

Revolutionizing the Rental Services in Siargao Island: Basis for Developing an Online Vehicle Rental Management System

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Abstract: *The research paper addresses the inefficiencies faced by tourists and local rental service providers in the vehicle rental sector of Siargao Island in the Philippines. Despite the thriving tourism industry in the island, the current manual processes for vehicle rentals are fraught with challenges such as unreliable service, booking difficulties, and inefficient fleet management. This study aims to bridge the gap between these traditional practices and modern technological solutions by proposing an online vehicle rental management system designed to streamline operations and enhance customer experience. Using a mixed-methods approach, the exploration integrates qualitative insights from ethnographic studies and interviews while quantitative data from the surveys targeting tourists, residents, and rental service providers. This methodology enables a thorough understanding of the operational challenges and user needs within the rental ecosystem. The findings revealed significant inadequacies in manual booking thus highlighting a strong demand for an automated and user-friendly online platform. The proposed system incorporates advanced system software to automate bookings, optimize fleet management, and provide real-time updates and notifications by enhancing operational efficiency, reducing errors, and improving service reliability. Additionally, it seeks to empower local rental businesses through provision with tools to manage their operations more effectively and compete in the digital age. The research underscores the potential of the proposed system to revolutionize rental services in Siargao Island by improving accessibility, convenience, and customer satisfaction. The future implementation of this online platform is expected to contribute significantly to the sustainable growth of Siargao's tourism industry, ultimately benefiting tourists, local businesses, and the broader community.*

Keywords: the proposed online system, Siargao Island, Vehicle rental, Online platform, Rental management system, Tourism, Technological solutions, Digital transformation, User-friendly interface

I. INTRODUCTION

Siargao Island, renowned for its natural beauty and tourism, faces issues with inefficient and unreliable rental services, causing difficulties for tourists in finding available vehicles and for rental providers in managing bookings and reaching customers. It is for this reason that this research identifies a significant gap between the current manual rental processes and available technological advancements. This situation emphasizes the need for a centralized online platform to modernize and optimize vehicle rental services on the island. Siargao's unique geography and thriving tourism industry make it an ideal location to study rental dynamics and implement innovative solutions. The development of the proposed vehicle rental management system involves integrating advanced system software and algorithms to automate booking processes, and optimize fleet management.

Driven by the need to enhance the rental experience for tourists, residents, and rental service providers, the research aims to revolutionize rental services on Siargao Island through the proposed system. By introducing this online platform, the study seeks to simplify the rental process, improve accessibility and convenience for tourists, and empower local rental businesses to enhance their efficiency and competitiveness. Ultimately, the goal is to contribute to

the sustainable growth of Siargao's tourism industry, creating a more enjoyable experience for all stakeholders involved.

II. AIM AND OBJECTIVES OF THE STUDY

The aim of this study is to investigate the current challenges within the rental services sector in Siargao Island. The gathered insights served as the foundation for developing a vehicle rental management system that enhance the efficiency, sustainability, and overall user experience within the island's transportation services. Moreover, the proposed online system is envisioned to revolutionize rental services on Siargao Island by not only enhancing operational efficiency but also promoting sustainability and elevating the overall user experience.

The objectives of the study can be formulated as follows:

- To investigate the existing manual processes and operational challenges within vehicle rental businesses in the island of Siargao.
- To propose the development of an online vehicle rental management system.
- To formulate comprehensive recommendations for the improvement of the rental services provided in Siargao island.

III. RELATED LITERATURE

The development of vehicle rental management systems has been a focal point in various studies, addressing the inefficiencies and complexities associated with traditional manual processes. The research by Unihomes highlighted the challenges in managing vehicle rentals manually such as prolonged processing times and booking errors. The proposed solution involves implementing a computerized membership management system using tools like Microsoft Visual Studio, Crystal Reports, and MySQL. This shift to a digital, database-driven approach aimed to streamline operations and reduce errors, demonstrating the potential benefits of an integrated digital system [1].

Similarly, a study focused on the car rental industry in Lampung proposed a web-based information system to manage the borrowing and returning of cars. This system was designed to replace manual records with a more efficient digital process, leveraging PHP and MySQL for development. The new system aimed to reduce the time, energy, and materials wasted in manual record-keeping, thereby enhancing operational efficiency [2] [8]. This aligns with the objectives of the proposed online system, which seeks to modernize Siargao Island's vehicle rental services by addressing similar inefficiencies.

In Malaysia, the EZGO project introduced a knowledge-based model for a smartphone application to improve the vehicle rental system. This digital solution provided users with a platform to search for and reserve vehicles, offering substitutes when the preferred option was unavailable. The study utilized an agile approach and UML diagrams for system design, indicating the importance of flexible and user-centric development methodologies in creating effective rental management systems [3].

The necessity of an online, fully integrated car rental system is further emphasized in research that aimed to automate manual procedures through a web-based platform. This system allowed customers to reserve vehicles from anywhere, detailing the type and location of the car they wished to hire. The goal was to enhance convenience and accessibility for users, ensuring that the service could be utilized globally [4].

Moreover, future-oriented studies have explored the role of advanced technologies in optimizing vehicle rental logistics. Innovations such as autonomous driving and on-demand rentals are anticipated to revolutionize the industry by improving customer satisfaction and fleet utilization. Although these technologies are not yet widespread, their potential impact underscores the importance of continuous technological advancement in the rental sector [5].

Other research focused on enhancing the user experience and operational efficiency through digital platforms. For instance, a study on SINAR XBZ's vehicle rental service aimed to create a website that simplified the rental process for both owners and tenants, thereby increasing revenue and customer satisfaction. This study utilized descriptive methods and direct interviews to understand the specific needs and preferences of users, highlighting the value of user-centered design in developing rental management systems [6].

The integration of notification technologies, such as SMS alerts, into car rental systems has also been explored. A web-based system that sends automatic alerts to customers about car availability can significantly reduce operational costs and improve customer service. This system was positively received in user acceptance testing, indicating that such features are beneficial for both customers and rental agencies [7].

The research conducted on Ezzy Car Rental demonstrated the effectiveness of an online management system in enhancing business operations. The system, developed using PHP and MySQL, included modules for clients and administration, and was praised for its user-friendly interface and performance. This study underscored the importance of interactive and efficient digital platforms in the car rental industry [9].

Finally, the importance of customer relationship management (CRM) and customer experience management (CEM) in vehicle rentals has been highlighted in the studies. These studies found that elements such as data management systems, online services, and strategies to build customer loyalty are critical for service quality. The development of mobile applications for car rentals was recommended to improve customer satisfaction and operational efficiency [10] [11].

IV. METHODOLOGY

4.1 Research Approach

The mixed-methodology research approach was employed in this study to comprehensively investigate the dynamics of rental services in Siargao Island, as both qualitative insights and quantitative data are imperative to fully understand the intricacies of the existing transportation ecosystem and to inform the development of the proposed online vehicle rental management system.

4.2 Research Design

The descriptive research design incorporates a qualitative phase, employing ethnographic studies and case studies to delve deep into the perspectives and challenges of various stakeholders in Siargao Island's transportation ecosystem. Through in-depth interviews and observations with local rental service providers, tourists, and residents, the study investigates the nuances of rental services, including pricing, availability, and customer preferences. Additionally, by analyzing both effective and ineffective rental service management systems in similar tourist destinations, to extract valuable insights and lessons learned to guide the proposed online system.

The online survey had quantitatively assessed the demand for rental services and preferences for vehicle types and usage frequency targeting tourists, residents, and rental service providers. Furthermore, the study assessed stakeholders' readiness to embrace an online management system. Utilizing statistical analysis techniques such as frequency distribution, computed weighted mean score, standard deviation, and ranking, the study identified patterns and correlations within the collected data, providing a robust foundation for evidence-based decision-making in the development and implementation of the proposed the proposed online system.

4.3 Research Instrument

The researchers utilized Google Form as the primary platform to gather data efficiently and reach a wider audience. Through this online survey platform, the researchers aimed to collect valuable insights from tourists, residents, and rental service providers in Siargao Island. The user-friendly interface of Google Form enables respondents to easily provide feedback on rental needs, preferences, and willingness to adopt an online management system. This digital approach ensures convenience for participants and facilitates the seamless collection and analysis of data for informed decision-making.

4.3.1 Survey Questionnaire

The researcher employs a questionnaire comprising both open-ended and closed-ended questions, which undergo a validation process to ensure its credibility. The survey questionnaire covers various aspects crucial to understanding the rental service ecosystem and the potential for implementing the proposed online system. Firstly, gathered respondent profiles to contextualize their perspectives. Then, delved into the challenges of existing manual processes, including booking, billing, communication, and fleet management.

Next, explored the features and functionalities of the proposed online system, seeking input on its potential usability and effectiveness in addressing these challenges. Finally, invited comprehensive recommendations from respondents, encouraging suggestions for improvement and refinement of the the proposed online systemsystem to better suit the needs of users and operators in Siargao Island.

4.3.2 Interview

The researchers conducted an interview with the owners of Siargao Car Rental Services, who serves as both the system administrator and rental service provider. This interview aims to gain valuable insights into the operational dynamics and requirements of the rental service from a managerial perspective. The interview explores the experience with current manual processes, operational challenges, and aspirations for improving efficiency and customer satisfaction. Additionally, it discusses their expectations and preferences regarding the features and functionalities of the proposed online system, as well as their role as the system administrator. By understanding their perspective as a key stakeholder overseeing the system's operation, the researcher ensures that the proposed online system is tailored to meet the specific needs and objectives of Siargao Car Rental Services while enhancing the overall rental experience on the island.

4.4 Participants of the Study

For this study, the researcher has identified three key participant groups: tourists, residents, and rental service providers. As target respondents, their insights are invaluable in shaping the development of the proposed online system, an online vehicle rental management system tailored to the needs of Siargao Island. The perspectives of tourists provide crucial input into rental preferences and experiences, while residents offer insights into local transportation needs and community dynamics. Additionally, rental service providers play a pivotal role in understanding operational challenges and requirements.

4.5 Sampling Method

In this study, the researcher employs a random sampling technique as the sampling method. This approach ensures that every member of the population being studied has an equal chance of being selected for participation. By randomly selecting participants from the population of interest, the study aims to minimize bias and ensure that the sample represents the broader population of tourists, residents, and rental service providers on Siargao Island.

4.6 Data Gathering Procedure

The data gathering procedure in this study involves the utilization of a comprehensive questionnaire consisting of both open-ended and closed-ended questions. Prior to deployment, the questionnaire undergoes a rigorous validation process to ensure its credibility and effectiveness in capturing the necessary insights.

To select participants, a random sampling technique is employed, ensuring that every member of the target population has an equal chance of being included in the study. Google Forms serves as the primary research instrument, facilitating the efficient collection of data from participants across various demographics.

4.7 Data Analysis

This study adopts both quantitative and qualitative data analysis to comprehensively explore the research objectives. For qualitative data, content analysis was employed to systematically examine and interpret the textual data collected from interviews, observations, and open-ended survey responses. This method allows for the identification of recurring themes, patterns, and insights within the qualitative data, providing a rich understanding of the perspectives and experiences of participants regarding rental services on Siargao Island. For quantitative data, the measure of central tendency using weighted mean is utilized to analyze numerical data obtained from closed-ended survey questions and quantitative measurements. This statistical method calculates the average value of a set of data, considering the relative importance or frequency of each response. By calculating weighted means, the analysis provides a concise summary of the central tendencies within the quantitative data, offering insights into trends, preferences, and attitudes of the participants towards rental services and the proposed online system. Table 1.0 provided the interpretation of range the

weighted mean which is essential to determine the level of assessment among the respondents on the current rental system in the island.

TABLE 1.0 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)

V. RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the data gathered from participants' responses to the specific questions posed in the study. The findings are categorized and discussed according to the qualitative and quantitative data analysis methods employed.

5.1 Demographic Profile of the Respondents

TABLE 2.0 PROFILE OF THE RESPONDENTS IN TERMS OF GENDER

Gender	Frequency	Percentage %
Male	10	37
Female	17	63
Total	27	100

Table 2.0 depicts the breakdown of participants by gender. Notably, a majority of respondents are female, constituting 17 individuals or 63%, while 10 individuals or 37% are male. This suggests that the predominant interest in the development of the proposed online system comes from female respondents.

TABLE 3.0 PROFILE OF THE RESPONDENTS IN TERMS OF CLASSIFICATIONS

Classifications	Frequency	Percentage %
Local Residents	23	85
Local Tourists	1	4
Foreign Tourists	3	11
Total	27	100

Table 3.0 illustrates the profile of respondents based on classifications. Notably, the majority of participants are locals, comprising 23 individuals or 85%, followed by 1 individual or 4% identified as local tourists, and 3 individuals or 11% identified as foreign tourists. The findings suggest that the majority of respondents are local residents, with a small proportion being local tourists and foreign tourists, indicating a predominantly local interest in the surveyed area.

TABLE 4.0 PROFILE OF THE RESPONDENTS IN TERMS OF THE NUMBER OF YEARS INVOLVED IN THE VEHICLE RENTAL BUSINESS ON SIARGAO ISLAND.

No. of Years	Frequency	Percentage %
Less than 1 year	15	56
1-3 years	5	19

3-5 years	1	4
More than 5 years	6	22
Total	27	100

Table 4.0 indicates that a significant majority, 56%, have been involved in the vehicle rental business on Siargao Island for less than 1 year, suggesting a relatively new and possibly rapidly growing industry, with 18% having 1-3 years of experience, 4% with 3-5 years, and 22% with over 5 years of involvement.

5.2 The Assessment of the Existing Manual Processes and Operational Challenges within the Vehicle Rental Businesses Siargao Island

TABLE 5.0 FACTORS THAT INFLUENCE THE RESPONDENTS’ ASSESSMENT OF THE EXISTING MANUAL PROCESSES AND OPERATIONAL CHALLENGES WITHIN THE VEHICLE RENTAL BUSINESSES.

Factors	Statement	WM	Category Value	Description
Booking and Reservation	The manual booking and reservation process are time-consuming and inefficient.	4.74	4.72	Strongly Agree
	There are frequent errors or discrepancies in booking details due to manual recording.	4.70		
	The manual handling of sensitive customer information poses security risks.	4.70		
Billing and Payment	The manual billing and payment process are time-consuming and inefficient.	4.67	4.67	Strongly Agree
	There are frequent errors or discrepancies in invoices and payment records due to manual handling.	4.63		
	Customers expect convenient and secure payment methods, which the manual system fails to provide.	4.70		
Communication and Coordination	Manual communication and coordination processes are time-consuming and inefficient.	4.67	4.72	Strongly Agree
	There are frequent errors or misunderstandings in communication due to reliance on manual methods.	4.74		
	Customers expect prompt, seamless communication channels, which the manual system fails to provide.	4.74		
Fleet Management	Manual fleet management processes are time-consuming and inefficient.	4.63	4.75	Strongly Agree
	There are frequent errors or discrepancies in vehicle records and scheduling due to reliance on manual methods.	4.78		
	It is challenging to track and manage vehicle maintenance schedules manually, leading to potential safety and reliability issues.	4.85		
	AVERAGE WEIGHTED MEAN SCORE		4.72	Strongly Agree

Table 5.0 suggests that the existing manual processes in Fleet Management hold the highest perceived value, rated at WM= 4.75, followed closely by Communication and Coordination at WM= 4.72, Booking and Reservation at WM=4.72, and Billing and Payment at W=4.67. The findings underscore the critical importance of improving existing manual processes in Fleet Management, given the significant time-consuming inefficiencies, frequent errors or discrepancies in vehicle records and scheduling, and the challenge of tracking and managing vehicle maintenance schedules manually, highlighting the pressing need to enhance efficiency, accuracy, and safety in this category.

TABLE 6.0 EFFICIENCY IMPACT OF RENTAL SERVICES PROVIDED IN SIARGAO ISLAND

Efficiency Impact	Frequency	Percentage %
Extremely	12	44
Significantly	8	30
Moderately	4	15
Slightly	2	7
Not at all	1	4
Total	27	100

Table 6.0 illustrates the efficiency impact of rental services in Siargao Island, as perceived by 27 respondents, indicates that 44% find it extremely impactful, 30% find it significantly impactful, 15% find it moderately impactful, 7% find it slightly impactful, and 4% find it not impactful at all.

TABLE 7.0 THE IMPACT OF CHALLENGES ON THE SUSTAINABILITY OF VEHICLE RENTAL BUSINESSES IN SIARGAO ISLAND

Challenges Impact	Frequency	Percentage %
Positively	27	100
Negatively	0	0
No impact	0	0
Total	27	100

Table 7.0 exemplifies the challenges affecting the sustainability of vehicle rental businesses in Siargao Island, as indicated by 27 respondents, have a unanimous positive impact, suggesting potential areas for improvement and adaptation within the industry.

TABLE 8.0 IMPORTANCE OF COLLABORATION WITH LOCAL AUTHORITIES AND TOURISM ORGANIZATIONS

Importance of Collaboration	Frequency	Percentage %
Extremely important	15	56
Very important	11	41
Moderately important	0	0
Somewhat important	1	4
Not important	0	0
Total	27	100

Table 8.0 shows the collaboration between vehicle rental businesses in Siargao Island and local authorities and tourism organizations is deemed extremely important by 56% of the 27 respondents, with an additional 41% considering it very important, underscoring its critical role in enhancing the island's tourism infrastructure and sustainability.

5.3 The Proposed Online Vehicle Rental Management System

TABLE 9.0 USER-FRIENDLY INTERFACE IMPACT

User-Friendly Interface Impact	Frequency	Percentage %
Extremely important	14	52

Very important	12	44
Moderately important	0	0
Somewhat important	1	4
Not important	0	0
Total	27	100

Table 9.0 illustrates that ensuring a user-friendly interface is crucial for the majority of the 27 respondents, with 52% deeming it extremely important and 44% considering it very important, highlighting its paramount significance for enhancing user experience.

TABLE 10.0 FEATURES AND FUNCTIONALITIES OF THE PROPOSED ONLINE SYSTEM TO IMPROVE THE OVERALL USER EXPERIENCE

Features of the proposed online system	Frequency	%	Rank
Online booking and reservation feature	26	12	1
Automated communication with customers (e.g., SMS, email)	26	12	2
Real-time vehicle tracking	26	12	3
Vehicle inspection and maintenance scheduling	26	12	4
Digital rental agreements and invoices	24	11	5
Integration with payment gateways	24	11	6
Customer reviews and ratings system	23	10	7
Integration with GPS navigation services	23	10	8
Multi-language support	22	10	9
Other	6	3	10
Total	226	100	

Table 10.0 shows the features of the proposed online system and that would enhance the overall user experience these include: Online booking and reservation (12%), Automated communication (12%), Real-time vehicle tracking (12%), Vehicle inspection and maintenance scheduling (12%), Digital rental agreements and invoices (11%), Integration with payment gateways (11%), Customer reviews and ratings system (10%), Integration with GPS navigation services (10%), Multi-language support (10%), and considering additional features suggested by 3% of respondents.

5.4 System Development Process of the Proposed Online Vehicle Rental Management System.

The system's development architecture is depicted in Figure 1.0. It illustrates the process of web application architecture that logically defines the relationships and manner of interactions among all these components for a web app, such as the user interface, a login screen, the database, etc.

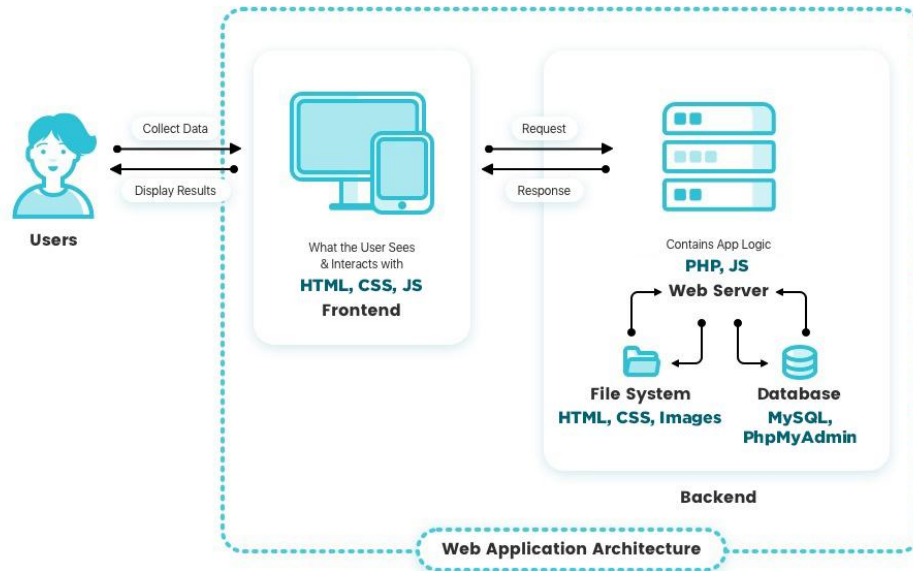


Fig. 1. Web Application Architecture of the Proposed System

The system interfaces are created with HTML (Hyper Text Markup Language) and CSS (Cascading Style Sheet), while MySQL is employed for database manipulation and access. PHP and jQuery are utilized for coding the system.

VI. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

In conclusion, the research sheds light on the crucial role of technology in addressing the longstanding challenges within Siargao Island's rental service ecosystem. Through a meticulous blend of qualitative and quantitative methodologies, the study unearthed inefficiencies plaguing manual rental processes, illuminating the pressing need for innovation and streamlining. The demand articulated by both tourists and residents for an online management system like the proposed online vehicle rental management system underscores its potential to revolutionize the rental landscape, offering not only efficiency gains but also an elevated user experience characterized by user-friendly interfaces and seamless booking functionalities.

Furthermore, the research underscores the essential role of collaboration among vehicle rental businesses, local authorities, and tourism organizations in fostering holistic improvements in Siargao's rental service landscape. By embracing the recommended strategies for enhancing the proposed online system's adoption and implementation, stakeholders can collectively contribute to fortifying the island's transportation infrastructure and enhancing the overall tourism experience. Thus, the research serves as a tool for an innovative change, revolutionizing Siargao's rental services, and charting a course towards a more sustainable and user-friendly transportation ecosystem.

6.2 Recommendations

Based on the results of the study, there are several recommendations to ensure the successful adoption and implementation of the proposed online system by vehicle rental businesses in Siargao Island.

The proposed online system should be available whenever needed, serving both locals and visitors accurately. Ensuring precise info and verifying users and drivers are vital. Good internet and proper hardware may be necessary, along with following local rules and keeping data safe. To encourage the adoption and getting more people using the proposed online system within the Siargao community, highlight its reliability and quick service. There should be awareness of its benefits, like being convenient and affordable, and offer discounts to encourage people to try it. Make sure vehicle rental businesses know how to use it well by providing thorough training and support. These steps can make the proposed online system a top choice for transportation on the island for both locals and visitors.

By implementing these recommendations, the proposed online system can build trust and make getting around the island smoother for everyone while Siargao Island can enhance its rental services, streamline operations, and provide a better experience for both residents and tourists, ultimately contributing to the island's sustainable tourism development.

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