

# A Web-based Ticketing and Booking Application for Enhancing Maritime Travel Operations and Services in Siargao Island

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**Abstract:** *Siargao Island is one of the world-class and most popular tourist destinations in the Philippines. The island is still in its developmental stage in terms of the tourism industry, which oftentimes face difficulties on its maritime travel services because of inefficiencies on manual ticketing and booking processes. With this, the study aimed at investigating the current services offered by the small-scale local maritime providers. A mixed-methodology approach was employed in the study through online survey and interviews to gather data on respondents' preferences, challenges, and recommendations. The respondents were selected by convenience sampling method. The gathered data were analyzed using frequency distribution, weighted mean score, standard deviation, and ranking. The findings revealed significant results such as the challenges related to labour-intensive ticketing processes and lack of real-time information are identified, suggesting the need for digital solutions. There is also a high demand for improved travel services, with preferences for online booking, real-time scheduling, and user-friendly interfaces. The study contributes to the development of a web application by providing insights into passenger preferences and challenges, guiding the design and implementation of a system that enhances maritime travel services in Siargao Island.*

**Keywords:** Ferry, Online Ticket, Reservation, Online Booking.

## I. INTRODUCTION

The island of Siargao is known for its world-class surfing spots which attracts a significant number of tourists who rely on small passenger boats for transportation. The current passenger boat ticketing system mainly depend on manual processes that pose challenges and inconvenience for the tourists. These include longer waiting time, uncertainty available schedule and seating assignment, and accessible of tickets especially to those who are located in further from the port site.

Siargao Island's maritime travel services need to be improved for a number of reasons. First, more convenient and effective ticketing for visitors and locals. Second, simplifying boat operations can help local businesses and the economy, and third, better information availability enables travellers to make more informed travel plans. Modern technological solutions are underutilized in managing maritime travel services in Siargao Island. The absence of a comprehensive web-based application specifically designed for passenger ticketing and boat operations hinders improvement.

By focusing on this situation, this research pursues to address the needs of the community on maritime travel. It aims to revolutionize maritime travel services in Siargao Island by proposing a web-based application called "Smart Lancha" designed specifically for small passenger boats. By providing online booking and ticketing for passenger convenience, real-time schedule updates for improved trip planning, streamlining operations for boat operators, increasing efficiency, and enhancing communication and information flow between passengers and operators, the development of "Smart Lancha" can greatly improve the maritime travel experience in Siargao Island. This web-based tool has the power to completely change how residents of Siargao Island perceive marine transport.

## **II. OBJECTIVE OF THE STUDY**

This exploration aims to achieve the following objectives:

- To investigate the challenges and inefficiencies in the current maritime travel services in Siargao Island.
- To identify the factors affecting the traditional boat ticketing systems in Siargao Island.
- To propose a web-based Ticketing and Booking Application for enhancing the maritime travel services in Siargao Island.
- To formulate recommendations for further improvement of maritime travel services in Siargao Island.

## **III. RELATED LITERATURE**

This chapter presents the relevant works and context of maritime travel services and technological integration in transportation system. It provides the basis and purpose of this study by examining existing literature on current challenges, best practices, and innovative solutions in the maritime travel industry, with a focus on enhancing convenience, safety, and customer satisfaction through technology.

### **Maritime Travel in the Philippines**

The Philippines serves as an exemplar of a country grappling with the challenges of maritime travel, primarily due to its strategic geographic location as a regional trade route [1]. According to the Department of Tourism-Caraga, Siargao Island alone witnessed a significant increase in tourist arrivals, welcoming 529,822 visitors in 2023 compared to 125,088 tourists in 2022. This surge comprised 476,074 domestic and 53,748 international visitors, reflecting a remarkable 511.89% increase in foreign tourists [2]. This growth underscores the critical need for efficient travel options, with lancha trips playing a crucial role in connecting tourists to the beauty of Siargao Island. Ferries serve as the backbone of inter-island travel in densely populated archipelagic nations like Indonesia and the Philippines, with thousands of far-flung islands. Due to the relatively short distances between islands and the affordability of tickets, Filipinos often prefer boat travel as their primary mode of transportation by.

### **Integrated ticketing system Services**

According to Luhur, M.A., et al [3], the ease of obtaining information on the schedule, making a ticket reservation, and making a hassle-free payment is obviously important for any passengers. This method of e-ticketing is also more cost-efficient, simple and practical as compared to conventional ticketing system with a hardcopy ticket. These information services with online ticket booking system can positively affect passenger's satisfaction Alpu et al [4] given that they provide easier access to tickets, reduce the costs in time and money for reservation and improve the efficiency of ticket service, Wen, et al [5]. Users can buy tickets via their smartphones, transportation tickets and can pay online directly when they book their travel itinerary, validate and retrieve tickets using mobile application Ceipidor, et al [6].

### **The Electronic Ticketing System**

Kazi et al. [7] introduced a novel algorithm aimed at providing an agile and smooth ticketing experience along with an organized approach to seat allotment for commuters. Their research underscores the importance of streamlining ticketing processes and enhancing user experience in maritime travel services. The researchers, Marfo and Quansah [8], investigated the factors influencing the adoption of e-ticketing systems in the bus transport sector in Ghana. Employing the Technology Acceptance Model (TAM) and Structural Equation Modelling (SEM), they found that perceived usefulness and subjective norms positively influence the intention to adopt e-ticketing systems. Their findings emphasize the significance of user perception and acceptance in the successful implementation of digital ticketing solutions. Another works of Ong and Abdullah [9] was an IoT-based ferry e-ticketing system with Quick Response code integration aiming to enhance the efficiency and reliability of ticket validation processes. Their study highlights the potential of IoT technologies to transform ticketing systems in maritime travel thus offering real-time validation and enhanced user convenience. Similarly, Ithriah et al. [10] focused on the development of a roll-on-roll-off ships self-service e-ticketing system by emphasizing the importance of real-time data processing and user-friendly interfaces. They have utilized firebase with NoSQL technology and able to support large-volume transactions which streamlined ticketing processes for passengers. Nzakizwanimana [11] explored the effectiveness of an electronic ticketing system in

improving fare revenue collection in public transport systems, particularly in the context of Kigali Bus Services Ltd. Their study highlighted the significant benefits of e-ticketing systems, including improved revenue collection and enhanced safety measures during the COVID-19 pandemic.

### Synthesis

The rise of tourism on Siargao Island exposes the limitations of manual boat ticketing and booking systems and creating long queues thus contribute to the inefficiencies in the maritime industry. Researchers suggest that an integrated e-ticketing offers numerous advantages, including improved passenger experience, reduced costs, and increased efficiency. Furthermore, advancements in data mining and technologies like QR codes and real-time processing can further enhance ticketing systems. Therefore, implementing a lancha online ticketing system that leverages these advancements is crucial to provide Siargao with a more efficient, user-friendly, and secure travel experience for all.

## IV. METHOD

### Research Approach

For this study, a mixed-methods research approach was employed to gain a comprehensive understanding of passenger perceptions and preferences regarding maritime travel services in Siargao Island.

A quantitative research approach was employed using a structured Google Form survey. The survey consisted of closed-ended questions, offering predefined response options in a multiple-choice format or on a scale. This method facilitated the collection of numerical data, allowing for statistical analysis. The survey focused on specific variables related to passenger attitudes towards the traditional ticketing system and the proposed Smart Lancha application. Participants were asked to select their responses from provided options, enabling the researchers to quantify perceptions, preferences, and satisfaction levels regarding maritime travel services in Siargao Island.

In addition to the quantitative survey, qualitative insights were sought through semi-structured interviews and open-ended questions. These qualitative methods allowed for a deeper exploration of the underlying reasons and contexts behind the quantitative survey responses. Through interviews, participants were encouraged to express their opinions, experiences, and suggestions regarding maritime travel services, providing rich, nuanced insights that complemented the numerical data obtained from the survey.

Overall, by combining quantitative data collection through the Google Form survey with the potential for qualitative exploration, this research approach aims to provide a comprehensive understanding of the challenges and opportunities for enhancing maritime travel services in Siargao Island.

### Research Design

The research design for this study follows a sequential exploratory mixed methods approach, incorporating both quantitative and qualitative elements to achieve a comprehensive understanding of the challenges and opportunities in enhancing maritime travel services in Siargao Island.

### Phase 1: Quantitative Data Collection

- **Survey Development:** The research started with the development of a structured questionnaire using Google Forms. The survey includes closed-ended questions designed to collect quantitative data on passenger attitudes, preferences, and experiences with the traditional boat ticketing system and the proposed Smart Lancha application. The questions were designed to capture key variables such as satisfaction levels, perceived convenience, and preferences for ticketing methods.
- **Survey Administration:** The survey was distributed to a sample of participants comprising passengers, and boat operators, in Siargao Island. Various methods such as social media platforms and community outreach efforts were employed to reach the target audience and ensure a diverse representation of perspectives.
- **Data Collection:** Responses from the survey were collected electronically through Google Forms and stored securely for analysis. The data collected include quantitative metrics such as Likert scale ratings, multiple-choice selections, and demographic information.

**Phase 2: Qualitative Data Collection**

- In-depth Interviews: Following the quantitative data collection phase, semi-structured interviews are conducted with a subset of participants to explore the underlying reasons and contexts behind their survey responses. Participants are selected based on their willingness to participate and their potential to provide rich insights into the research topic. The interviews allow for in-depth exploration of themes related to challenges, perceptions, and recommendations for improving maritime travel services.
- Data Analysis: Interview transcripts are analyzed using thematic analysis techniques to identify recurring patterns, themes, and insights. This qualitative data analysis process helps contextualize the quantitative findings and provides a deeper understanding of the research phenomenon.

**Phase 3: Integration and Interpretation**

- Data Triangulation: Quantitative and qualitative data are integrated to triangulate findings and enhance the validity and reliability of the research outcomes. By comparing and contrasting insights from both data sources, a more comprehensive understanding of the research topic was achieved.
- Interpretation *and Synthesis*: The integrated data are interpreted and synthesized to draw conclusions and formulate recommendations for enhancing maritime travel services in Siargao Island. Key findings from the study are discussed in relation to the research objectives, and implications for policy, practice, and future research are outlined.

***Research Instrument***

For this study, aiming to enhance maritime travel services in Siargao Island, two primary research instruments were employed: a structured questionnaire and a semi-structured interview schedule. The structured questionnaire was utilized to gather quantitative data from diverse participants, including passengers, boat operators, and ticketing agents. Comprising closed-ended questions with predetermined response options, the questionnaire aims to capture specific variables pertaining to passenger attitudes, experiences, and preferences concerning the traditional boat ticketing system and the proposed Smart Lancha application. Sections within the questionnaire encompass demographic information, perceptions of the current maritime travel services, preferences for ticketing methods, and suggestions for improvement. Response options, including Likert scales and multiple-choice selections, facilitated the efficient data collection and analysis. The questionnaire was designed using platforms like Google Forms for seamless distribution and data collection.

The semi-structured interview schedule served as a qualitative tool for conducting in-depth interviews with a select group of participants to delve deeper into their experiences, perspectives, and recommendations concerning maritime travel services in Siargao Island. Comprising a series of question with open-ended questions, the interview is designed to encourage participants to elaborate on their responses and provide details for improvement of the current system.

***Participants of the Study***

There were 144 participants consist of individuals with common characteristics related to their involvement in maritime travel services in Siargao Island. These participants are identified by the researchers as target respondents crucial for gathering insights and data pertinent to the research objectives.

***Sampling Method***

For this study, a purposive sampling technique was employed to choose survey respondents from the target population of passengers and boat operators in Siargao Island. This method involves deliberately selecting participants based on their expertise, experience, or relevance to the research objectives. Through purposive sampling, the study aims to capture a range of perspectives and experiences related to maritime travel services in Siargao Island, thereby enriching the qualitative data obtained from the interviews.

**Data Gathering Procedure**

For this study on enhancing maritime travel services in Siargao Island, both primary and secondary data were gathered to provide a comprehensive understanding of the research phenomenon.

The primary data were collected directly by the researchers through surveys and interviews, allowing for firsthand insights from participants involved in maritime travel services in Siargao Island. The semi-structured interview was conducted with a subset of participants to gather qualitative insights into their experiences, perspectives, and recommendations regarding maritime travel services in Siargao Island.

In addition to primary data, secondary data was collected from existing sources to complement and contextualize the findings of the study. The relevant academic journals, articles, reports, and government publications will be reviewed to gather background information, theoretical frameworks, and existing studies related to maritime travel services, ticketing systems, and technology interventions.

By combining primary and secondary data sources, this data gathering procedure aims to provide a comprehensive and well-rounded analysis of the factors influencing maritime travel services in Siargao Island and to inform the development of Smart Lancha and other potential interventions.

**Data Analysis**

The data collected for this study underwent analysis using both quantitative and qualitative methods to extract meaningful insights and draw conclusions. The primary statistical method was utilized following descriptive statistical tools: (a) frequency distribution and percentage, (b) mean and category value, (c) verbal interpretation. Table 1.0, which determine the agreement level among the respondents for each survey question, ranging from "Strongly Agree" to "Strongly Disagree."

**Table 1.0 The Interpretation of Range of the Weighted Mean**

Range of the Weighted Mean	Interpretation
4.51 – 5.00	Strongly Agree (for the questions asked)
3.51 – 4.50	Agree (for the questions asked)
2.51 – 3.50	Moderately Agree (for the questions asked)
1.51 – 2.50	Disagree (for the questions asked)
1.50 and below	Strongly Disagree (for the questions asked)

The qualitative data obtained from semi-structured interviews were analyzed using thematic analysis. This method involves systematically identifying, analyzing, and reporting patterns or themes within the qualitative data. The process includes transcription of interview recordings verbatim to facilitate analysis, followed by systematic coding to identify recurring patterns, concepts, and themes. These codes were grouped into broader themes based on similarities and connections. Finally, the themes were interpreted in relation to the research objectives to generate insights and conclusions.

**V. RESULT AND DISCUSSION**

This chapter delved into the analysis and interpretation of the data collected from participants' responses in addressing the specific research questions of the study.

**Demographic Profile of the Respondents**

Table 2.0 Profile of the Respondents in the terms of Age

Age	Frequency	Percentage
Under 18 years old	31	21.5%
18-25 years old	85	59%
26-35 years old	22	15.3%
36-45 years old	4	2.8%
46-55 years old	2	1.4%
Over 55 years old	0	0%
<b>Total</b>	<b>144</b>	<b>100</b>

Table 2.0 presents the profile of the respondent's according to Age. As can be seen on the table, majority of the respondents are between 18 years old to 25 years old, comprising 59% of the population, followed by respondents who are within the age range of 26 to 35 years old (15.3%). This implies that majority of the participants are young adults.

Table 3.0 Profile of the Respondents in terms of Gender

Gender	Frequency	Percentage
Female	99	68.1%
Male	46	31.9%
<b>Total</b>	<b>144</b>	<b>100%</b>

Table 3.0 shows the profile of the respondent's according to gender. As can be seen on the table, there are 99 or 68.1% of the respondents are male while 46 or 31.9% are female. This implies that majority of the participants are female.

Table 4.0 Profile of the Respondents in the terms of Occupation

Occupation	Frequency	Percentage
Local Resident	81	56.3%
Tourist/Visitor	59	41%
Boat Operator	3	2.1%
Business Owner	1	0.7%
<b>Total</b>	<b>144</b>	<b>100%</b>

Table 4.0 shows the profile of the respondents according to Occupation. As can be seen on the table, there are 81 or 56.3% of the respondents are local residents while 59 or 41% are Tourist/Visitor, there is no respondent for Boat Operator and there is 1 or 0.7% is Business Operator. This implies that majority of the participants are the people living or native to the island of Siargao.

**Respondents' Assessment on the Challenges and Inefficiencies in the Current Maritime Travel Services in Siargao Island**

Table 5.0 Challenges and Inefficiencies in Current Maritime Travel Services

Statement	Weighted Mean	Description
The availability of lancha, a small passenger boats is sufficient for the demand in Siargao Island.	4.43	Agree
I often encounter challenges when accessing accurate schedule information for lancha a small passenger boats in Siargao Island	4.35	Agree
The waiting time for boarding traditional small passenger boats is often unreasonable.	4.15	Agree
The traditional ticketing process for lanchas in Siargao Island is not smooth and hassle-free.	4.19	Agree
Delays or cancellations are common when using maritime travel services in Siargao Island.	4.21	Agree
<b>Average Mean Score</b>	<b>4.26</b>	<b>Agree</b>

Table 5.0 provides the data highlighting the challenges faced by passengers using maritime travel services in Siargao Island, Philippines. The analysis focused on the respondents' assessment expressing their level of agreement on a scale likely ranging from 1.00 (strongly disagree) to 5.00 (strongly agree). The weighted mean score for The availability of lancha, small passenger boats is sufficient for the demand in Siargao Island fell with the weighted mean score of 4.43. This indicate respondents "Agree" that obtaining availability of lancha, small passenger boats is sufficient for the demand in Siargao island. The weighted mean score for accessing accurate schedule information for lanchas fell with the weighted mean score of 4.35. This suggests respondents "Agree" that obtaining accurate lancha schedules is a significant challenge. The weighted mean score for long waiting times when boarding traditional small passenger boats fell within a range with a weighted mean score of 4.15. This indicates respondents "Agree" that long wait times are a

major inefficiency. The weighted mean score for the ticketing process being smooth and hassle-free fell within a range with a weighted mean 4.19. This suggests respondents “Agree” that the current ticketing system needs improvement. The weighted mean score for the Delays or cancellation are common when using maritime travel in Siargao Island fell within a range with a weighted mean score of 4.21. This suggests respondents “Agree” that Delays or cancellations are common when using maritime travel services in Siargao Island is a significant challenge.

As can be seen on the table, the category Value is 4.26 with interpretation of “Agree”. This implies majority of the participants are agreeing that they face such challenge. The findings based on the weighted mean scores suggest significant room for improvement in Siargao Island's maritime travel services. Passengers face considerable difficulty in obtaining accurate lancha schedules, as evidenced by the agreement on this challenge. Long waiting times for boarding traditional boats further contribute to inefficiency. The manual ticketing process indicates that the current process is not entirely smooth or hassle-free for passengers. . Additionally, weighted mean score for the Delays or cancellation are common when using maritime travel in Siargao Island is a significant challenge. Addressing these challenges could significantly improve the user experience for maritime travel in Siargao. Implementing solutions like online platforms with real-time lancha schedule updates could address the information gap. Exploring ways to streamline the boarding process and potentially implement a more user-friendly ticketing system could further enhance passenger satisfaction.

**Respondents’ Assessment on the Factors Affecting Traditional Boat Ticketing Systems in Siargao Island**

Table 6.0 Factors Affecting Traditional Boat Ticketing Systems in Siargao Island

Factor Statement	WM	Description
The lack of online booking options makes it difficult to secure boat tickets in advance.	4.38	Agree
The process of purchasing tickets for lanchas is not straightforward.	4.08	Agree
The limited information availability about boat schedules and availability affects my decision-making process.	4.26	Agree
The absence of transparent pricing for boat tickets is a concern.	4.37	Agree
The outdated management systems hinder effective operation of boat ticketing systems.	4.30	Agree
<b>Average Mean Score</b>	<b>4.28</b>	<b>Agree</b>

Table 6.0 identifies factors affecting traditional boat ticketing systems in Siargao Island, Philippines, with respondents expressing their level of agreement on a scale likely ranging from 1.50 (strongly disagree) to 5.00 (strongly agree). Passengers encounter difficulty in 5 main areas: The lack of online booking options makes it difficult to secure boat tickets in advance with the weighted mean score of 4.38. This suggests respondents “Agree” that the current booking system needs improvement. Purchasing tickets for lanchas is not a straightforward process with the weighted mean score of 4.08. This indicate respondents “Agree” that the traditional ticketing process needs improvement. Limited information availability about boat schedules and availability affects my decision-making process. The table indicates a moderate level of agreement with weighted mean score of 4.26 with this statement, suggesting it is a common issue for passengers. The absence of transparent pricing for boat tickets is a concern with the weighted mean score of 4.37. This suggests respondents “Agree” that absence of transparent pricing for boat tickets needs improvement. Outdated management systems hinder effective operation of boat ticketing systems with the weighted mean score of 4.30. This suggests respondents “Agree” that outdated management system needs improvement. As can be seen on the table 6.0, the category Value score is 4.28 with interpretation of “Agree”. This implies majority of the participants are agreeing the factors affecting traditional boat ticketing systems in Siargao Island.

The results of the table suggest that there is room for improvement in the way maritime travel services are delivered in Siargao Island. Passengers would benefit from more readily available and accurate schedule information for lanchas. The ticketing process could be streamlined to make it smoother and less hassle-free. Finally, the waiting times for boarding traditional small passenger boats could be reduced. These improvements could make maritime travel in

Siargao Island more efficient and user-friendly for passengers. It is important to note that the data in the table is specific to Siargao Island and may not be representative of maritime travel services in other parts of the Philippines.

**Preferences for Smart Lancha Web-based Application**

Table 7.0 Preferences for Smart Lancha Web-based Application

Statement	WM	Description
I would prefer a Smart Lancha Web-based Application for booking boat tickets over traditional methods.	4.53	Strongly Agree

Table 7.0 shows a strong user preference for a Smart Lancha Web-based Application for booking boat tickets. The weighted mean score for this statement is 4.53, which aligns with the interpretation of "Strongly Agree" in the table. This suggests that users find the traditional methods for booking lancha tickets to be inconvenient and would prefer a more streamlined web-based approach. The data in the table indicates a strong user demand for a Smart Lancha Web-based Application. This suggests that users are interested in the potential benefits such an application could offer, easier access to real-time schedule information for lanchas, addressing the challenge you mentioned of having difficulty obtaining accurate schedules, the ability to book tickets online, potentially eliminating the need to wait in line and reducing the hassle associated with the traditional ticketing process. This suggests that a Smart Lancha Web-based Application could address these challenges and improve the overall user experience for maritime travel in Siargao Island.

Table 8.0 Preferred Features and Functionalities of Smart Lancha Application

Features	Frequency	Percentage	Rank
Online booking and payment options	127	16.4	1
Real-time boat schedules and availability updates	111	14.3	2
Passenger can choose where they want to seat	99	12.8	3
User-friendly interface	96	12.4	4
Transparent pricing information	93	12.0	5
Ability to provide feedback and ratings	91	11.7	6
Priority seat for person with disability, senior citizen, pregnant women and children	91	11.7	7
Forecast/update wind and sea condition	63	8.1	8
Free Wifi	4	0.5	9
<b>Total</b>	<b>775</b>	<b>100</b>	

The table 8.0 highlights user priorities for features in a Smart Lancha Web App. Online booking and payment options is the highest-ranked feature (Rank 1) with 127 users selecting it (frequency) and a strong level of agreement at 16.7%. This signifies it's the feature users consider most important for inclusion in the Smart Lancha Web App. Real-time boat schedules and availability updates come in at Rank 2, with a frequency of 111 and a percentage of 14.3%. This indicates the second most important feature based on user agreement. It is considered to have significant value for users. Passenger can choose where they want to seat is ranked 3rd, with a frequency of 99 and a percentage of 12.8%. This caters to passenger comfort and preferences. A user-friendly interface is ranked 4th with a frequency of 96 and a percentage of 12.4%. This indicates that this feature would make the application easy to use for people with varying levels of technical expertise. Transparent pricing information is ranked 5th with a frequency of 93 and a percentage of 12.0%. This feature eliminates confusion about trip costs. The ability to provide feedback and ratings is ranked 6th with a frequency of 91 and a percentage of 11.7%. This indicates that this feature allows users to share their experiences, suggest improvements, and help developers enhance the application over time. Priority seat for person with disabilities or pregnant women is ranked 7th with a frequency of 91 and a percentage of 11.7%. This indicates that the application will cater to passengers with disabilities and expectant mothers by ensuring they receive priority seating for a safer and more comfortable journey. Forecast/update wind and sea condition is ranked 8th with a Frequency of 63, and a Percentage of 8.1. This information helps users make informed travel decisions by providing real-time data on



weather conditions that could impact the journey. Free Wi-Fi is ranked 9th with a Frequency of 4 and a Percentage of 0.5%. While receiving the lowest agreement, this feature offers an additional convenience for passengers during their trip.

Overall, the data suggests that a Smart Lancha Web App with the features listed above has the potential to significantly improve the user experience for maritime travel in Siargao Island. By addressing user pain points and offering convenient functionalities, the application can make booking and using lanchas easier, more efficient, and more passenger-friendly.

**System Development Process of the Proposed Smart Lancha Application**

This diagram presented below (Figure 1.0) indicates the development architecture of a system that extracts patterns from an existing database, following the Knowledge Discovery in Databases (KDD) process. The four stages of the process are data collection, data transformation, software development, and pattern extraction. Each stage considers different parameters and data mining methods. The development stage utilizes technologies like MySQL for database interaction, HTML and CSS for user interface design, and PHP and jQuery for system coding. This demonstrates a comprehensive approach to extracting knowledge from the data.

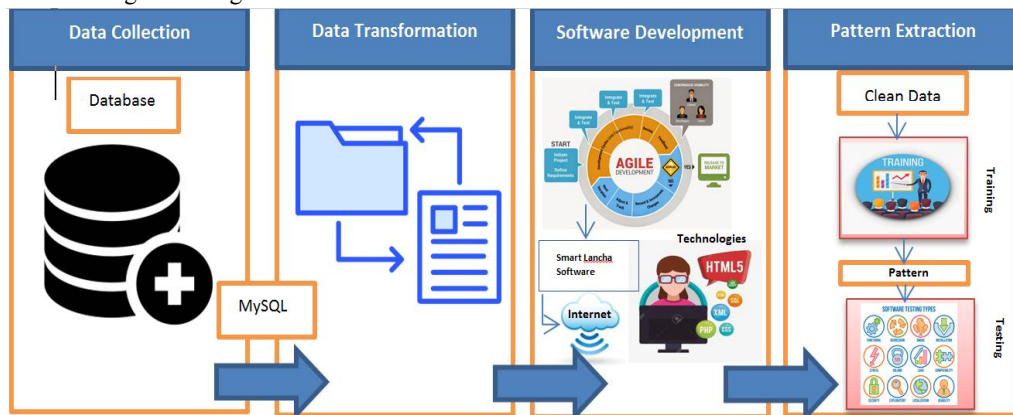


Figure 1. System Development Process of the Proposed Smart Lancha Application

The diagram below illustrates the web application's architecture, logically defining how various components interact. Users interact with the user interface, built with HTML and CSS, through their web browser. This sends requests to the web server, which processes them using server-side code written in PHP and jQuery. The server might interact with a MySQL database to retrieve or store data. Finally, the server sends a response back to the user's browser, updating the user interface.

**Web Application Architecture**

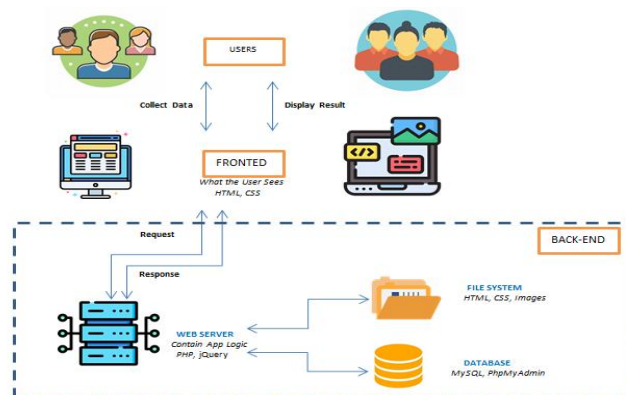


Figure 2. Web Application Architecture

**Additional Recommendations for the Improvement of the Current maritime Travel Services in Siargao Island**

Table 9.0 Respondents Perception of the Local Government Commitment in Improving Maritime Travel Services in Siargao Island

Additional and Recommendation	Frequency	Percentage
Very Important	89	61.8%
Important	47	32.6%
Somewhat Important	8	5.6%
Not Important at all	0	0
Total	144	100%

Table 9.0 present the Additional and Recommendation of the respondents. As can be seen on the table, there are respondents with 89 or 61.8% with “Very Important”. There are respondents with 47 or 32.6% with “Important”. there are respondents with 8 or 5.6% with “Somewhat Important “and there is no respondent for “Not Important at all”. This implies that significant majority 61.6% with "Very Important” It shows how important respondents believe local government investment in improving maritime travel services on Siargao Island is.

Table 10.0 Respondents’ likelihood to recommend the Smart Lancha Web-based Application to others for booking boat tickets.

Additional and Recommendation	Frequency	Percentage
Very likely	102	70.8%
Likely	34	23.6%
Neutral	6	4.2%
Unlikely	0	0
Very unlikely	2	1.4%
Total	144	100%

Table 10.0 present the Additional and Recommendation of the respondents. As can be seen on the table, there are respondents with 102 or 70.8% with “Very likely”. There are respondents with 34 or 23.6% with “Likely”. There are respondents with 6 or 4.2% with “Neutral “and there is no respondent for “unlikely”. There are respondents with 2 or 1.4% with “Very unlikely”. This implies that significant majority(70.8%) of respondents indicated they are "Very Likely" to recommend the app. This suggests a high potential for user adoption and positive word-of-mouth promotion. The open-ended question aimed to gather comments and suggestions for improving maritime travel services in Siargao Island received 66 responses. The analysis identified key themes: convenience and accessibility, with suggestions for online booking apps and maintaining traditional methods; safety, with calls for stricter protocols, regular maintenance, and priority seating for vulnerable groups; technological integration, emphasizing user-friendly web applications and online payment options; customer service and comfort, highlighting the need for excellent service, free snacks, Wi-Fi, and enhanced comfort on long journeys; and affordability, with some suggesting lower ticket prices or discounts for specific groups like students.

Overall, the responses provided valuable insights into areas for improvement in maritime travel services in Siargao Island. By addressing the suggestions and recommendations outlined by participants, stakeholders can work towards enhancing the overall travel experience and ensuring the safety, convenience, and satisfaction of passengers.

**VI. CONCLUSION AND RECOMMENDATION**

**6.1 Conclusion**

In conclusion, this study sheds light on the challenges and inefficiencies present in the maritime travel services of Siargao Island, Philippines, and proposes solutions to enhance the overall experience for passengers. Through an examination of current practices and user preferences, it becomes evident that there is a pressing need for improvements in various aspects of the maritime travel system. The findings highlight the importance of addressing issues such as limited information availability, long waiting times, and the lack of transparent pricing. The proposed Smart Lancha Web-based Application emerges as a promising solution, with strong user support and potential for widespread

adoption. Furthermore, the study underscores the significance of continued investment by the local government in enhancing maritime travel infrastructure to meet the needs and expectations of residents and visitors alike. Ultimately, by implementing the recommendations outlined in this study, stakeholders can work towards creating a more efficient, user-friendly, and sustainable maritime travel system in Siargao Island.

## 6.2 Recommendation

Based on the findings of this study, several recommendations are proposed to improve maritime travel services in Siargao Island. Firstly, the local government should prioritize investment in upgrading infrastructure and implementing modern technologies to enhance the efficiency and convenience of boat ticketing systems. This could include the development and promotion of the proposed Smart Lancha Web-based Application, providing users with real-time schedule updates, online booking options, and transparent pricing information. Additionally, efforts should be made to streamline boarding processes and improve communication regarding delays or cancellations. Furthermore, collaboration between government agencies, boat operators, and tourism stakeholders is essential to ensure the sustainable development of maritime travel services in the region. Lastly, ongoing monitoring and evaluation of the implemented interventions are crucial to identify any further areas for improvement and to adapt strategies as needed. By implementing these recommendations, Siargao Island can establish itself as a model for efficient and user-friendly maritime travel, enhancing the overall experience for residents and visitors alike while contributing to the sustainable growth of the local tourism industry.

## VII. ACKNOWLEDGMENT

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