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# Car Rental Information System Using The Waterfall Method In One Of The Car Rental Companies

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**Abstract**

*Car rental reservations are presently conducted only over WhatsApp. The absence of social media promotions has resulted in stagnant revenue for the company, and there is no established mechanism to streamline data collection and processing for the automobile rental industry. This research seeks to facilitate online car rentals for clients and to deliver information to them effectively, efficiently, and accurately. Furthermore, it aims to augment the company's revenue substantially. The Waterfall software development methodology was selected to emphasise the systematic processes involved in creating this information system. This study seeks to develop and construct an effective car rental information system. The deployment of this car rental information system will enhance operational efficiency in handling rentals, expedite the borrowing and returning processes, and improve the overall user experience.*

**Keywords:** *Information Systems, Car Rental, Rental, Waterfall Method*

## Introduction

Car rental services offer daily or contractual rentals, either with drivers or for self-drive. This car rental solution can serve as a significant advancement for individuals lacking personal transportation for operational purposes. It is also advantageous for companies, as they do not incur supplementary expenses for transportation maintenance. The car rental industry is a lucrative enterprise intrinsically linked to services, as it enables individuals to start a business with a diverse fleet of vehicles. This enterprise also assists individuals requiring car rental services for various reasons, including those seeking a service provider in Bandung. Presently, reservations for car rentals at one firm are declining due to intense rivalry among service providers, and Borju Trans's promotional efforts are ineffective. Promotions are only executed through advertisements on social media platforms, namely WhatsApp. This promotional strategy is useless as only contacts view WhatsApp stories. Consequently, the volume of rental bookings at this organisation has not undergone substantial expansion.

To maintain competitiveness, a car rental company should contemplate the use of a web-based car rental management system (Setiawan et al., 2023). This system can automate procedures, optimise data management, and elevate customer service (Hariyanto et al., 2022; Setiawan et al., 2023). Customers can easily access available vehicles, schedule appointments, and finalize payments online, ensuring a seamless and comfortable experience (Hariyanto et al., 2022; Setiawan et al., 2023). This method allows firms to optimise fleet management and monitor reservations more efficiently (Setiawan et al., 2023; Wana et al., 2024). By optimising the rental process and utilising contemporary technology, a car rental firm can transform its conventional manual system into an agile, web-based platform that meets the requirements of both the organisation and its customers (Setiawan et al., 2023).

Moreover, one of the automobile rental firms ought to broaden its marketing techniques to engage a broader audience (Maulana et al., 2024; Wan Fariza Wan Abdul Rahman & Nur Izzan Nadia Binti Mohd Rusli,

2023). Although WhatsApp promotions have constraints, utilizing alternative social media platforms, search engine optimization (SEO), and paid digital advertising can significantly enhance visibility (Kurniawan & Sudarmilah, 2024; Maulana et al., 2024). Interacting with local communities via events and collaborations can foster significant connections and produce leads (Kurniawan & Sudarmilah, 2024; Wan Fariza Wan Abdul Rahman & Nur Izzan Nadia Binti Mohd Rusli, 2023). By understanding the target demographic and customizing marketing strategies to align with their needs and preferences, a car rental company can enhance its brand recognition and attract new clients (Saputra et al., 2024; Wan Fariza Wan Abdul Rahman & Nur Izzan Nadia Binti Mohd Rusli, 2023).

Ultimately, an automobile rental company may consider providing competitive pricing and packages, loyalty programmes, and referral incentives to attract and keep clientele (Saputra et al., 2024; Wan Fariza Wan Abdul Rahman & Nur Izzan Nadia Binti Mohd Rusli, 2023).. Incentives and rewards for returning customers can foster loyalty and encourage ongoing patronage. Partnering with local enterprises, such as hotels and tourism destinations, to offer joint promotions can expand access to new clients. By prioritizing client happiness and delivering a flawless rental experience, a vehicle rental company can establish a robust reputation and achieve substantial growth in the car rental market.

**Information Systems**

Oktaviani & Sari (2025) define an Information System as an amalgamation of personnel, infrastructure, technology, media, procedures, and controls intended to create essential communication pathways, routinely process specific transactions, inform management and others of critical internal and external occurrences, and serve as a basis for decision-making.

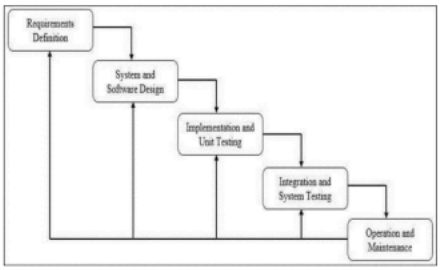
**Car Rental**

As stated by Pramoedya Ananta Dzikri et al., (2024), car rental constitutes a service that provides daily or contractual rentals, available with either driver or self-drive alternatives. This car rental solution can

serve as a significant advancement for individuals or companies lacking mobility for operational purposes.

**Waterfall Method**

Widya Bintari et al., (2024) asserts that the waterfall technique comprises primary phases that represent essential development tasks. The waterfall model comprises five phases: requirement analysis and definition, system and software design, implementation and unit testing, integration and system testing, and operation and maintenance.




1. Analysis and Definition of Requirements: Define the system's characteristics, limitations, and goals by engaging with system users. All these aspects will be explicitly delineated and will constitute the system specs.

2. The System and Software Design team will develop a system architecture according to the specified specifications. This step also entails identifying and illustrating the fundamental abstractions of the software system and their interrelations.

3. The implementation and unit testing will actualize the outcomes of the software design as a collection of programs or program units. Every unit will undergo testing to verify compliance with its requirements.

4. Integration and System Testing will combine each programme unit and evaluate them as a cohesive system to verify compliance with the established requirements. Subsequently, the system will be provided to the users.

5. Operation and Maintenance will encompass the installation of the system and its subsequent activation. This step also encompasses rectifying faults not detected during the development stage. Additionally, system development will occur, including the incorporation of new features and functionalities.

To resolve this issue, a car rental company must develop a web-based information system to facilitate online car search and rental for customers. This technology will provide consumers with an efficient car rental process and precise details about the vehicles they intend to reserve. The author aims to develop a web-based car rental information system in response to the aforementioned challenge. This system will function successfully and efficiently, providing rapid, precise, and dependable information for the vehicle rental company while broadening the scope of car rental promotions, thereby enhancing bookings.

**Research Method**

The study will utilise the Waterfall software development process, noted for its systematic and linear framework. This methodology has various phases: requirements analysis, system design, implementation, testing, deployment, and maintenance. The project will commence with a comprehensive requirement study to collect vital information from stakeholders, including existing customers and corporate personnel. This phase will determine the precise requirements for the online automobile rental system, focusing on user needs, data management, and operational efficiency.

During the system design phase, the architecture of the automobile rental information system will be formulated. This entails creating an intuitive interface that enables clients to explore available automobiles easily, make reservations, and complete online payments. The backend system will be designed to facilitate effective data management, encompassing the storing and retrieval of client information, rental history,

and vehicle availability. The design will include promotional and marketing capabilities, allowing the organisation to engage a broader audience via diverse digital media.

Upon the system's implementation, comprehensive testing will be performed to verify that all functionalities operate as intended. This will encompass unit testing, integration testing, and user acceptability testing to discover and resolve any issues prior to release. Upon validation of the system, it will be deployed, and a maintenance plan will be established to accommodate future upgrades or enhancements. This holistic strategy aims to establish a proficient automobile rental information system that optimizes operational efficiency, enhances customer experience, and ultimately increases the company's income through improved service delivery and broader market penetration.

## Result and Discussion

### System Analysis and Design

#### a) Business Process Analysis

The subsequent outline delineates the existing business process flow of Car Rental.




Figure 1. Rental Process

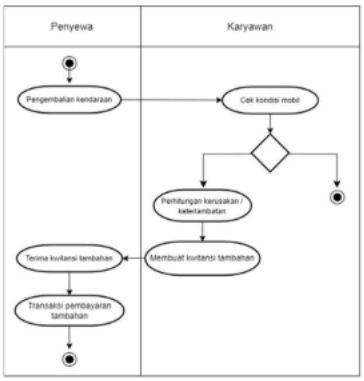



Figure 2. Return Process

**b) New System Proposal**

**i. Usecase Diagram**

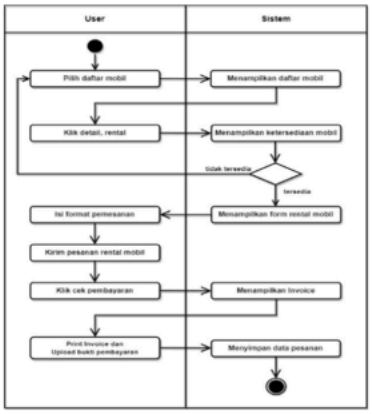



**ii. Scenario Table**

| | |
|---|---|
| **Usecase** | Registration |
| **Actor** | Customer |
| **Pre Condition** | Displaying the registration page |
| **Post Condition** | The system displays the login page |
| **Main Flow Event** | |
| **Actor Action** | **Sysrem Resoonse** |
| 1. Enter customer data | |

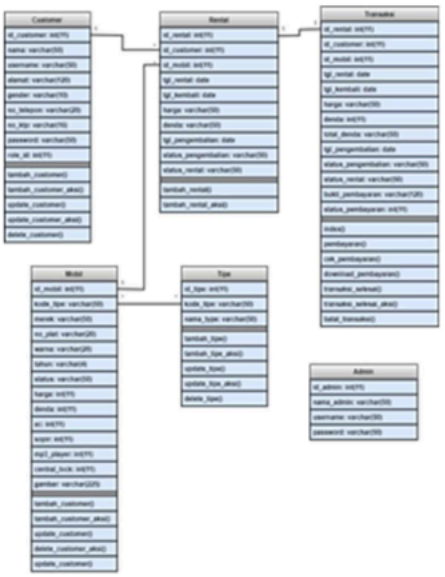
| | |
|---|---|
| 2. Press the register button | |
| | 3. Connection to the database |
| | 4. Display the login page |

**iii. Activity Diagram**




**c) System Design**

**i. Database Design**



| Field | Type Data | Size | Key |
|---|---|---|---|
| id_admin | int | 11 | * |
| nama_admin | varchar | 50 | |
| username | varchar | 50 | |
| password | varchar | 50 | |

### ii. Interface Design




**Figure 3. Admin Dashboard Page Design**

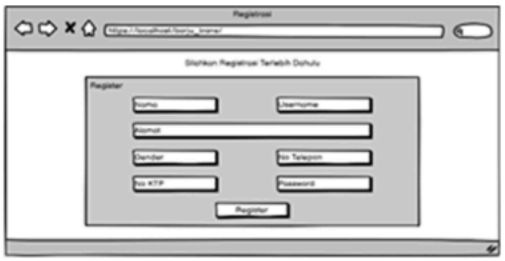


**Figure 4. Registration Page Design**

### iii. System Implementation

System implementation is the phase of executing a designed and developed system, enabling it to function and be utilised by its users.




**Figure 5. Login Page View**

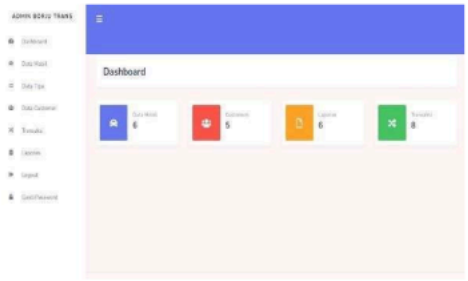



**Figure 6. Admin Dashboard Page View**

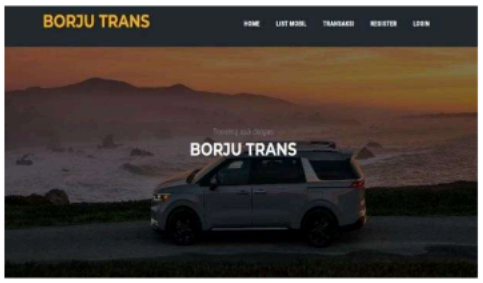



**Figure 7. Main Menu Display**

## Conclusion

The research findings on the online Car Rental Information System demonstrate that the administration of rental and return data is effectively integrated, leading to enhanced accuracy of information. The web-based car rental system has been successfully established, allowing clients to access information via the website without constraints of space and time. This system can swiftly and reliably generate reports and contains an extensive menu that includes options for inputting vehicle data, categorising automobile kinds, and indicating rental status (available or unavailable), facilitating superior control of rental information.

The web-based Car Rental Information System developed is highly efficient and fulfils the specified objectives. Nonetheless, additional advancement would be advantageous by evaluating alternative methodologies for the online automobile rental system to get superior outcomes.

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