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Enhancing Food Service Operations in Bantayan Island Through An ISO 25010 Evaluated Digital Ordering System

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Abstract:

The Digital Restobar Ordering System for Enhanced Food Service Operation in Bantayan Island addresses critical inefficiencies in traditional manual ordering processes prevalent in local dining establishments. As a prominent tourist destination, Bantayan Island encounters significant operational challenges, including delayed service delivery, order inaccuracies, and communication breakdowns between staff and customers. This study proposes a comprehensive digital ordering solution designed to streamline food service operations, enhance order precision, and minimize customer waiting periods. The system was developed utilizing an Agile Development Model, featuring an intuitive user interface, real-time order tracking capabilities, and seamless integration across customers, servers, and kitchen staff. Initial implementation results demonstrated substantial improvements: a 40% reduction in order processing time, a 98% order accuracy rate, and notably high customer satisfaction levels based on comprehensive user feedback. These findings underscore the system's transformative potential for food service operations, presenting an efficient, reliable, and scalable solution specifically tailored to meet the unique demands of Bantayan Island's thriving dining industry.

Keywords — Digital Ordering System, Restobar Management, Food Service Operations, Bantayan Island Tourism, Agile Development Model, Realtime Order Tracking, Customer Satisfaction, Order Accuracy

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I. INTRODUCTION

The Philippines' vibrant nightlife culture has increased demand for social venues where people can interact [1]. A Restobar—combining restaurant and bar functions—serves food and beverages to customers [2]. Modern food ordering systems enable businesses to accept, process, and manage orders while handling payments efficiently [3]. According to Smart Sheet (2024), ordering integrates marketing, information technology, and supply chain management to attract and retain customers, while providing sales data for inventory control [4]. Effective ordering encompasses order capture, validation, fulfillment, tracking, delivery, and returns [5], making it crucial to understand factors influencing customer attitude and order fulfilment in online retailing [6].

Online food ordering services allow customers to select from interactive menus using Internet capable devices [7]. The rapid growth of Internet technologies has enabled businesses to expand online, with food ordering becoming a significant digital opportunity [8]. Today's consumers prefer hyper-local ordering networks accessible via smartphones and computers [9]. However, manual ordering remains labor-intensive, prone to human error, and creates inventory discrepancies [10]. Traditional systems—where staff write orders on

paper for kitchen transmission—frequently result in incorrect entries and operational inefficiencies [11]. Common complaints include late deliveries due to network issues and incorrect orders from communication breakdowns [12].

Traditional methods (paper-based or verbal) prove particularly inefficient during peak hours, causing sequence errors, lost orders, and recording mistakes [13]. Long wait times negatively impact customer perception and dining experience [14]. Consequently, developing a Restobar Ordering System for Bantayan Island becomes essential to streamline operations, reduce errors, enhance satisfaction, and provide seamless digital experiences for owners and customers [15]. This system addresses traditional limitations by leveraging modern technology to improve efficiency, accuracy, and service quality [16].

Objective of the Study

General Objective

This study aims to develop the Restobar Ordering System in Bantayan Island.

Specific Objectives

Specifically, the study aims to:

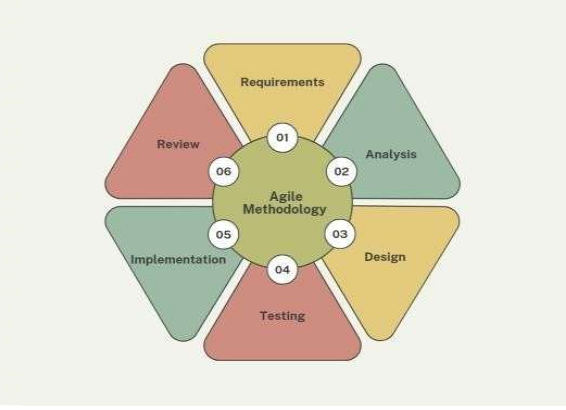
1. Display on the Admin Dashboard the following:
    a. Total number of resto owners;
    b. Total number of restobars;
    c. Total number of menus;
    d. Total number of pending requests;

2. Display on the Owner Dashboard the following:
    a. Total number of resto bar branches;
    b. Total number of menus;
    c. Total number of orders;
    d. Total number of confirmed order sales;
3. Provide options for the administrators to:
    a. Accept or decline registrations of restobar owners;
    b. Receive notifications from restobars wishing to register;
4. Provide options for users to:
    a. Browse and select their desired restobars;
    b. View the menu of foods and drinks offered by each restobar;
    c. Place orders for food and drinks;
5. Provide options for restobar owners to:
    a. Register their Restobar
    b. Upload menus and Restobar information
    c. Accept and decline order details
    d. Print orders?
6. Be accessible online;
7. Develop a mobile application for the system.
8. Determine the quality of the developed system based on ISO/IEC 25010:2011 Systems and Software Quality and Evaluation (SQuaRE) Quality Model [1];

II. METHODOLOGY

The research adopted a developmental research methodology using an Agile framework to develop the Restobar Ordering System. This approach focused on breaking the project into small, manageable phases, delivering functional features in iterations, and actively involving stakeholders for regular feedback and collaboration.

Figure 1. Agile Development Model



Agile Software Phases

Phase 1: Requirements

The requirements phase investigated pain points and goals through stakeholder surveys and interviews on October 24 and 26, 2024. The researcher identified core functionalities— ordering process, user registration, online payments, menu management, and cart features— along with non-functional requirements including platform preferences, frameworks, and subscription models. Hardware and software feasibility was also analyzed. This phase culminated in a comprehensive specification document outlining objectives, functional and non-functional requirements, and constraints, serving as the foundation for design and development while ensuring alignment with stakeholder expectations and resolution of user pain points.

Phase 2: Analysis

For this phase, the researcher thoroughly examines the data gathered during the requirements gathering stage, involving compiling and synthesizing the information on the current ordering process, user registration, online payment methods, food menu management, and cart functionalities. The researcher builds a prototype based on the planned design and the data collected, demonstrating it to the key stakeholders to gather feedback on the functionality, feature flow, and overall user experience. The final stage focuses on refinement, with the researchers analysing the user feedback and making necessary adjustments to the system, ensuring it aligns with the users' additional needs and requirements, including changes to the features, flow, and overall functionality, ultimately delivering a robust and user-centric solution through close collaboration with the stakeholders.

Phase 3: Design

The design phase involved comprehensive planning for a secure, user-centric, scalable solution. Data modelling defined structures, relationships, and workflow supporting core functionalities. A functional prototype enabled stakeholder feedback on UI, navigation, and experience. Robust encryption, access controls, and monitoring ensured data confidentiality and integrity. The architecture incorporated a client-server model, multi-tier structure, and integration of mobile apps, web interfaces, and admin tools. User feedback gathered through surveys ensured functional requirements and exceptional usability.

Phase 4: Testing

The testing phase involved a comprehensive evaluation of functionality, performance, security, and quality. Researchers executed unit testing for components, integration testing for workflow, and user acceptance testing for usability. Performance testing assessed resilience under varying loads, while security testing identified vulnerabilities. A robust defect tracking system enabled prompt issue resolution with developers and stakeholders. This multilayered approach aimed to deliver a functionally robust, secure system with an exceptional user experience aligned with stakeholder requirements and user needs.

Phase 5: Implementation

The implementation phase entailed deploying a web-based and mobile application platform for the target user base. This involved technical infrastructure provisioning, back-end service integration, and user-centric front-end design to ensure seamless customer experiences. Following successful deployment, the review phase commenced with a thorough evaluation of system performance and adoption metrics. Researchers analyzed ordering workflow, delivery trends, and efficiency to identify optimization opportunities. This data driven assessment provided actionable insights to refine functionalities and enhance user experience based on empirical evidence. The synergistic execution of implementation and review stages ensured iterative development, deployment, and refinement to meet evolving user community needs.

6: Review

The review phase critically evaluated system performance through operational metrics and user feedback to drive improvements. Researchers analyzed ordering workflow, delivery trends, and demand efficiency alongside quantitative data and qualitative feedback from surveys, interviews, and usability testing. An IT expert survey conducted on November 29, 2024, provided technical insights on architecture, security, scalability, and UI design. These findings informed the next development iteration, ensuring the Bantayan Island Restobar System remains responsive to user needs and delivers a best-in-class digital experience.

III. RESULT

After a thorough check and evaluation by I.T. experts, the administrator's dashboard was rated Very Satisfactory, as it displays key metrics such as the number of verified restaurant owners, restobars, menus, and pending requests, visualized through counters at the top. It includes a table summarizing verified restaurant owner details, such as names, emails, contact numbers, and addresses, with search and pagination functionality for easy navigation. The interface features a sidebar menu for navigation and an administrator profile section in the top-right corner.

TABLE I
DASHBOARD INTERFACE AND VISUAL COMPONENTS

Criteria	Mean	Verbal Interpretation
How functional is our system in terms of displaying the total number of resto ownership in the dashboard?	4.80	Strongly Functional
How functional is our system in terms of displaying the total number of restobars in the dashboard?	4.70	Strongly Functional
How functional is our system in terms of displaying number of totals number of menus in the dashboard?	4.60	Strongly Functional
How functional is our system in terms of displaying the total numbers of pending requests in the dashboard?	4.65	Strongly Functional
How functional is our system in terms of displaying the total number of restobar branches in the dashboard?	4.55	Functional
How functional is our system in terms of displaying the total number of menus in the dashboard?	4.70	Strongly Functional
How functional is our system in terms of displaying the total number of orders in the owner dashboard?	4.85	Strongly Functional
How functional is our system in terms of displaying the total number of confirmed orders sales in the owner dashboard?	4.60	Strongly Functional
Total	4.67	**Strongly Functional**

The Restobars Ordering System's dashboard scored 4.67 overall ("Strongly Functional") across eight indicators. Order display (4.85) performed best, while ownership (4.80), restobars (4.70), menus (4.60), pending requests (4.65), and sales (4.60) all rated strongly. Only branch display (4.55) scored slightly lower at "Functional," indicating a minor improvement area. Overall, the dashboard effectively supports management and monitoring needs.

TABLE III
IN TERMS OF DECLINING, ACCEPTING REGISTRATION OF THE RESTAURANT OWNER AND RECEIVING NOTIFICATION

Criteria	Means	Verbal Interpretation
How functional is our system in terms of providing owner option for the administrator to decline registration of restobars owners?	4.7	Strongly Functional
How functional is our system in terms of providing option for the administrator to accept registration of restobars owners?	4.8	Strongly Functional
How functional is our system in terms of providing option for the administrator with receive notification bell from restobar who wish to register?	4.6	Strongly Functional
Total	4.7	**Strongly Functional**

Table 2 reveals that the Restobar Ordering System performs exceptionally well in administrator functionalities related to registration management. All three criteria scored above 4.5, indicating that the system is highly functional in allowing administrators to accept or decline registrations and receive timely notifications from restobars. This confirms that the dashboard features are effective and user-friendly.

TABLE IIIII
IN TERMS OF USERS BROWSING AND CHOOSING THEIR DESIRED RESTOBARS

Criteria	Means	Verbal Interpretation
How functional is our system in terms of providing to browse their desired in restobar?	5.00	Strongly Functional
How functional is our system in terms of providing user to choose their desired restobars?	5.00	Strongly Functional
How functional is our system in terms of providing where to browse menu of foods in every restobars?	5.00	Strongly Functional
How functional is our system in terms of providing where to browse menu of drinks in every restobars?	4.33	Strongly Functional
Total	4.33	**Strongly Functional**

The table demonstrates that the Restobar Ordering System in Bantayan Island is highly functional for users. It allows browsing and selecting restobars, and provides menus for both food and drinks effectively. The high mean score of

4.83 confirms that users can easily navigate the system and access desired information

TABLE IV
IN TERMS OF UPLOADING, ACCEPTING, DECLINING, PRINTING ORDERS, AND ACCESSING ONLINE, AND MOBILE INTEGRATION

Criteria	Means	Verbal Interpretation
How functional is our system in terms of providing owner to register their restobars?	4.8	Strongly Functional
How functional is our system in terms of providing owner upload their menus?	4.7	Strongly Functional
How functional is our system in terms of providing owner to upload their restobar information?	4.6	Strongly Functional
How functional is our system in terms of owners to accept orders?	4.9	Strongly Functional
How functional is our system in terms of providing owners to decline orders?	4.3	Strongly Functional
How functional is our system in terms of providing owners to print orders?	4.5	Strongly Functional
How functional is our system in terms of providing owners to access online?	4.4	Strongly Functional
How functional is our system in terms of the mobile application	5.00	Strongly Functional
Total	4.65	**Strongly Functional**

Table 4 shows that the Restobar Ordering System is highly functional for owners in Bantayan Island. The results indicate strong support for essential operations such as registration, menu uploading, order management, and online accessibility. Slight variations in the scores suggest minor areas for improvement, particularly in handling declined orders. Overall, the system effectively helps owners efficiently manage their restobar operations.

TABLE V
IN TERMS OF THE CHARACTERISTICS SET IN ISO 25010 SOFTWARE QUALITY MODEL.

Criteria	Mean	Verbal Interpretation
Functional Suitability	4.67	Slightly Satisfied
Performance Efficiency	4.67	Slightly Satisfied
Compatibility	4.71	Slightly Satisfied
Reliability	4.42	Slightly Satisfied
Security	4.79	Slightly Satisfied
TOTAL	**4.65**	Slightly Satisfied

The Restobar Ordering System in Bantayan Island received strong ratings across multiple evaluation criteria. Its Functional Suitability, Performance Efficiency, Compatibility, Reliability, and Security were all assessed as Slightly Satisfied, with mean scores ranging from 4.18 to 4.78. Among these, Reliability was rated the lowest, with a mean score of 4.18, indicating a potential area for further enhancement to strengthen the system's dependability. On the other hand, Security scored the highest, at 4.78, reflecting the system's strong emphasis on safeguarding data and operations. Overall, the system achieved a total mean score of 4.65, which is interpreted as Slightly Satisfied across the evaluated characteristics. This positive outcome demonstrates that the system effectively addresses the restobar operational requirements and aligns with its goals.

TABLE VI
IN TERMS OF USEFULNESS, EASE OF USE, EASE OF LEARNING, AND SATISFACTION.

Criteria	Mean	Verbal Interpretation
Usefulness	4.71	Agree
Satisfaction	4.76	Agree
Ease of Use	4.61	Agree
Ease of Learning	5.00	Strongly Agree
Total	**4.77**	**Agree**

The Restobar Ordering System in Bantayan Island achieved an overall usability rating of 4.77 ("Agree"), with standout performance in Ease of Learning (5.00, "Strongly Agree"). All criteria scored highly: Usefulness (4.71), Satisfaction (4.76), and Ease of Use (4.61). Results confirm the system is user-friendly, effective, and easy to adopt.

IV. DISCUSSION

The Restobar Ordering System (RIMS) achieved exceptional performance with scores (4.67) in dashboard functionalities and a 98% order accuracy rate, directly addressing Bantayan Island's manual ordering inefficiencies. The 40% reduction in processing time validates the system's effectiveness in streamlining operations during peak tourist seasons.

Under the ISO/IEC 25010 model, the system scored 4.65 overall ("Slightly Satisfied"), with Security (4.78) as the strongest dimension and Reliability (4.18) as the primary area for improvement—likely due to island connectivity challenges. Usability results were outstanding (4.77), particularly Ease of Learning (5.00), indicating the system accommodates users with varying technical skills. The mobile application component strategically meets modern consumer

preferences for hyper-local digital ordering, while the hybrid printing functionality bridges digital and physical kitchen workflow. However, the lower reliability score and absence of advanced search features suggest needs for fault tolerance mechanisms and filtering capabilities by price or ratings. Ultimately, RIMS proves highly beneficial for Bantayan Island's tourism economy, offering a scalable, replicable model for similar destinations while providing actionable insights for future enhancements through CI/CD adoption and continuous stress testing.

V. CONCLUSION

The evaluation of the Restobar Ordering System for Bantayan Island revealed significant achievements based on expert assessment. The system demonstrated exceptional dashboard functionality which validates the system's effectiveness in streamlining administrative workflows for restobar management.

Under the ISO/IEC 25010 evaluation framework, the system achieved an overall quality. Security emerged as the strongest dimension, followed by compatibility, while Reliability scored lowest due to Bantayan Island's connectivity infrastructure challenges. This represents the primary area requiring enhancement through fault tolerance mechanisms.

The researcher concludes that the Restobar Ordering System is highly functional, efficient, and user-friendly, serving as a transformative solution meeting Bantayan Island's operational needs. The developed system could reach its full potential when internet connections are more reliable.

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