# The Effectiveness Level of Tabletop Ordering Kiosk Technology in the Food Industry

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## ABSTRACT

The food industry in the Philippines faces several difficulties in terms of their operations, including the administration of consumer inflow during peak hours, manual inventory control, and sporadic instances of order discrepancies. This study was conducted in one of the famous restaurants in Laguna. The restaurant accommodates a range of 200 to 300 clients on weekdays and around 500 customers on weekends. As a result, there is a noticeable increase in waiting times and a subsequent loss of consumers. The use of manual inventory techniques is associated with inefficiency and the occurrence of inventory errors. In order to tackle these concerns, a potential resolution is the implementation of the Tabletop Ordering Kiosk equipped with an Inventory and Appointment System. The aforementioned system facilitates a streamlined process of consumer ordering by means of interactive kiosks, improves inventory management via the use of real-time monitoring and notifications, and provides an appointment functionality to optimize seating arrangements. These improvements are in keeping with the emerging trends after the pandemic, aiming to achieve precise order processing, efficient operational procedures, and enhanced customer satisfaction. The suggested system has the ability to address issues, enhance service speed, and optimize inventory management in order to provide a more efficient dining experience.

**Keywords:** Kiosk Technology, Tabletop, Ordering, Food Industry, Information System, Capstone, Information Technology

## INTRODUCTION

The food industry in the country has been around since the post war era. Different variants of restaurants and genres of food have been serving the Filipino people, including foreign foods such as the Korean barbecue. also known as samgyeopsal, has continued growing its popularity in the Philippines. Since its introduction in 2018, many restaurants have embraced this concept and established their own Korean barbecue places. The popularity of Korean barbecue in the Philippines will be attributed to the increasing influence of Korean culture in the country and the appeal of its unique dining experience. Customers will be able to grill their own meat at the comfort of their table and enjoy it with a variety of side dishes. The sample population and client for this study is expected to remain one of the big players in the market, offering the same concept as part of the trend that started growing in 2018. For the purpose of anonymity the client's name is replaced with the general term and since this study is developmental research the term sample is also the same as the client.

Struggles are always a part of a business. These are the several struggles that client is currently experiencing: accommodating all of the customers, manually inventorying items, and serving late or wrong orders. The client caters to two hundred to three hundred customers on weekdays and five hundred customers on weekends. With this number, they are having difficulty accommodating all customers, especially during peak hours. Because of this, several customers leave the restaurant and choose to dine in other establishments, especially because of the long waiting time. Some orders are also served incorrectly due to human errors,

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which may cause inventory record inaccuracy (IRI) and customer dissatisfaction. Additionally, the restaurant's inventory system is still manual, which not only consumes more time and energy but also affects inventory accuracy.

This research focused on providing solutions to the needs and struggles of the restaurant. With that said, Tabletop Ordering Kiosk Technology was developed. The system is designed to provide a convenient and efficient ordering experience for customers by allowing them to place their orders through a tabletop kiosk. Not only do they cook their food at the comfort of their own table, but also order additional servings with minimal effort as well. The system will also have the feature to manage inventory, ensuring that the staff can constantly check that the restaurant has sufficient stock to meet customer demand. Lastly, the system also included an appointment system, allowing customers to book a table in advance, both online and walk-in. Customers with pre-booked appointments can enter the restaurant in their timeslot, thus avoiding long waiting times, especially on weekends and peak hours.

Researchers developed and assessed the effectiveness level of the tabletop ordering kiosk technology integrating it to the operations of the served clientele.

## METHODOLOGY

### Research Design

This research used a descriptive-developmental method. A descriptive research design aims to answer questions regarding the research problem that can be answered appropriately and does not manipulate any variables (Voxco, 2021). It determines the characteristics of subjects and is a useful tool to validate existing conditions, which can be conducted through in-depth analysis before drawing conclusions. A developmental research is a result from an existing knowledge that leads to the development of new materials, technology, or devices. This research is mostly found on this type of study which is technology and engineering (Portillo, et al. 2003). Since the study measured the effectiveness level, the researchers used quantitative type of research in order to measure the level properly

### Research Locale

The research was carried out in Santa Rosa City, situated within the province of Laguna. The study participants will be drawn from the personnel of the client, specifically the staff of a certain popular restaurant. . Data will be collected from the respondents through the utilization of a structured questionnaire to assess the effectiveness level of the developed system.

### Research Participants

In this study, a total of eighteen (18) respondents, including the management and service staff of the restaurant were selected using total enumeration. Taking into account the possibility that differences in characteristics could affect the study's results and also with the basis of their qualifications and willingness to share valuable information and experiences in response to the study's questions. Regarding the data sources, the research methodology employs both primary and secondary data sources. Concurrently, secondary data such as related studies and literature, were gathered from the Internet in order to enrich the content of the second segment of the research.

### Research Instrument

This study used a developed and validated questionnaire in order to measure the effectiveness level of the developed system. The questionnaire used a Likert scale method to identify if the management or the client agrees or disagrees with each statement. The questionnaire was divided into four parts namely; (1) reliability, (2) maintainability, (3) usability, and (4) efficiency. These divisions in the questionnaire were inspired from the ISO software characteristics.

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### Data Gathering Procedure

The research process involved several distinct steps in gathering the necessary data, aiming to comprehend the challenges faced by service staff and administrators while utilizing the existing manual system. Subsequently, a comprehensive questionnaire was designed to extract relevant information from the participants. These data gathering tools were carefully crafted to elicit responses that contributed to the study's objectives.

Following the creation of tools in gathering data, a survey was carried out, during which respondents completed the provided questionnaire. Their responses were meticulously collected for subsequent analysis aimed at informing the development process. It provided valuable insights into the current system's challenges and issues.

### Ethical Considerations

It is important to mention that ethical considerations, such as informed consent and data confidentiality, were taken into account while collecting and analyzing the data. The researchers took necessary precautions to protect the privacy of the participants and ensure that their rights are not violated in any way. The researchers followed the principles and guidelines stated in the Data Privacy Act. The study does not involve individuals that belong to vulnerable groups, as well as they are not at risk during the data gathering phase. The sources of data and the data analysis methods are clearly described in the methodology section of the research paper to make the research transparent and accessible for further evaluation and replication.

## RESULTS AND DISCUSSION

### Develop a Software with Tabletop Ordering Kiosk Technology for the Restaurant

The following are the main features with descriptions of each part of the developed software.

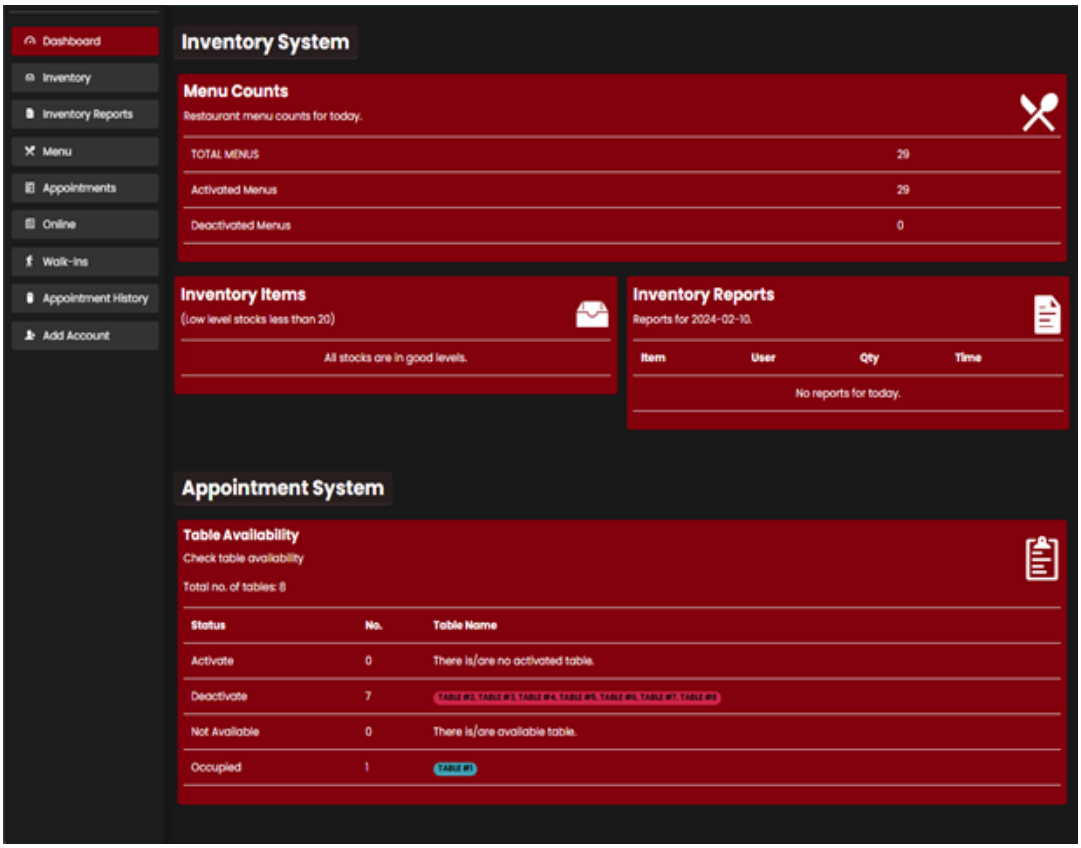


Fig 1. Dashboard page of the Tabletop Ordering Kiosk for the Administrator (Inventory and Appointment System)

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Within the admin dashboard, specific functionalities are available to streamline day-to-day operations. The menu counts section enables the admin to easily view both activated and deactivated menus, providing a clear overview of available offerings. The inventory items feature allows the admin to monitor stock levels, particularly focusing on items with limited or low availability. The inventory reports section provides access to comprehensive reports on the restaurant's supplies, allowing effective management. Lastly, the appointment System provides information on the status and availability of tables, allowing admins to utilize available tables and improve the overall customer experience.

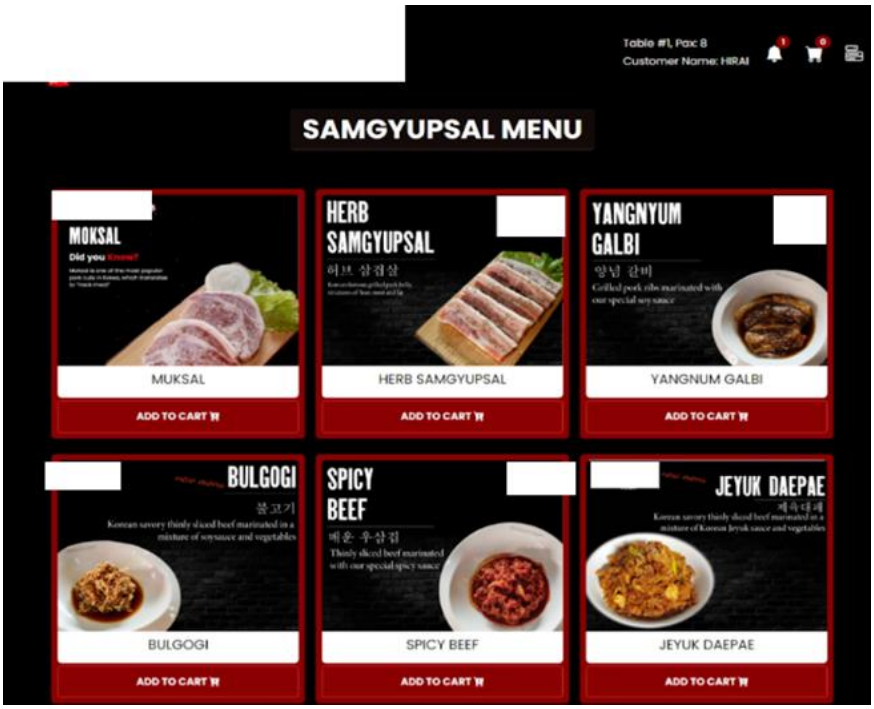


Fig 2. Menu Screen

The Samgyupsal menu area entices with delicious visuals and detailed descriptions of different dishes. The presentation of each item is carefully considered, enabling customers to choose their desired quantity giving a customized and satisfying meal experience.

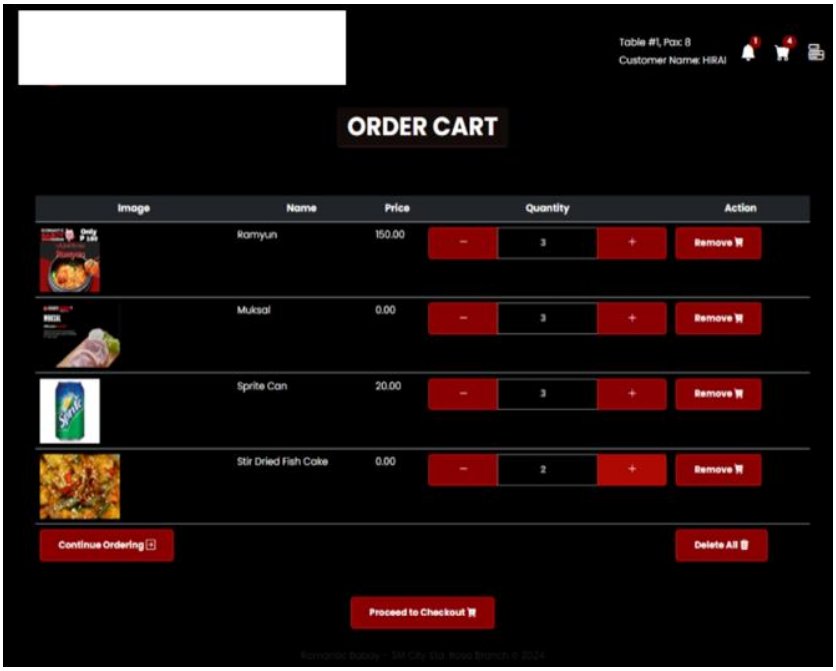


Fig 3. Order Cart

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The Order Cart user interface optimizes your ordering experience with a clean layout that prioritizes the needs and preferences of the user. The information is presented in a visually pleasing manner, with clear visibility of product names, prices, and quantities. The user-friendly controls enable effortless modifications to your choices, promoting a smooth and uninterrupted user experience.

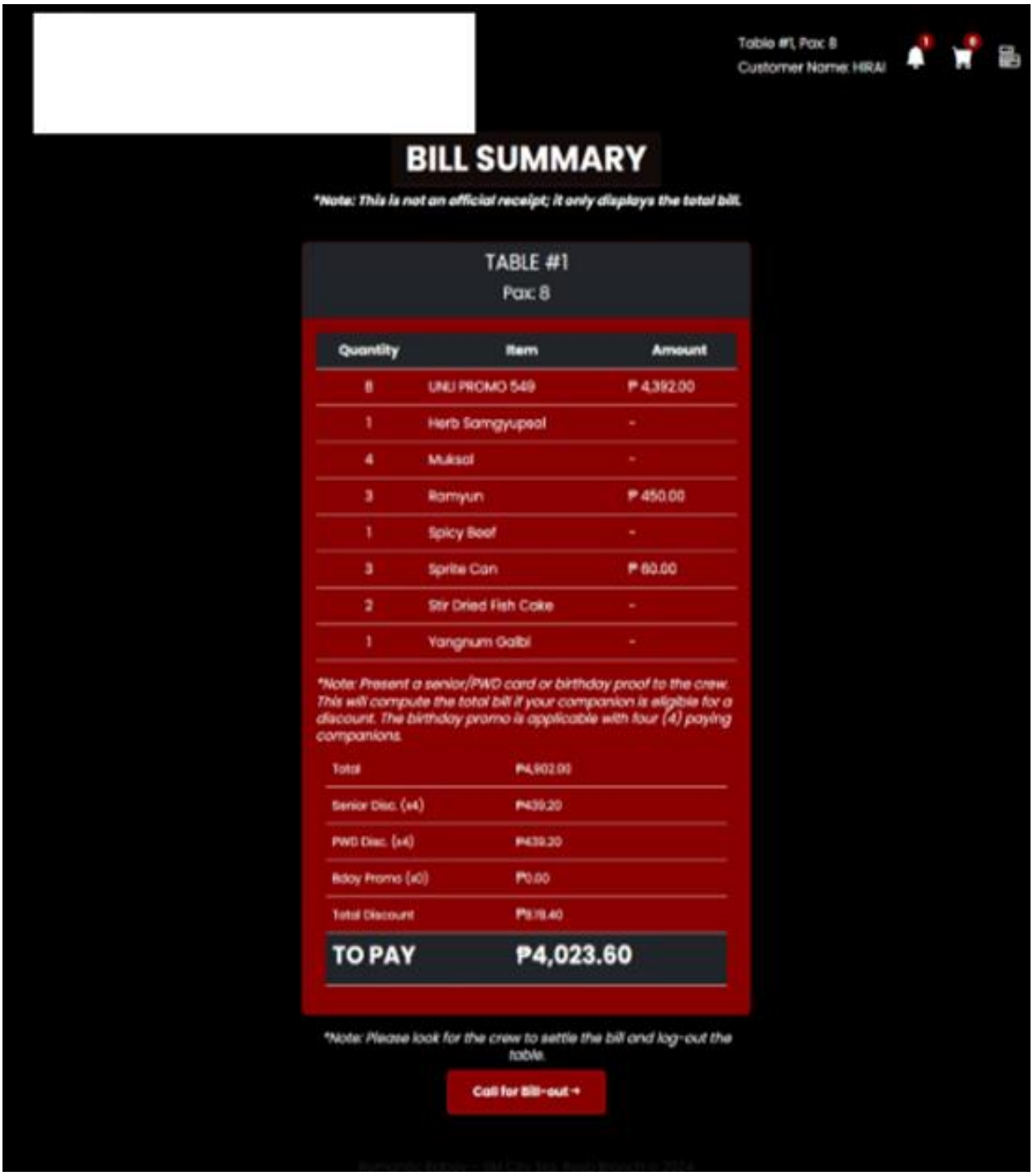


Fig 4. Bill Summary

The Bill Summary Interface provides a concise and user-friendly interface for easily managing the expenses. Every item is properly documented, including explicit information such as the number of items, the name of each item, and the specific amounts. The layout ensures that essential information is displayed in a visually comprehensible way, enabling effortless examination of purchases. The incorporation of a continuously updated cumulative sum automatically adjusts when you add or subtract goods, offering immediate and up-to-date information regarding how much you spent. It also has a button to call for a bill out after reviewing the bill summary.

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Fig 5. Report Generation

The Inventory Reports UI offers a comprehensive and user-friendly interface for effectively controlling and monitoring the stock levels. Every item is thoroughly documented, including vital information such as the item's name, description, unit of measurement, and the current stock quantity. By adding an activation option, users can effortlessly manage the availability of each item in the inventory. In addition, the user interface provides users with flexible export choices, allowing them to generate full reports in PDF, Excel, or CSV formats.

**Assess the Effectiveness Level of the Developed Software with Tabletop Ordering Kiosk Technology using the ISO Software Characteristics**

**Maintainability**

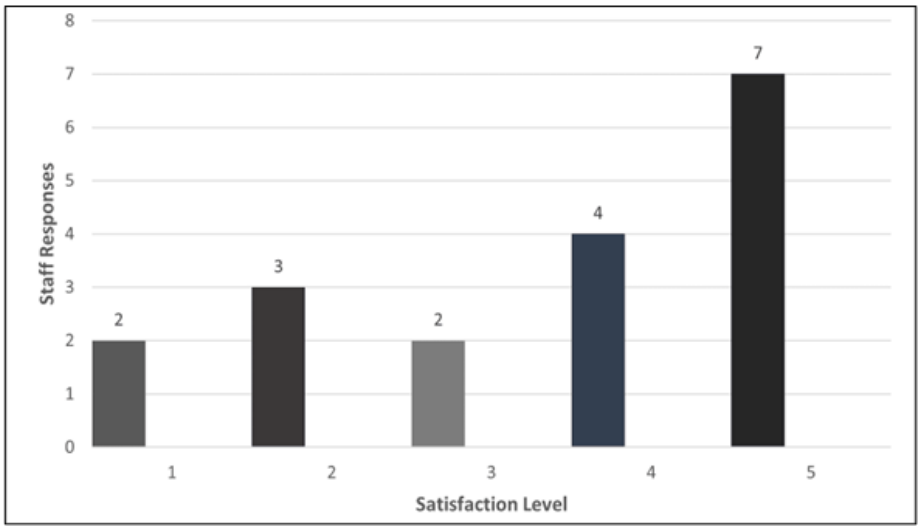


Fig 6. Summary of Responses for Maintainability

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Having a weighted mean of 3.61, and verbally interpreted as “Agree”. The results highlight a generally positive outlook on the maintainability of the system with regards to its software and hardware technology. The statement received strong agreement from the majority of respondents, with a rating of 5, as indicated by 7 respondents or about 38.9%. Furthermore, a total of 4 respondents, or about 22.2% provided a rating of four, signifying they agree with the system’s maintainable features. While 2 respondents or about 11.1% provided a neutral rating of 3, suggesting a lack of a definitive stance or uncertainty regarding the maintainability of the software. In contrast, 3 respondents, or about 16.7% expressed disagreement with the statement, assigning a rating of 2. Lastly, 2 respondents or about 11.1% expressed strong disagreement with the statement, assigning it a rating of 1.

**Usability**

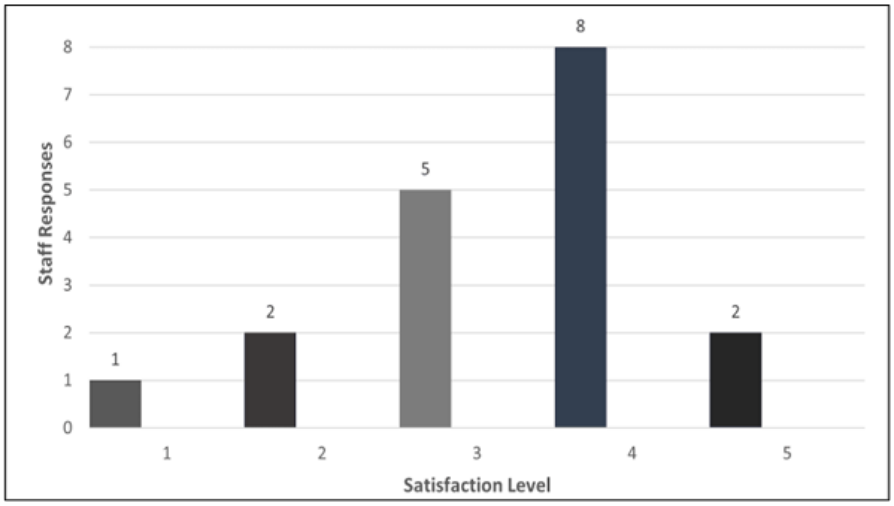


Fig 7. Summary of Responses for Usability

With a weighted mean of 3.44, the verbal interpretation is in alignment with the interpretation "Agree." Two respondents, or about 11.1% of the total, strongly agree, indicating a high level of satisfaction with the ease of learning and using the system's processes. Eight people, or approximately 44.44%, agree, expressing a high level of satisfaction with the system's processes' simplicity. Five respondents, or approximately 27.78%, are neutral, indicating a balanced perspective on the ease of learning and using the developed system's processes. Two respondents, or approximately 11.11% Notably, one respondent strongly disagrees, accounting for approximately 5.56% of those who strongly disagree with the statement.

**Reliability**

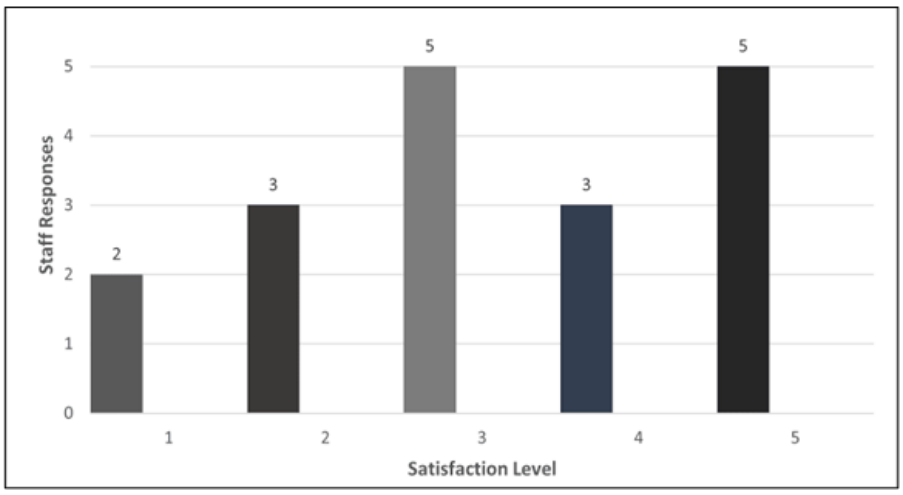


Fig 8. Summary of Responses for Reliability

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With a weighted mean of 3.33, the verbal interpretation is in alignment with the interpretation "Moderately Agree". There were five respondents who strongly agreed, making up approximately 27.78% of the total. This suggests that the developed system is strongly endorsed in terms of consistently producing accurate results free from errors or discrepancies. Three respondents, or approximately 16.67% of the sample, concurred, indicating a high degree of satisfaction with the proposed system's reliability in delivering precise results. Five respondents, or roughly 27.78%, expressed no opinion. A notable portion of respondents, three out of the total, or roughly 16.67% disagreed, suggesting that the system might not always generate accurate results free from errors or discrepancies. Significantly, two respondents disagreed strongly with the statement, making up about 11.11% of the total respondents who expressed strong disagreement.

**Efficiency**

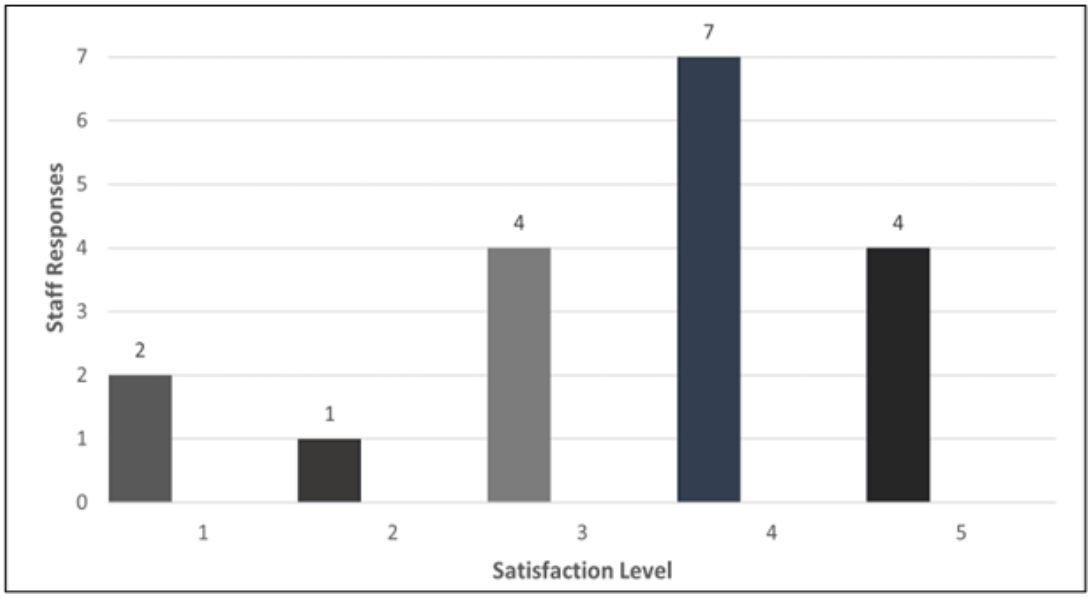


Fig 9. Summary of Responses for Efficiency

With a weighted mean of 3.56, the verbal interpretation is in alignment with the interpretation "Agree". Four respondents, or about 22.22% of the total, strongly agree, indicating that the proposed system allows staff to complete tasks and record information without delays. Seven people, or approximately 38.89%, agree, expressing a high level of satisfaction with the system's efficiency in task completion and information recording. Four respondents, or approximately 22.22%, remain neutral, indicating a balanced opinion on whether the system allows staff to work without delays. One respondent, which is approximately 5.56% of the total, disagrees, indicating that the developed system may cause delays in completing tasks and recording data. Additionally, two respondents strongly disagree, which represents about 11.11% of those who strongly disagree with the statement.

## CONCLUSION

The processes employed by the client within the current system to address order completion, appointment booking, and inventory management issues. Although the client's existing operations are effective, there is clear space for enhancement in crucial aspects such as order fulfillment, appointment scheduling, and inventory management. The survey conducted across three segments indicated a "Moderately Agree" reaction, implying that improvements and optimizations are achievable. The feedback emphasizes the need to address certain areas in order to ensure a more prompt and effective service experience for clients. By prioritizing these areas, Romantic Baboy may enhance efficiency and achieve more customer satisfaction by enhancing service delivery. Hilario (2023) states that the stationary robot and the kiosks at various branches of the restaurant improve and streamline the ordering process, resulting in increased efficiency for the restaurant and a smoother experience for consumers. This invention supports the argument made in this

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research that integrating technology simplifies restaurant operations. It provides operational efficiency for the restaurant and enhances convenience for customers during their dining experience.

The restaurant employs a comprehensive approach to accurately consolidate and generate reports, encompassing the report-generating process, data source and accuracy, integration and consolidation, quality assurance, and review, as well as report utilization and impact, to support its business operations. It relies heavily on the consistent precision of its reporting. Every single data point, collected and examined with great care, serves as a vital component for strategic planning and decisive decision-making. Even the most minor distortion or mistake in these reports can result in catastrophic outcomes, including financial mismanagement, operational inefficiencies, and poorly executed commercial endeavors. Hence, it is imperative for the sample to uphold the highest level of honesty in its reporting systems. Traditional manual data methods like spreadsheets and pivot tables may be advantageous for small businesses, but they also present certain difficulties. The drawbacks include the inability to scale these strategies as the organization grows, inconsistency around data sharing among multiple departments, and a substantial time commitment to data integration. This evidence supports the notion that it would be highly advantageous for the restaurant to use an ordering system that automates the integration and consolidation of their data. This will not only optimize the overall operations at the restaurant, but also mitigate the risk of processing and distributing unreliable data to stakeholders.

After conducting the assessment review of the system it is generally found that the management is moderately agree with regards to the system's maintainability, reliability, usability, and efficiency indicating that the system has the ability to operate and assist the client in its daily operations and elevate its working experience for the management and dining experience for the customers.

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