



HM HOTEL RESERVATION SYSTEM V2: SMART AND DATA-DRIVEN FRAMEWORK FOR ENHANCED RESERVATION MANAGEMENT

KATHLEEN M. UNGON¹; JUVILYN B. TAN-AWON²; ROSIE JEAN S. NUÑEZ³;
QUENIEELYN BATAYOLA⁴; DINO ILUSTRISIMO, PhD⁵; CLEA STEPHANIE P. LOBO⁶;
MATEO A. ALMONICAR JR.⁷; AIRENE B. HIJAPON⁸; CHERRY ROSE O. OFTANA⁹;
KURT BRYAN ALEGRE, MIT(C)¹⁰

^{1,2,3,4,5,6,7,8,9,10}Information Technology Department, Madridejos, Community, College, Madridejos, Cebu, Philippines

¹ Ungonkathleen@gmail.com; ² juvilyntanawon4@gmail.com; ³ rosiejeannunez019@gmail.com;

⁴ batayolaq@gmail.com; ⁵ dino.ilustrisimo@mcclawis.edu.ph; ⁶ lobocleastephanie@gmail.com;

⁷ mateo.almonicar@mcclawis.edu.ph; ⁸ airenehijapon@gmail.com; ⁹ cherryroseoftana@mcclawis.edu.ph;

¹⁰ kurtbryan.alegre@mcclawis.edu.ph

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Abstract: The HM Hotel Reservation System V2: An Advanced Framework for Enhanced Reservation Management was developed for the HM Department of Madridejos Community College. The previous system lacked of advanced features was a challenge for students with real-time experience in handling bookings. Using the agile Development Model, the new system addresses these challenges by improving accuracy, streamlining processes, and reducing errors. It integrates and reliable performance, making it suitable for both academic and the real world. The system was thoroughly evaluated by IT experts and received an overall mean score of 4.67, rated as highly functional. Newly integrated features designed to enhance usability and overall system efficiency, achieved a perfect mean score of 5, classified as strongly functional. However, the features for displaying confirmed and canceled booking on the dashboard scored a mean of 4, indicating the need for improvement as it was reported to be non-clickable, potentially limiting its effectiveness. These results highlight the HM Hotel Reservation system V2 as a highly beneficial tool. The enhanced system provides students at Madridejos Community College with valuable hands-on experience in reservation management equipping them with practical skills that are directly applicable in the hospitality industry. Additionally, it offers instructors an effective resource to enrich their teaching methods. Beyond academic use, the system serves the broader community as a fast, accurate, the user-friendly platform for online hotel bookings, further showcasing its versatility and potential impacts. The results showed that the system received positive ratings, especially in functionality and system features. The previous reservation system has limited features and lacked efficient tools for managing bookings, which created difficulties for students and instructor in organizing reservation records and monitoring booking activities.

Keywords: Hotel Reservation System, Agile Development Model, Usability, Real-time Booking, Hospitality Education

I. INTRODUCTION

Based on (Prajeesh & Meenakshi, 2024) hotel reservation prioritizes user experience through intuitive interfaces and seamless navigation, allowing users to search, select, and book accommodations effortlessly. Moreover, service characteristics such as convenience, security, and personalization significantly influence user trust and satisfaction, affecting purchasing behavior (Kim & Kim, 2023). Furthermore, online hotel reservation systems enable users to book rooms anytime and anywhere, eliminating the need for physical visits (Ramadhan *et al.*, 2023). Managing extensive data, including visitor statistics, and booking histories, facilitating better decision-making for hotel management (Adriana *et al.*, 2024). Purchasing information significantly affects online reservation choices, underscoring the need for hotels to maintain a strong online presence (Tasmara *et al.*, 2024). High perceived service quality on hotel websites correlates with increased purchase intentions, highlighting the need for hotels to customize their online offerings to meet customer expectations (Kourtesopoulou & Kehagias, 2019). (Tasmara, D., Islami, G. A. J., & Ferdian, F. 2024). Exploring online reservation decision through e-commerce platform in the hotel industry. According to (Sani, Dermawi, and Putro (2023), Customer considerations in hotel reservations based on UI/UX of application design user interface design and UX elements play a central role in shaping customer satisfaction, influencing intentions to continue using hotel reservation applications.

Variables that influence customer satisfaction primarily comprise the hotels' geographical location, room size and comfort, the availability transportation infrastructure, and the overall decoration of the hotel adds up to the perceived functional value (Du *et al.*, 2020). Tourists have begun to travel to more international locations because of globalization, which has increased the opportunity for cross-cultural interaction and communication (Jaroensak & Saraceni, 2019; Jhaiyanuntana & Nomnian, 2020). In many ways HM Hotel Reservation System faced many challenges. Firstly, not having a notification bell where the admin is not automatically notified because of a lack of notification for awareness. Secondly, ways of paying, where the guests demand other preferences to pay their bills. Thirdly, the guests who are not satisfied with the services and experienced that they encounter in making a reservation. Fourthly, the visible ratings and language barriers for guest

Furthermore, there are successfully implemented systems that are the same as HM Hotel Reservation System but have distinctive features to the system that we are making. Such as Trawex, a system that has a booking engine that develops custom booking engines for hotels, and travel agencies, enabling online reservations and payments. Another one is an online appointment booking system that allows businesses and clients to easily schedule and manage appointments through an internet platform. Also, Agoda, an online travel agency that specializes in booking hotels, vacation rentals, and travel services worldwide. Likewise, Klook, an online platform that allows users to book travel activities, attractions, and services, including tours and transportation, at various destinations. Since HM Hotel Reservation wants to level up their user-guest experience we want to fix the user experience challenges and to make the system a different level. According (Elmedulan, A. M., Jr., & Javier, F. V. 2025). Impact of online customer reviews on booking intentions and customer trust among hotels in Region X. In accordance with (Tammiz R, 2022) service quality is consistently shown to positively affect customer satisfaction. Inadequate hotel service will result in unhappy customers, which will lower demand and ultimately lower hotel performance (Demir *et al.* 2020). An effective service quality strategy must be put into place because satisfied guests will result from high quality service (Othman *et al.* 2019). Also, hotel professionals are aware of the growing tendency of guests booking hotel rooms using mobile devices rather than desktop computers (Yin *et al.* 2022). Online purchasing offers give the advantages of convenience and flexibility. The websites that are offering services and products are a system and need to have system-level quality and service-level quality, promoting positive inclination among the users (Tien *et al.*, 2019). Also, most tourists are inclined to use web resources to book hotels, and intensive use of social media is evident in recent times (Hayat and Al-Mamun, 2020). According to (S. Sun 2024) Exploration of Hotel Reservation Through Mobile Online Travel Agencies mentioned the adoption of smartphones can help the hospitality and tourism industry in reaching a wide client base. Moreover, from a customer viewpoint, the online platform offers immediate access to information, enabling uninterrupted price comparisons based on their preferences while highlighting real-time discounts against various values, services, facilities, and prices (Gao & Bi, 2021). Prospective customers benefit from accurate product and service information as well as information integrity. (Jou and Day, 2021).

The primary goal of this project HM Hotel Reservation V2 is to have a different language for users, notification bell, online payment, chat box, and to have feedback from guests. Enhancing notification capabilities, increasing payment options, ratings and languages are intended to be addressed by this customization. In simplifying these elements is to improve the system's overall usability and user experience. To improve the HM Department of Madridejos Community College's user experience for students by

developing an improved version of the HM Hotel Reservation System. It is also anticipated that this update would help educational initiatives by giving students a useful tool that complies with industry requirements. In the end, we want to develop a reservation system that is more effective and convenient for teachers and student.

In summary, instructors and students of Madrdejos Community College in the HM Department will benefit from the system. Instructors will gain a valuable tool for demonstrating how technology integrates into Hotel Management practices. This system enhances the learning experience for students by providing hands-on opportunities. By using this tool, students will be better prepared for successful careers in the Hospitality Industry. HM Hotel Reservation System Version 2 is designed to connect theoretical knowledge with practical skills in Reservation Management. Ultimately, it encourages a deeper understanding of modern industry standards and practices.

Objective

To develop an HM Hotel Reservation System V2 for the HM Department.

Specific Objective

1. Develop a system that can:
 - 1.1 To display on the dashboard the booking today, confirm booking, cancelled book Checked in guest, Rooms, Check out guest, Reservation, Accommodation, Overall total of full payment, Total of Pending payments, and Overall Total payment.
 - 1.2 Provide the optional for the user to perform CRUD operation such as create, read, update and delete information for guest user and admin user.
 - 1.3 Allows generation and printing of reservation details for documentation and reporting purposes.
 - 1.4 Integrate user-friendly features such as multilingual support, notification alerts, chatbox communication, room rating system, and online payment options to enhanced user experience,
2. Accesses software quality based on ISO/IEC 25010, including functional suitability, performance efficiency, compatibility, and reliability.
3. Evaluates system usability in terms of usefulness, satisfaction, ease of use, and ease of learning (Lund, A. M. 2001).

II. METHODOLOGY

This study utilized a Developmental Research Design to guide the developmental of the HM Hotel Reservation System V2 Developmental research focuses on the systematic design, development, and evaluation of instructional on technological tools (Rita C. Richey & James D. Klien. 2005).

Agile Software Development Life Cycle Model: In this study, the researcher used the Agile Software Development Life Cycle Model (SDLC) model in developing the software.

SOFTWARE LIFE CYCLE MODEL

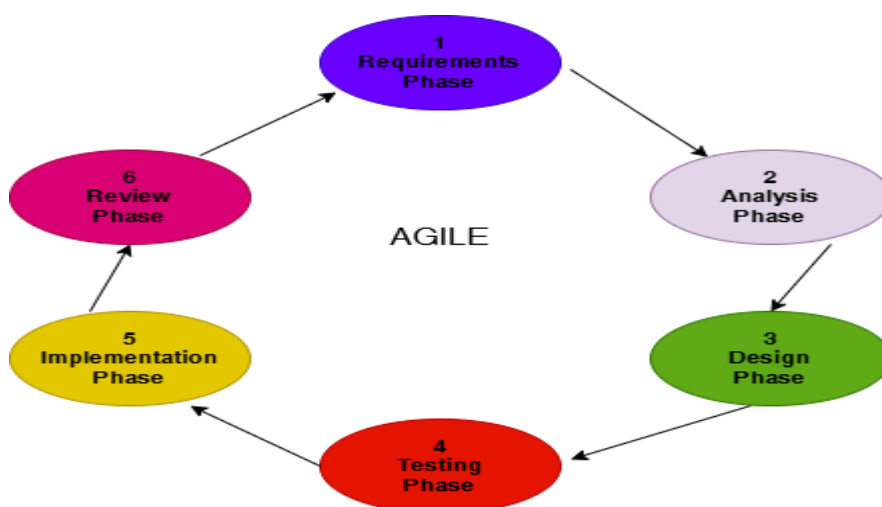


Fig 1. Agile Software Development Life Cycle Model

The development of the HM Hotel Reservation System V2 followed a structured process consisting of six stages: Requirement, Analysis, Design, Testing, and Implementation and Review.

Stage 1: Requirement Phase In this phase, the researchers gathered both functional and non-functional requirements through interviews, surveys, focus group discussions, and observations. These methods helped identify user expectations and system needs. Key features requested by the beneficiary included Gmail account integration, OTP verification, guest information management, and room information management. The system was designed for web accessibility and incorporated payment and verification through GCash and OTP codes to improve security and convenience.

Stage 2: Analysis Phase The researchers analyzed several components including data requirements, UI/UX design, data security, data management, data reports, and documentation. They reviewed existing forms and policies to ensure accurate data handling. The interface design was customized to meet the department head’s preferences while maintaining accessibility standards based on Web Content Accessibility Guidelines. Security methods and network infrastructure were also evaluated to ensure reliable data protection and system scalability.

Stage 3: Design Phase During this stage, the system structure and data flow were planned. Wireframes and prototypes were created and presented to stakeholders for feedback. The system used programming technologies such as PHP and JavaScript within a client-server architecture to support efficient performance. Security features like OTP authentication were integrated using Google Firebase. The design also included dashboard analytics with visual charts and a user manual for training and reference.

Stage 4: Testing Phase The system was evaluated through a survey questionnaire that measured functionality, usability, reliability, portability, and maintainability. Experts validated the questionnaire and reliability was tested using Cronbach’s Alpha. Technical experts performed system testing by completing tasks and providing feedback. The results were analyzed to identify issues and improvements, ensuring the system met all requirements.

Stage 5: Implementation Phase In the final phase, the system was deployed in the operational environment. Administrators were trained to properly manage the system, and the rollout was conducted gradually. Continuous monitoring was performed to address issues and ensure the system operated effectively after deployment.

Stage 6: Review Phase To ensure the successful deployment of the HM Hotel Reservation System V2, we began by gathering all the required tools and resources, including the software framework, server infrastructure, and payment integration components such as GCash and OTP verification tools.

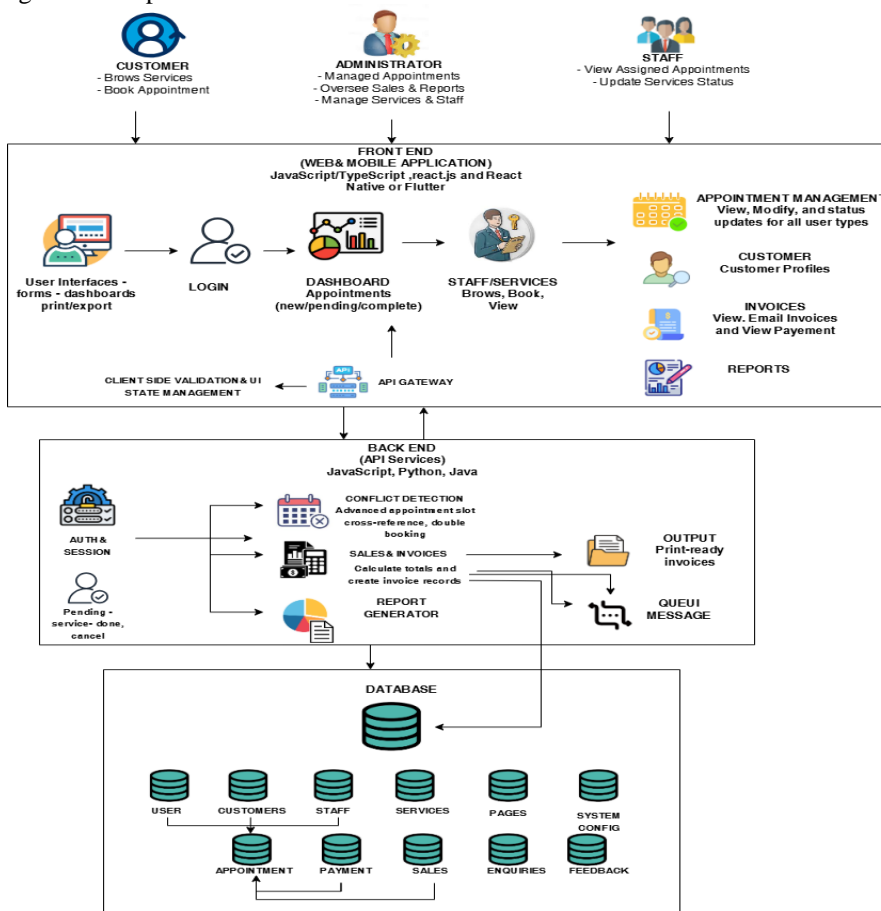


Fig 2 System Architecture

Figure 2 shows the system architecture for the HM Hotel Reservation System, an advanced framework for enhanced reservation management. It is structured into two primary components.

The front end and back end. Through a web interface, both administrators and visitors can use the Front-End. While guests can book rooms, check availability, and manage their reservations, administrators can manage rooms and reservations in real time.

In order to prevent unwanted access, a firewall filters incoming and outgoing traffic to safeguard the system. To maintain performance during periods of high demand, a load balancer on the back end divides user requests among servers. In order to provide scalability and remote access, a cloud server manages data processing and storage, including reservations and user data.

All things considered, the system is built to be dependable, scalable, and secure, guaranteeing effective hotel reservation management and an improved user experience.

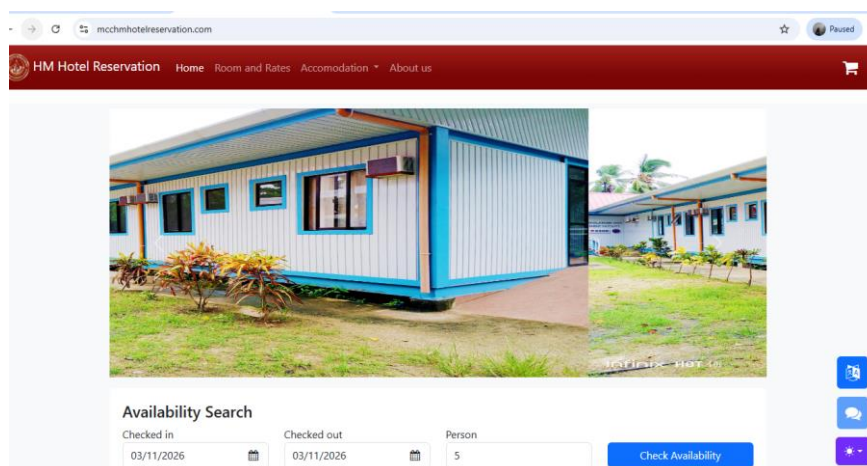


Fig 3 Hotel Reservation

Figure 3 show the Hotel Dashboard template created to manage well the guest's reservation of the hotel and display a hotel reservation interface design to efficiently manage guest booking through an intuitive dashboard.

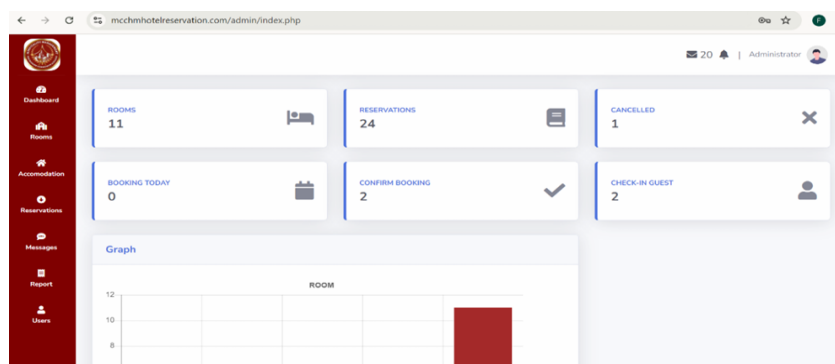


Fig 4 Hotel Dashboard

Figure 4 show the section of the HM Hotel Reservation System that is shown on the dashboard allows the administrator to view the total number of bookings today, confirmed, and cancelled reservations, check-in and check-out guests, rooms, reservations, accommodations, total full payment, total pending payment, and total payment. This system feature makes it easier for the administrator to view the specifics of a guest's reservation.

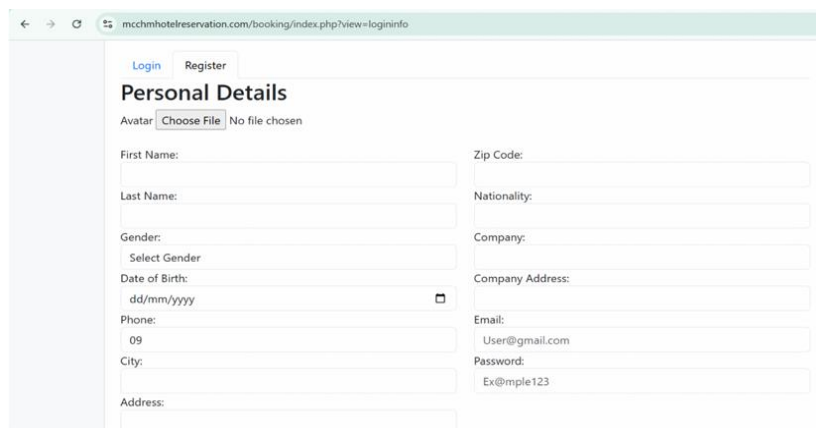


Fig 5. Shows allowing users to create account

Figure 5 shows the HM Hotel Reservation System where the user can create their account. Illustrates the registration page the HM Hotel Reservation System, which enables users to create account by entering their personal details.

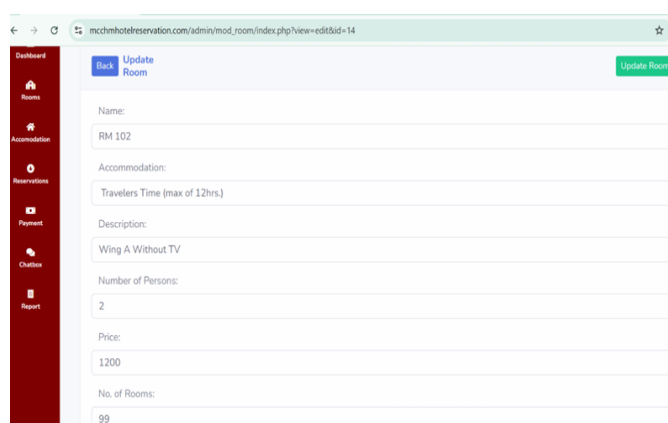


Fig 6. Shows updating room for admin

Figure 6 shows the HM Hotel Reservation System where the admin can update the room of the hotel. It represent the interfaces that allows administrators to modify and update room information.

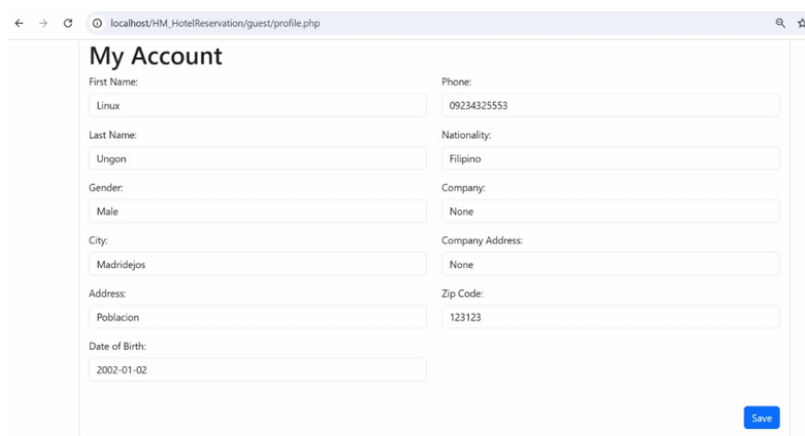


Fig 7. Shows updating users' information

Figure 7 shows the HM Hotel Reservation System where the user can update its details. Display the user account section where individuals can edit their personal details.

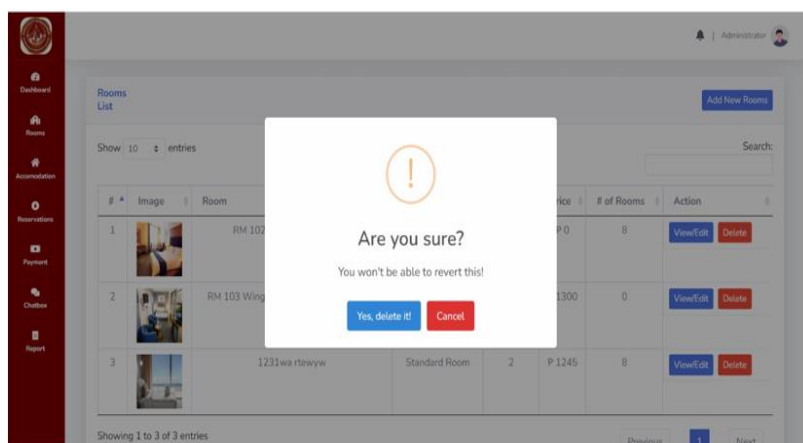


Fig 8. Shows deleting rooms

Figure 8 shows the HM Hotel Reservation System where the admin can delete the rooms of the hotel.

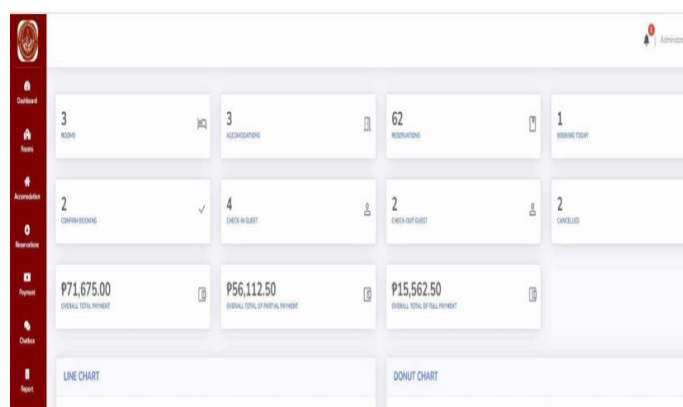


Fig 9. In terms of receiving notification bell.

Figure 9 shows the HM Hotel Reservation System where the admin can receive notification for booking. Notification bell is a big important to our system to notify us of the guest's reservation. With this source we developed the idea of having a notification bell to make us lively connected to the guest's reservation.

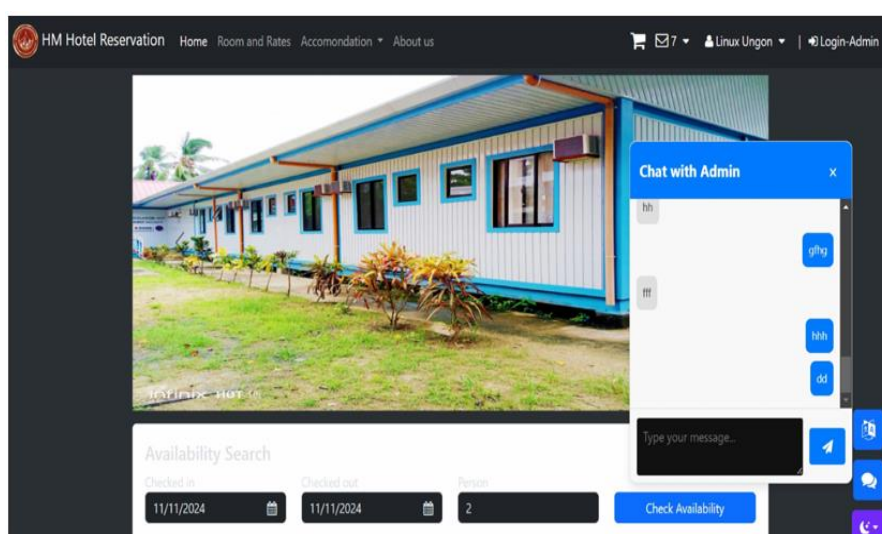


Fig 10. In terms of using chat box

Figure 10 shows the HM Hotel Reservation System where the chat box is being viewed and used. The idea of making it look like this in the chat box, where guests can interact and have a real-time conversation with the admin.

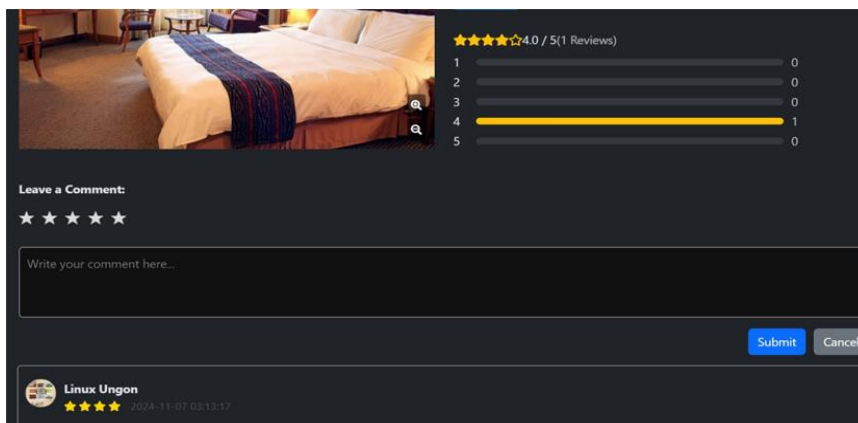


Fig 11. In terms of room star rating

Figure 11 shows the HM Hotel Reservation System where the room star rating is being viewed and used. Room star rating to know if the guests are satisfied with their stay at the hotel. We came up with the idea to make it look like this in a room star rating for users and admin to know users feedback while staying at the hotel. These reviews help other users decide whether to purchase content and provide valuable insights to developers for improving their offerings.

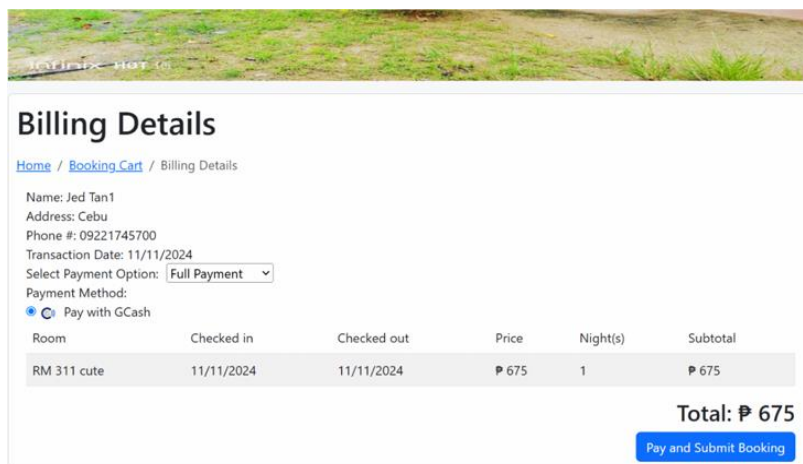


Fig 12. In terms of making online payment

Figure 12 shows the HM Hotel Reservation System V2 where making an online payment is being viewed and used.

III. RESULT

TABLE I
Scoring Range of Likert Scale of the Survey

SCALE	RANGE	VERBAL INTERPRETATION
5	5:00	Strongly Functional
4	4:00 – 4:99	Highly Functional
3	3:00 – 3:99	Moderately Functional
2	2:00 – 2:00	Slightly Functional
1	1:00 – 1:99	Not Functional

TABLE III
System Features and Performance Evaluation

CRITERIA	MAIN	VERBAL INTERPRETATION
Dashboard Functionality	4.63	Highly Functional
CRUD Operation	4.64	Highly Functional
Reservation details for documentation and reporting purposes	6.65	Highly Functional
User-friendly features such as multilingual support, notification alerts, chat box communication, room rating system, and online payment.	4.80	Highly Functional
TOTAL	4.68	HIGHLY FUNTIONAL

Table 2 reveals a total mean score of 4.68, classifying the dashboard's overall functionality as "Highly Functional" and indicating strong performance across display metrics. While confirmed and canceled bookings scored the lowest mean of 4.63, they remain "highly functional" but could benefit from minor improvements in clarity. Elements like checked-out guests and payment totals received perfect scores mean of, reflecting exceptional reliability and clarity in key hotel reservation functions. While the highest mean score is 4.80, they are highly functional like rating and payment fear.

TABLE IIIII
In terms of the characteristics set in ISO 25010 Software Quality Model

CRITERIA	MAIN	VERBAL INTERPRETATION
Functional Suitability	4.33	Good
Performance Efficiency	4:13	Good
Reliability	4:16	Good
Security	4:33	Good
Compatibility	4.33	Good
AVERAGE MEAN VALUE	4.25	GOOD

Table 3 evaluates the HM Hotel Reservation V2 System using ISO 25010, with a total mean score of 4.25, categorized as "Good." Performance efficiency received the lowest score of 4.13, highlighting potential areas for improvement. Functional suitability, security, and compatibility scored the highest at 4.33, reflecting strong reliability and usability. The system effectively meets user needs with adequate speed and responsiveness, demonstrating suitability for frequent use.

TABLE IVV
In terms of usefulness, Ease of use, Ease of Learning, and Satisfaction

CRITERIA	MEAN	VERBAL INTERPRETATION
Usefulness	4.53	Agree
Ease of use	4:42	Agree
Ease of Learning	4:49	Agree
Satisfaction	4:49	Agree
AVERAGE MEAN VALUE	4.47	AGREE

Table 4 shows the total mean score of 4.47, which is categorized as agree, according to Table 2 above. With a mean score of 4.42, Ease of use earns the lowest rating. This suggests that although consumers think the system is largely usable, there may be a few small issues that should be fixed to encourage user participation. Usefulness received the highest rating of 4.53, indicating that they find it helpful in meeting their needs. This high rating implies that the system is a helpful instrument for its intended significantly supporting people's needs.

IV. DISCUSSION

The HM Hotel Reservation System V2 successfully addressed these gaps by adding advanced features and improving usability. The system was rated highly functional, reliable, and useful, though minor improvements are still needed in performance and ease of use. Overall, it provides a more efficient, user-friendly, and practical solution for both academic and real-world use.

V. CONCLUSION AND RECOMMENDATION

With the effectiveness of using a descriptive analysis, the researcher was able to represent the data of HM Hotel Reservation System V2: An Advanced Framework for Enhanced Reservation Management that showed the total number of bookings today, rooms, reservations, confirmed bookings, canceled bookings, guests checked in, accommodation, check-out guests, overall total full payment, pending payment, and overall total payment on the dashboard. The researchers conclude that the "HM Hotel Reservation System V2: An Advanced Framework for Enhanced Reservation Management" is efficient and easy to use for managing hotel reservations. Furthermore, based on the expert evaluation feedback through the web-based system, the researchers conclude that it is useful, secure, reliable, easy to use, effective, quick, and convenient for users to make reservations. The result of the findings shows that "HM Hotel Reservation System V2: An Advanced Framework for Enhanced Reservation Management" satisfied the respondents. The evaluation shows the system met the criteria and objective in terms of functional suitability, performance efficiency, compatibility, reliability, security, and usefulness satisfaction. In conclusion, a perfect score of 5 such as in number of check-out guests, overall total full payment, pending payment, overall total payment, deleting rooms and accommodations, displaying print guests' reservations, generating print guests' reservations, and additional features like language options, notification bell, chat box, room star rating, and online payment helps the system to become more effective and reliable for the HM department of Madridejos Community College

To further improve "HM Hotel Reservation System V2: An Advanced Framework for Enhanced Reservation Management," the following actions were recommended:

1. Improve the capability of confirmed and canceled booking displays by making it a button as recommended by one of the I.T. experts.
2. Improved reading user information by making an improved design of the user interface.
3. Improve performance efficiency by minimizing time and resource efficiency.
4. Enhance the ease of use of the system by making it a more friendly user interface and ensuring menus and navigation paths are simple and well-structured.

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