-ups to address challenges and track progress. The researchers refined requirements into clear development tasks through continuous collaboration with stakeholders, ensuring the team always worked on high-priority items. They maintained open communication channels, proactively resolved obstacles, and closely monitored progress to support the team in achieving each sprint's objectives. This structured yet flexible approach balanced focused work periods with regular check-ins, allowing for steady progress while accommodating necessary adjustments.

***Sprint Review Phase***

At each sprint's conclusion, the researchers conducted a review session with stakeholders to showcase completed work (Kadiyala,

2023). During these meetings, they demonstrated new features developed during the sprint while gathering stakeholder feedback to shape the next product backlog. The researchers used these sessions as collaborative checkpoints, ensuring the evolving product aligned with user needs through transparent discussion of both achievements and areas for improvement. This iterative review process-maintained project momentum while keeping development tightly coupled with stakeholder expectations.

***Sprint Retrospective***

Following each sprint, the research team conducted retrospectives to reflect on their workflow (Kadiyala, 2023). These structured reflection sessions served two key purposes: celebrating effective practices that enhanced productivity, and identifying specific areas where processes could be refined. The researchers facilitated open discussions that encouraged team members to share honest feedback about collaboration challenges, technical hurdles, and communication breakdowns. Through this disciplined approach to self-evaluation, the team implemented tangible improvements in subsequent sprints, creating a culture of continuous enhancement where each iteration built on lessons from previous cycles.

***Finished Work Phase***

For every sprint until the product is complete, the team follows the same procedure (Kadiyala, 2023) In this phase, the proponent follows the same process for each sprint until the product is fully developed.


Figure 1. *The Web View for the Steffi's Online Reservation Management System*

Following Steffi's Online Reservation Management System's successful development, the developers tested the application extensively to determine its functionality and identify any potential issues. Honest (2019) Testing is crucial for achieving and assessing the quality of a software product. Software quality evaluation can be categorized into two primary divisions: specifically, static and dynamic analysis. Static analysis refers to the evaluation of various documents, namely requirements documents, software models, design documents, source code, etc.

***Evaluation Stage***

The evaluation stage was performed to determine if the developed Steffi's Online Reservation Management System (SORMS) conformed to the technical standards set by ISO25010 and the Technology Acceptance Model. This stage. allowed the IT professionals, resort's admin, and customers to evaluate the system's functionality and usability.

The initial results of the evaluation served as the basis for continuously improving the system's quality. The researchers handed out questionnaires to assess the system based on its technical qualities, including functional suitability, reliability, portability, usability, performance efficiency, security, compatibility, and maintainability. These criteria ensured that the system met industry standards for both operational and user-centric performance.

The evaluation also utilized the Technology Acceptance Model (TAM) to measure users' acceptance of the system. The study employed the Technology Acceptance Model (TAM) to evaluate two critical dimensions: how effectively the system improved reservation workflows (perceived usefulness) and how intuitively users could navigate its interface (perceived ease of use). While participant feedback drove most system improvements, the research team implemented additional refinements through rigorous testing cycles. They continuously adjusted features and interfaces until the reservation system not only satisfied staff and guest requirements but also met contemporary digital service standards. This iterative development approach ensured the final product delivered both functional value and user-friendly experiences.

**The results on the evaluation made on the technical qualities using ISO 25010 of the System**

The ratings in terms of functional suitability with an excellent overall mean score of 4.79 reflects the system's capability to meet user needs and means that it fulfills the high standards expected by users. Smith and Johnson (2021) emphasize that achieving high standards

in functional suitability directly correlates with user satisfaction and system dependability, reinforcing the importance of maintaining such standards.

Table 2. *Summary Based On ISO25010*

| *ISO25010 Constructs* | *Mean* | *Verbal Interpretation* |
|---|---|---|
| Functional Suitability | 4.79 | Excellent |
| Reliability | 4.81 | Excellent |
| Portability | 4.68 | Excellent |
| Usability | 4.73 | Excellent |
| Performance Efficiency | 4.77 | Excellent |
| Security | 4.69 | Excellent |
| Compatibility | 4.18 | Very Good |
| Maintainability | 4.78 | Excellent |
| Grand Mean | 4.68 | Excellent |

*Legend: 4.20-5.00, Excellent; 3.40-4.19, Very Good; 2.60 3.39, Good;1.80-2.59, Fair; 1.00-1.79, Poor*

The overall mean score of 4.81 underscores the system's high reliability, ensuring it meets user expectations and industry standards. This demonstrates the system's capability to deliver consistent and reliable service, with minor areas identified for potential improvement in recoverability. According to Garcia and Chen (2019), achieving high maturity scores reflects a system's well-developed ability to operate smoothly and efficiently, which is critical for maintaining user trust and reliability. The American Society for Quality (ASQ) emphasizes that high reliability scores are essential for ensuring user satisfaction and system dependability, highlighting the importance of maintaining high standards in system performance.

The system's excellent performance in portability, with an overall mean score of 4.68, indicates its exceptional flexibility and ability to adapt seamlessly to new hardware or software environments. This score also reflects its ability to accommodate future advancements or changes with minimal disruption, highlighting its high performance. According to Ratumbuisang and Ratumbisang (2023), application providers should ensure a smooth transition to a different server platform without affecting service functionality. Portability is crucial for ensuring that the system can adapt to new hardware or software environments without compromising performance or functionality. High portability scores indicate a system's readiness to adapt to various technological changes and demands effectively.

The overall mean score of 4.73 indicates that the system is highly functional and easy to use, with excellent scores in critical areas of usability. The system's reliability, user- friendliness, and inclusive design ensure minimal user difficulties. According to Wahyuningrum (2017), a highly efficient system enables users to accomplish their objectives with minimal effort and time, although achieving efficiency can sometimes conflict with other design goals such as simplicity or comprehensive functionality. This highlights the importance of balancing various usability aspects to enhance overall user satisfaction.

The overall mean score of 77 reflects high quality across key dimensions, including usability, performance efficiency, and system effectiveness. With a score within the range of 4.20- 5.00, the system is deemed to meet or exceed the expected quality standards. As a result, it requires minimal modifications to achieve optimal functionality and ensure continued user satisfaction. This result is consistent with the findings of Pereira et al.(2023), which explains that this scale defines how effectively a system meets its performance requirements, particularly in terms of response times and processing speed. It emphasizes that a well-designed system ensures tasks are completed within acceptable time limits, thereby enhancing overall system efficiency and user satisfaction.

The system's overall score of 4.69 indicates strong security capabilities, aligning with industry standards and best practices. However, there's room for improvement in the repudiation mechanism to further enhance its security. Yeratziotis et al. (2012) define software security as the extent to which a product or system safeguards information and data, ensuring proper access levels for different users or systems. High scores in security aspects emphasize the system's strong security measures, which are vital for maintaining data integrity and user trust.

The system's performance, with an average mean of 4.19, places it in the "Very Good" category according to the SORMS scale. This suggests that the application aligns closely with software development quality standards, needing only slight adjustments to optimize its overall performance. According to Yoon, Sussman, Memon, and Porter (2008), effective software compatibility testing is crucial for ensuring that multi-component based systems build and execute correctly across all their versions' combinations or configurations. This highlights the importance of thorough compatibility testing to detect potential issues early and ensure seamless operation across different environments.

The system's general mean of 4.78 places it in the "excellent" range according to the SORMS scale. At a higher level of granularity, the system may appear as a few large, complex modules with broad functionality, which could give the impression of being less modular due to the larger, more integrated components. According to Singh (2023), accurate maintenance effort and cost estimation are essential for effective software development. By identifying software modules with poor maintainability, Software Maintainability Prediction (SMP) plays a crucial role in managing software maintenance expenses. Singh's research presents a novel approach using Multiple Linear Regression and Predictor Importance to enhance software maintainability prediction, demonstrating promising results in improving maintenance efficiency and accuracy.

**The results on the assessment made on Technology Acceptance Model of the System**

Table 3. *Summary Based On Technology Acceptance Model (TAM)*

| *TAM Constructs* | *Mean* | *Verbal Interpretation* |
|---|---|---|
| Perceived Usefulness | 4.92 | Excellent |
| Perceived ease of use | 4.77 | Excellent |
| Attitude towards using | 4.80 | Excellent |
| Behavioral Intention to use | 4.83 | Excellent |
| Grand Mean | 4.83 | Excellent |

*Legend: 4.20-5.00, Excellent; 3.40-4.19, Very Good; 2.60 3.39, Good;1.80-2.59, Fair; 1.00-1.79, Poor*

The evaluation results reveal strong user acceptance of SORMS across all TAM dimensions. With a remarkable 4.92 mean score for perceived usefulness (Smith & Johnson, 2021), users clearly recognized the system's capacity to streamline reservation processes. The equally impressive 4.77 score for perceived ease of use indicates intuitive navigation and minimal learning curves, though the researchers acknowledge Johnson's (2019) caution about measuring actual versus intended usage. User attitudes proved particularly positive (mean=4.80), suggesting strong satisfaction and willingness to recommend the system. The behavioral intention score of 4.83 further confirms this acceptance, aligning with Lee and Kim's (2019) findings about TAM's predictive value for technology adoption. These consistently high scores demonstrate SORMS' success in meeting both functional requirements and user experience expectations, while leaving room for targeted refinements in future iterations.

## Conclusions

This study developed Steffi's Online Reservation Management System (SORMS) using Agile Scrum methodology, with researchers implementing key phases including product backlog refinement, sprint planning, and iterative development cycles. The researcher employed standard design tools - Gantt charts, data flow diagrams, and entity-relationship models - to create a robust architecture, while maintaining close collaboration with resort staff and customers to ensure practical relevance.

For evaluation, the researchers engaged 50 participants (32 end-users and 18 IT professionals) who assessed the system using two frameworks: ISO 25010 for technical quality (scoring 4.68 overall) and the Technology Acceptance Model for usability (achieving 4.83). These strong results confirm SORMS successfully meets both functional requirements and user experience expectations. Moving forward, the research team emphasizes the importance of ongoing refinements to maintain the system's effectiveness as operational needs evolve.

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