

## International Journal of Computer Science and Mobile Computing



A Monthly Journal of Computer Science and Information Technology

**ISSN 2320-088X**

**IMPACT FACTOR: 7.056**

*IJCSMC, Vol. 15, Issue. 4, April 2026, pg.113 – 123*

# Design and Implementation of Mobile Seafood Ordering System to Optimize Supply Chain Efficiency and Reduce Perishability Waste in Coastal Markets

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**DOI: <https://doi.org/10.47760/ijcsmc.2026.v15i04.013>**

**Abstract:** The customer can place orders conveniently through the Marion's Seafood's Ordering System and the disadvantage of the conventional queuing mechanism is eliminated, with this approach, visitors can order food to go. As a result, this approach improves the efficiency and uniformity of taking customers' orders and it offers a better platform for communication and the details about the user are recorded, the menu for Marion's Seafood's has been set up and customer can quickly place order with just one click. Additionally, you can quickly keep track of orders, update the client database, and enhance the goods of orders using the seafood menu and the user of this system can choose the desired seafood items from the menu that is displayed. The seafood products are ordered by the user and the user's information is kept private since it keeps a distinct account for each user, the payment can be done through the delivery system and for each user, a unique ID and password are issued and in terms of determining the overall performance of MARION'S SEAFOOD'S ORDERING SYSTEM based on survey questionnaire it was rated with a mean value of 4.66 which is interpreted as very satisfactory, in terms of determining the quality of MARION' S SEAFOODS ORDERING SYSTEM based on the

characteristic set in ISO 25010 software quality model, it was rated with a mean value of 4.41 which is interpreted as very satisfactory, in terms of determining the usability of MARION'S SEAFOODS ORDERING SYSTEM based on usefulness, satisfaction, and ease of use and learning it was rated with a mean value of 4.41 which is interpreted as very satisfied. Therefore, it provides a more secured ordering, Marion Seafood's Ordering System is designed for servers to be used in any business the server of this system is represented by the customers of this business itself and by using this system it will take the orders from the customer using wireless technology typically with a mobile device.

**Keywords:** Mobile ordering platform, Perish ability waste reduction, Seafood ordering system, Supply chain Implementation, Sustainable fisheries management

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## I. INTRODUCTION

The rapid growth of mobile technology has opened new opportunities for digitizing business operations, particularly in industries that have long depended on manual, paper-based processes. In the context of coastal seafood markets in the Philippines, the integration of mobile-based ordering systems represents a critical step toward improving supply chain efficiency and reducing perishability waste [3]. Mobile food ordering applications have also demonstrated measurable impacts on restaurant performance and customer satisfaction [4], and studies confirm that consumer preference increasingly favors digital ordering platforms over traditional methods [17]. Seafood is among the most time-sensitive of all food commodities, and any delay or error in its ordering, inventory tracking, or distribution directly translates to spoilage, financial loss, and reduced customer satisfaction [8].

The MARION'S SEAFOODS Company in Tacad, Bantayan, Cebu serves as the primary context of this study. As a long-established seafood business that exports products to the city, MARION'S SEAFOODS has faced growing operational challenges under its current manual system, particularly in keeping pace with the daily mix of seafood harvests. Staff must manually record each transaction, which is time-consuming and prone to human error, leading to incorrect order fulfillment, inaccurate inventory tracking, and an inability to respond swiftly to fluctuating stock levels [6]. These inefficiencies contribute directly to perishability waste, reduced revenue, and diminished customer experience.

Specifically, the existing manual system presents four critical problems: (1) the manual recording of seafood orders is slow and error-prone, leading to stock discrepancies and incorrect order fulfillment; (2) the absence of real-time inventory monitoring increases the likelihood of spoilage and financial loss; (3) customers lack a convenient self-service interface, resulting in long queues and reduced operational throughput; and (4) management is unable to generate timely sales reports, limiting data-driven decision-making for restocking and business planning. These problems highlight the urgent need for a dedicated digital ordering platform tailored to the time-sensitive and perishability-driven demands of coastal seafood businesses.

While prior studies have explored mobile and web-based food ordering systems, most of these solutions—including restaurant management systems and general e-commerce platforms—are designed for urban food service environments dealing with stable, non-perishable goods [9], [10], [11], [13]. Studies by Bhargave *et al.* (2017) and Bhandge *et al.* (2017) on Android-based ordering systems focused primarily on quick-service restaurants rather than perishable commodity supply chains, leaving a significant gap in technology application for coastal fisheries commerce [1], [2]. The broader fisheries sector likewise faces regulatory and supply chain challenges that underscore the need for more efficient digital solutions [12]. Furthermore, no locally contextualized system has been developed and empirically evaluated for small- to medium-scale coastal seafood enterprises in Philippine rural communities [7]. The existing literature lacks studies that integrate mobile ordering, real-time inventory management, and cloud-based deployment specifically within this geographic and economic context [3], [5].

To address these gaps, this study designed, developed, and evaluated the MARION'S SEAFOODS Ordering System—a mobile and web-based platform that streamlines the entire ordering and inventory process for coastal seafood businesses. The system enables customers to place orders conveniently through a self-service interface, while giving management full control over product listings, inventory, order confirmations, and sales reporting via a real-time dashboard. The system is deployed using cloud technology, ensuring accessibility from any location and device. Results of the evaluation confirmed that the system is not only necessary and safe to use, but also fast, reliable, and highly effective in improving the accuracy and efficiency of seafood order management. Expert evaluations using the ISO/IEC 25010 Software Quality Model [20] rated the system at a mean of 4.41 (Very Satisfactory), while user feedback using the USE Questionnaire [21] yielded a mean satisfaction score of 4.41 (Very Satisfied), and overall system performance was rated 4.67 (Very Satisfactory) by respondents—affirming that the MARION'S SEAFOODS Ordering System successfully addresses the operational challenges of coastal seafood markets and fills the identified gap in localized digital solutions for Philippine fisheries commerce.

## II. OBJECTIVES OF THE STUDY

This study aims to develop a Marion's Seafood's Ordering System.

Specifically, it aims to:

1. Display on the dashboard the following:
  - 1.1 Display on the dashboard the daily sales graph, ordered products, prepare ordered products, delivery ordered products, delivered ordered products, received ordered products, and cancelled ordered products.
  - 1.2 Provide options for the admin to create, read, update, and delete product information, manage inventory product, and display the total sales of the day, weeks, and months.
  - 1.3 Generate and print sales report weekly and monthly
  - 1.4 Customers can review the product.
2. Conduct expert evaluation using the ISO/IEC 25010 software quality model [20].
3. Measuring Usability with the USE Questionnaire [21].

## III. MATERIALS AND METHODS

### A. Research Design

This research study uses the Developmental Research methodology it is specialized and systematized in designing, developing and evaluating instructional programs processes, and products that must meet the level and categorized consistency and effectiveness [22]. And to add up, the researcher uses the descriptive type of analysis in presenting the data through the dashboard of the system.

### B. Software Life Cycle Model

In this study, the research uses the Rapid Application Development (RAD) model in creating the software

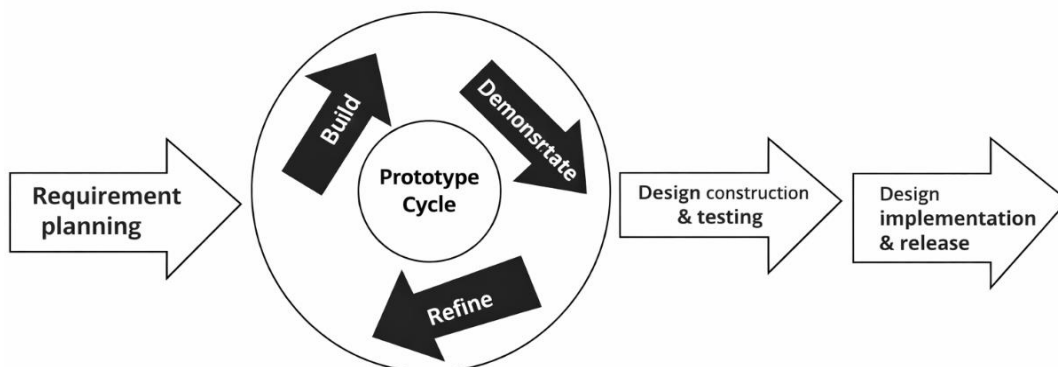


Figure 1. Rapid Application Development Model

### RAD Process Phases

This research uses the Rapid Application Development approaching developing the system for a reason that this method is a project management strategy that is well-introduced in development software [15], [16]. Having RAD approach provides great advantage and benefits because of its faster completion capacity of the design project, becoming the best option in choosing for develops working in fast-paced environment such as development [18], [19]. The resulting system supports real-time customer feedback and wireless order processing consistent with prior work on customizable wireless ordering systems [14].

### RAD Software Phases

The following phases involved in the developing of a System Rapid Application Development.

#### Step 1. Requirement Planning

In this stage, evaluating and understanding is used in determining the capabilities and problems of the current system that must discussed with the administrators. Together with the management and staff and with the help of research, planning of development of the system will be prioritized in building plan of the system.

#### Step 2. Prototype Cycles (Demonstration, Refine, Build)

In this part, this is where the process of the software takes place such as: Development, demonstration and improvement. This phase model of the system will be made and develop (prototyping) then show it to the client for testing purposes. This is a demonstration for our customers to receive feedback.

**Step 3. Design Construction and Testing**

In this phase, the system is being ready to test and expected to be effective and functional. Update and change and other remake of the system is open to be added according to per client's request. Any changes that may occur on the system can be repeated during testing.

**Step 4. Design Implementation and Release**

This phase is the last step which is the implementation of the system. It has to be performed data transformations, testing, switching to new systems, and trainings is present to the users of the system.

C. *System Architecture*

System Architecture for the Marion’s Ordering Management System illustrates the System as to what devices and technologies are used in the implementation of the system.

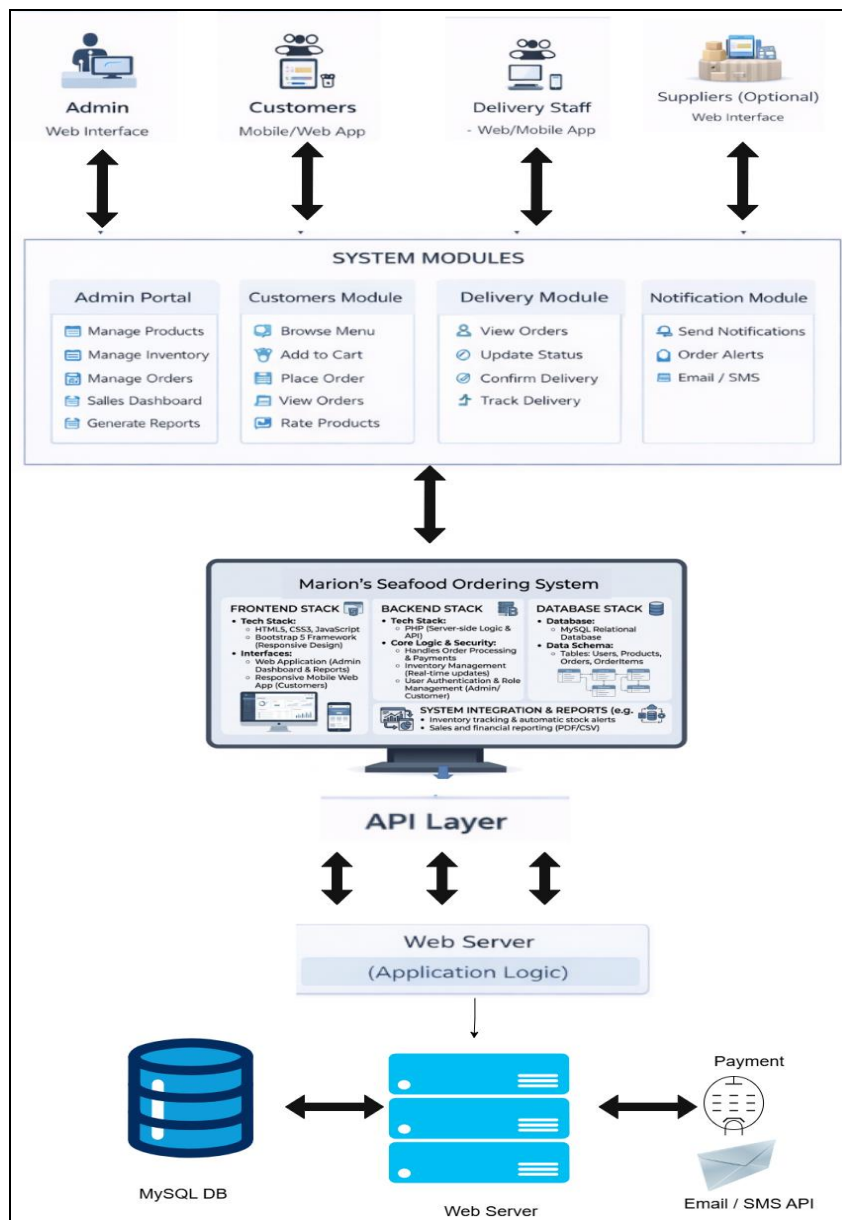


Figure 2. System Architecture

The system architecture of Marion’s Seafood Ordering System utilizes a robust, layered design that bridges the gap between coastal market operations and modern web technology. By integrating a Bootstrap-powered frontend with a PHP and MySQL backend, the system ensures a seamless flow of data from the moment a customer places an order to the final delivery update. The centralized API layer acts as a critical bridge,

allowing the distinct modules—such as the Admin Portal and Delivery Module—to synchronize in real-time, which is essential for managing the fast-paced and perishable nature of seafood inventory. This structured approach not only automates manual tasks like reporting and stock alerts but also provides a scalable foundation that can easily adapt to the growing demands of the business.

**D. Confirmation and Control of Orders**

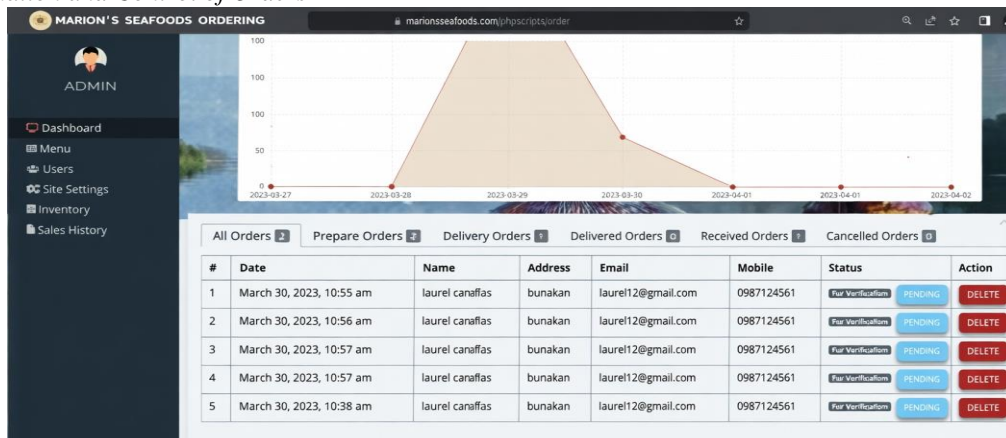


Fig 3. Confirmation and Control of Orders

Figure 3. Shows the Admin Dashboard of Marion’s Seafood Ordering System, which serves as the central control panel for order management. The dashboard presents a real-time overview of all incoming orders categorized by their status—ordered, being prepared, out for delivery, delivered, received, and cancelled. Management users can drill into individual order details, verify customer information, and confirm or update order statuses with a single action. This consolidated view eliminates the confusion and miscommunication common in manual order-taking, ensuring that every transaction is tracked from placement to fulfillment. The visual dashboard layout significantly reduces the cognitive load on staff and speeds up order processing during peak business hours.

**E. Generate and print sales report**

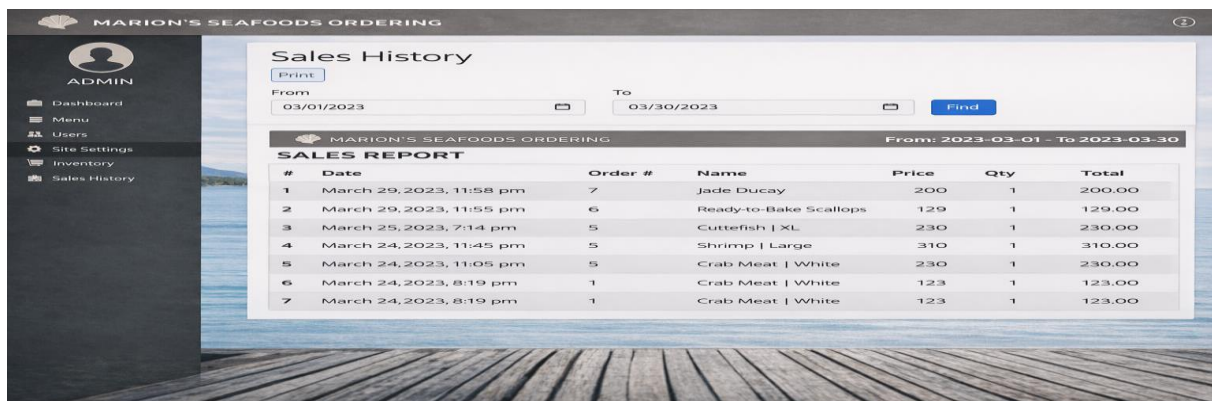


Fig 1. Generate and print sales report.

Figure 1. Shows the sales report generation and printing feature of Marion’s Seafood Ordering System. This module enables management users to compile transaction data into structured weekly and monthly reports. The interface provides summary statistics of total sales, product performance, and order volumes, allowing administrators to assess business trends and make data-driven restocking decisions. The print functionality ensures that physical records can be produced for bookkeeping and regulatory compliance, replacing the time-consuming and error-prone manual tally sheets previously used by the establishment.

F. Manage the inventory product.



Fig 2. Admin can manage the inventory products.

Figure 2. Shows the inventory management module of Marion’s Seafood Ordering System, where administrators can monitor and update product stock in real time. This feature allows the admin to add new seafood products, modify existing entries, set stock thresholds, and remove discontinued items from the catalog. For a coastal seafood business dealing with highly perishable goods, this functionality is critical: by maintaining an accurate and up-to-date inventory, the system helps minimize spoilage, prevent overselling out-of-stock items, and ensure that customers are only offered seafood that is available and fresh. The interface replaces manual stock ledgers with a centralized, digital record accessible at any time.

G. Creating, Reading with Updating and Deleting of Product

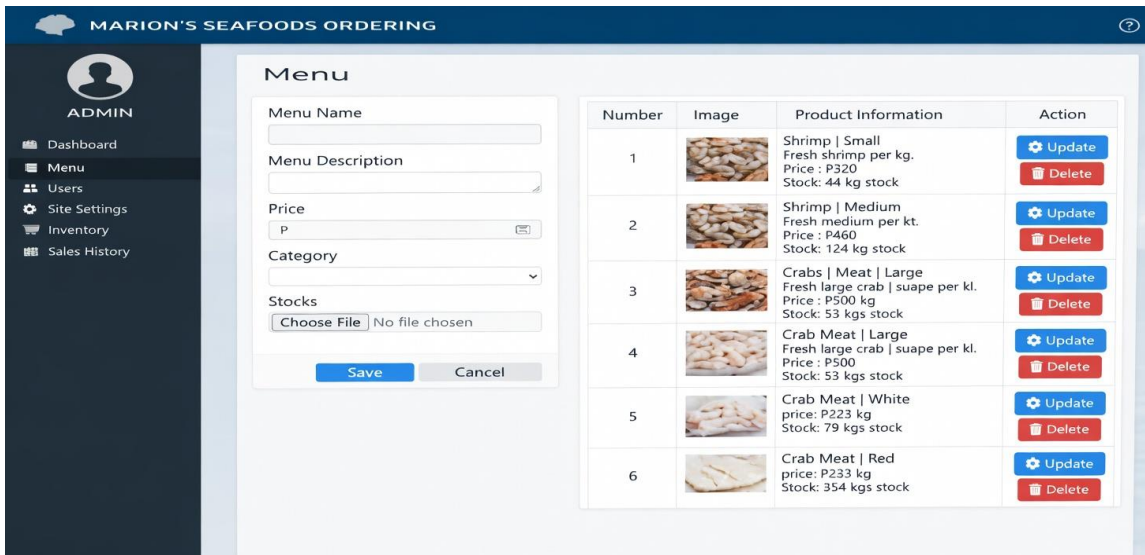


Fig 4. Creating, Reading with Updating and Deleting of Product

Figure 4. Shows the product management interface of Marion’s Seafood Ordering System, where authorized administrators can perform full Create, Read, Update, and Delete (CRUD) operations on the seafood product catalog. Through this screen, management can add new seafood items with their corresponding descriptions, types, and prices; edit existing product details to reflect daily price changes or seasonal availability; and remove products that are no longer offered. This dynamic product management capability is especially important for a seafood business where stock variety and pricing fluctuate based on daily harvest yields and market conditions. By centralizing product data in one accessible interface, the system ensures that the customer-facing menu always reflects accurate and current offerings.

H. Viewing of the orders and adding orders to the carts

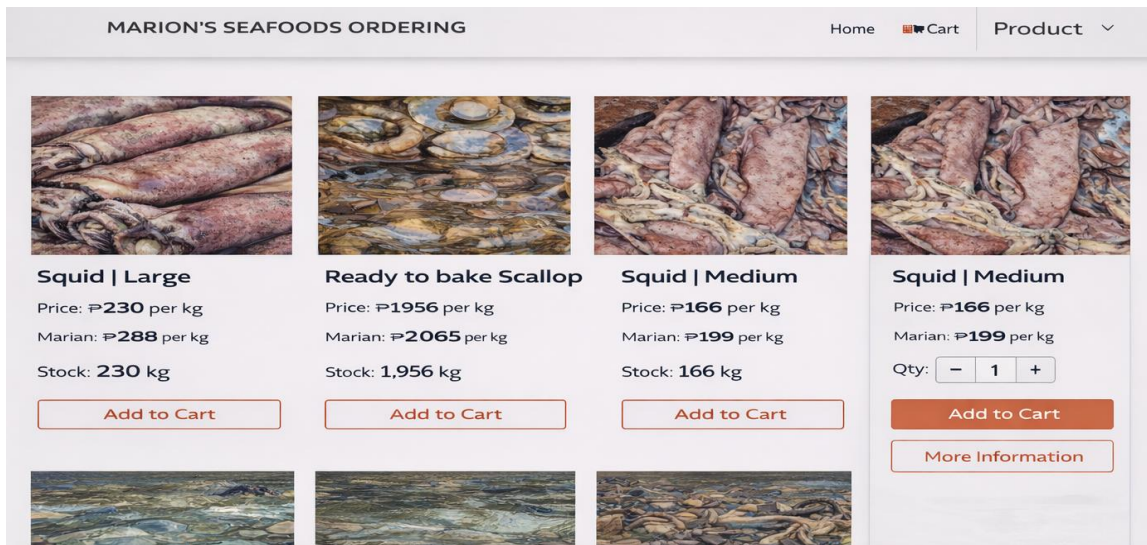


Fig 5. Viewing of the orders and adding orders to the carts.

Figure 5. Shows the customer-facing order management screen of Marion’s Seafood Ordering System, where users can review their selected items and manage their shopping cart prior to checkout. Customers can view the details of each added item—including product name, quantity, and unit price—and make adjustments such as increasing or decreasing quantities or removing unwanted items before finalizing their purchase. This self-service capability empowers customers to take full control of their orders without relying on staff assistance, thereby reducing order errors stemming from verbal miscommunication. The cart feature also encourages customers to consider additional purchases, potentially increasing the average transaction value and improving overall business revenue.

I. Customers Rating Marion’s Seafoods Product

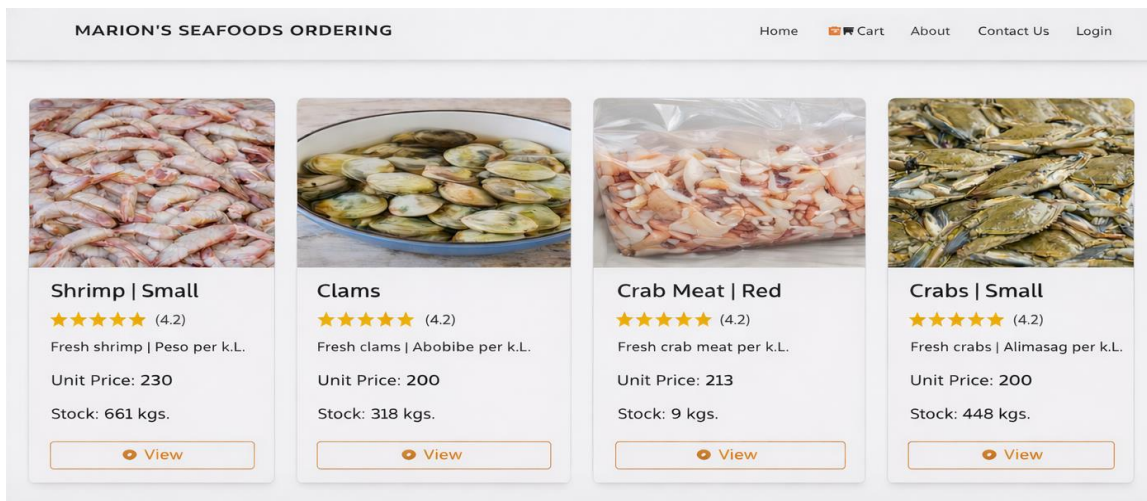


Fig 6. Marion’s Seafood Customer Ratings

Figures 6. Show all four products listed on Marion's Seafoods Ordering — Shrimp (Small), Clams, Crab Meat (Red), and Crabs (Small) — have received a uniform customer rating of **4.2 out of 5 stars**. This consistent rating across all items reflects a generally high level of customer satisfaction with the seafood offerings available on the platform. The fact that no single product stands out with a higher or lower score suggests that buyers find the overall quality, freshness, and value of Marion's seafood to be reliably good regardless of the product they choose. A 4.2-star rating is considered strong in most e-commerce contexts, indicating that the majority of customers are pleased with their purchases, though there remains a small margin for improvement that could potentially push ratings closer to a perfect score. Overall, the uniformity of the ratings speaks to Marion's consistent product standards and dependable service across its seafood lineup.

**IV. RESULT AND DISCUSSION**

This section presents the findings derived from the results of the study.

**A. Evaluation Instruments and Scoring**

The evaluation instrument was used. first a 5-point Likert scale where 5 is the highest and 1 is the lowest. A mean score of this 4.50 – 5.00 = Excellent, 3.50 = 4.49 Very Satisfactory, Agree, Good 2.50 = 3.49 is neutral 1.00 = 1.49 Disagree, Fair and lastly is 1.00 = 1.49 is Strongly Disagree, Poor. Second, is the ISO/IEC 25010 Software Quality Model [20] characteristics using 4.50 – 5.00 = Excellent, 3.50 = 4.49 Very Satisfactory, Agree, Good, 3.50 = 4.49 is Neutral 1.500 = 2.49 Disagree, Fair 1.00 = 1.49 is Strongly Disagree, Poor and third, the USE Model [21] is used for 5.00 = Excellent, 4.00 = 4.99 Very Satisfactory, Agree, Good, 3.50 = 3.49 is Neutral 1.50 = 2.49 Disagree, Fair 1.00 = 1.49 is Strongly Disagree, Poor.

TABLE I  
Scoring Range of Likert Scale of the Survey

Interpretation	Range
Excellent	4.50 – 5.00
Very Satisfactory/Agree/Good	3.50 – 4.49
Satisfactory/ Neutral	2.50 – 3.49
Neutral Disagree/Fair	1.50 – 2.49
Strongly Disagree/Poor	1.00 - 1.49

**B. System Performance Metrics**

TABLE II  
In terms of Functionality

Criteria	Mean	Verbal Interpretation
Display on the dashboard the daily sales graph, ordered products, prepare ordered products, delivery ordered products, delivered ordered products, received ordered products, and cancelled ordered products.	<b>4.66</b>	<b>Excellent</b>
Provide options for the admin to create, read, update, and delete product information, manage inventory product, and display the total sales of the day, weeks, and months.	<b>4.73</b>	<b>Excellent</b>
Generate and print sales report weekly and monthly.	<b>4.83</b>	<b>Excellent</b>
Customers can review the product.	<b>4.66</b>	<b>Excellent</b>
<b>Grand Total</b>	<b>4.72</b>	<b>Excellent</b>

The table above presents the evaluation results of the Marion’s Seafood Ordering System based on the specific objectives of the study. Overall, the system garnered a grand total mean of 4.72, which is verbally interpreted as Very Satisfactory.

In terms of Display on the dashboard the daily sales graph, ordered products, prepare ordered products, delivery ordered products, delivered ordered products, received ordered products, and cancelled ordered products., which covers the display of the dashboard including the daily sales graph, ordered products, prepare ordered products, delivery ordered products, delivered ordered products, received ordered products, and cancelled ordered products, the respondents rated it with a mean of 4.66, interpreted as Very Satisfactory. This indicates that the dashboard features were well-received and effectively presented the necessary information to the users.

For Provide options for the admin to create, read, update, and delete product information, manage inventory product, and display the total sales of the day, weeks, and months, which involves providing options for the admin to create, read, update, and delete product information, manage inventory, and display total sales of the day, weeks, and months, the system obtained a mean of 4.73, also interpreted as Very Satisfactory. This suggests that the administrative functionalities of the system were found to be highly functional and efficient.

Generate and print sales report weekly and monthly., which pertains to the generation and printing of sales reports weekly and monthly, received the highest mean score of 4.83, interpreted as Very Satisfactory. This result reflects that the respondents were highly pleased with the reporting features of the system.

Finally, Customers can review the product., which allows customers to review and rate the products, the system received a mean of 4.66, interpreted as Very Satisfactory. This shows that the review and rating feature was useful and appreciated by the users.

Overall, the evaluation results demonstrate that the Marion’s Seafood Ordering System successfully met all the specific objectives of the study and was rated Very Satisfactory by the respondents, reflecting the system’s effectiveness, functionality, and usability.

**C. Expert Evaluation Results**

TABLE III  
Expert evaluation using ISO/IEC 205010 software quality model

	<b>Mean</b>	<b>Verbal Interpretation</b>
Functional Suitability	<b>4.55</b>	<b>Excellent</b>
Performance Efficiency	<b>4.33</b>	<b>Excellent</b>
Compatibility	<b>4.41</b>	<b>Excellent</b>
Reliability	<b>4.33</b>	<b>Excellent</b>
Security	<b>4.44</b>	<b>Excellent</b>
<b>Total</b>	<b>4.41</b>	<b>Excellent</b>

Table III shows the result of the IT Expert’s feedback in determining the quality of the Marion’s Seafoods Ordering System on the characteristics set in ISO 25010 Software Quality Model [20].

In terms Functional Suitability, it was rated with a mean value of 4.55, which is interpreted as Very Satisfactory and for Performance Efficiency, it was rated with a mean value of 4.33, which is interpreted as Very Satisfactory. With regards to Compatibility, it was rated with a mean value of 4.41, which is interpreted as Very Satisfactory. Concerning Reliability, it was rated with a mean value of 4.33, which is interpreted as Very Satisfactory. As to Security, it was rated with a mean value of 4.44, which is interpreted as Very Satisfactory.

**D. User Satisfaction Results**

TABLE IV  
MEASURING USABILITY WITH THE USE QUESTIONNAIRE [21]

	<b>Mean</b>	<b>Verbal Interpretation</b>
Usefulness	<b>4.33</b>	<b>Excellent</b>
Ease of use	<b>4.48</b>	<b>Excellent</b>
Ease of learning	<b>4.49</b>	<b>Excellent</b>
Satisfaction	<b>4.37</b>	<b>Excellent</b>
<b>Total</b>	<b>4.41</b>	<b>Excellent</b>

Table IV shows the result of the user’s feedback in determining the usability of Marion’s Seafood Ordering System with Data Analysis based on usefulness, satisfaction, and ease of use learning, as measured using the USE Questionnaire [21].

In terms of Usefulness, it was rated with a mean value of 4.33, which is interpreted as Very Satisfied. With regards to Satisfaction, it was rated with a mean value of 4.37, which is interpreted as Very Satisfied. As to Ease of Use and learning, it was rated with a mean value of 4.48, which is interpreted as Very Satisfied.

**V. CONCLUSIONS**

MARION'S SEAFOODS Ordering System successfully resolves the four critical operational problems identified — eliminating slow and error-prone order recording, enabling real-time inventory monitoring to reduce spoilage, providing customers with a convenient self-service interface, and equipping management with timely sales reports for data-driven decision-making.

The system proved to be fast, reliable, and highly effective for both customers and management, with its intuitive dashboard empowering staff to track sales, manage product listings, and respond swiftly to fluctuating

stock levels inherent in coastal seafood commerce. Moreover, this study fills the gap in existing literature by delivering a locally contextualized digital solution for small- to medium-scale coastal seafood enterprises in rural Philippine communities. Expert evaluations rated the system at a mean of 4.41 (Very Satisfactory) under the ISO/IEC 25010 Software Quality Model [20], while user satisfaction scored 4.41 (Very Satisfied) and overall performance reached 4.67 (Very Satisfactory) — confirming that the MARION'S SEAFOODS Ordering System effectively modernizes coastal seafood market operations and advances digital transformation in Philippine fisheries commerce.

#### RECOMMENDATION

Based on the findings and conclusion drawn the following recommendations are being forward.

1. The Marion's Seafoods Ordering System may implement to.
  - a. Easy manage the ordering process. This system can be used as to promote the business and the products. It can help to easily monitor the in and out purchased orders of the products. It helps to minimized time of manual recording of the orders and can easily process of the orders.
  - b. Make use of ordering system so that customer can easily create their accounts and process their own orders fastly with no hassle, they can customize their own orders either can add the quantity or view order history.
  - c. Use as a simple and fast way of processing, the product orders, monitoring, of all order history and to provide the business widely over the internet.
2. In addition, it is also recommended that the same study can be made to make better or improve the Marion's Seafoods Ordering System that will directly flow to the payment options of the Marion's Seafoods Ordering System.

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