Computational Design: Journal of Modern Informatics

Vol. 1, No. 1, March 2026, pp. 21-31

DESIGN OF WEB-BASED TRAVEL CAR RENTAL GOVERNANCE USING RESEARCH AND DEVELOPMENT METHOD

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(Received: January 1, 2026; Revised: March 1, 2026 March 15, 2026; Accepted: March, 27, 2026; Available online: March 31, 2026)

Abstract

The development of information technology has greatly influenced the development of the world of education and business, information technology has been able to change work governance within an organization. Designing a car rental information system to develop a web (website) with software engineering, using a web browser, internet network. which is expected to support the management of administrative data, and Lathifa travel car rental data. The purpose of this study was to produce a web-based information system using the PHP programming language and MySQL database to discuss the management of rental data, car data, customer data, return data and rental transactions at Travel Lathifa Maju Sentosa. This system was built using the descriptive Creswell research method that seeks to describe and interpret existing objects. Where the object under study is explained from the author's point of view. This system can make it easier for car rental owners to check rental data and assist in storing and processing tenant data. Keywords: Information System Design, Leasing, Web

Keywords: *Information System Design, Car Rental, Web-Based System*

1. INTRODUCTION

The rapid development of computer information technology has had an impact on the worlds of knowledge and business education; computer information technology has brought about changes and advancements in the fields of science and business. Developments in science and information technology have been able to influence and transform working practices across all fields of science and the business world, making them more effective, efficient and practical, and enabling their utilisation over time. Advances in computer science and information technology are now a primary necessity in driving business operations and organisations forward, for every institution, whether government or private, the progress of an institution or company can be seen in how computerised technology is utilised as a tool to solve problems or carry out tasks using application programmes—programmes created by users designed to perform specific tasks through software engineering, web applications that can be accessed via a web browser over the internet or an intranet (Utama and Sariana, 2019). In the utilisation of computer information technology within the education sector and the business world, various applications are required to manage governance or coordinate staff, and to manage administrative processes within a business organisation" (Irwanto et al.,

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2022). “A car rental system via a website can simplify the process of providing information about car rental services within a business sector or an enterprise operating in the field of transport services for the public” (Saputra and Darusalam, 2022). Customers are a vital component as users of car rental services, and they always expect to receive the best possible service. Therefore, evaluation and development are required in terms of service management or operations to ensure more optimal service delivery. One initiative undertaken in the management of the Travel Lathifa Maju Sentosa car rental business is the development of a computerised management information system to assist in the management of travel car rental services, which will ultimately result in smoother operations, easier service delivery, and well-organised data. Previously, there were challenges such as the loss of customer data, delays in vehicle delivery, vehicles not being returned on time, and payment systems not being properly maintained, amongst other issues. Thus, through the use of web-based information technology systems, all these problems can be resolved, thereby minimising errors. Car Travel Lathifa, located in Bukittinggi, is an organisation or company specialising in providing reliable car hire services in Bukittinggi, offering a variety of car makes. For both corporate and personal needs, we offer competitive and varied pricing without compromising on quality or service. However, to date, Lathifa Car Rental’s operational productivity has faced challenges in management due to the absence of a computerised management information system to oversee car rental operations. Another challenge faced by Lathifa Travel is the continued reliance on paper-based systems and manual record-keeping using physical ledgers, which makes it difficult for office management to record car rental data each time a customer arrives. There is also the risk of damage or loss of these rental ledgers, as car rental services are still conducted manually, requiring customers to visit Lathifa Maju Sentosa Travel in person. This is considered ineffective for car rental services, as Lathifa Travel is currently only able to provide car rental services to customers residing within the city; those located outside Bukittinggi are unable to use the services of Lathifa Maju Sentosa Travel. Based on the research conducted, the researcher aims to help address the existing issues in the management system by designing a Web-Based Car Rental Management System for Travel Lathifa Maju Sentosa. The objective is for this web-based car rental management information system to facilitate the management of all tenant data without any data redundancy. Furthermore, Travel Lathifa Maju Sentosa does not yet have an informative website, so information regarding travel rentals is currently only disseminated through word of mouth. Based on these issues, the author has developed a web-based information system as the subject of this research, titled “Design of a Web-Based Car Rental Management System for Travel Lathifa Maju Sentosa”, with the aim that this information system is expected to optimise

2. LITERATURE REVIEW

The development of information and communication technology has had a significant impact across various sectors, especially in business and education (Utama & Sariana, 2019). One of the widely developed applications is web-based information systems, which allow users to access services online conveniently and quickly. In the context of the car rental business, web-based information systems are crucial as they help manage vehicle data, customer data, transactions, and vehicle return information in a more organized and efficient manner (Irwanto et al., 2022).

Previous studies have shown that using a web-based information system for vehicle rental services can streamline operational processes while improving customer service quality (Pratama & Sariana, 2019). For instance, systems that offer online services reduce paperwork and manual recording, thereby minimizing the risk of data loss and recording errors (Saputra & Darusalam, 2022). Customers can register, select

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vehicles, and complete payment transactions online without needing to visit the rental office, widening service accessibility, especially for users outside the company's physical reach.

Another advantage is the system's ability to automatically generate transaction reports, aiding management in making faster and more accurate decisions. However, many car rental businesses have yet to fully adopt this technology, leading to issues such as delayed vehicle returns, inaccurate customer data, and poorly organized payment systems (Arifin, Mahendra, & Handayani, 2007). Hence, developing a web-based car rental management information system is not only an administrative tool but also a strategy to enhance competitive advantage in the digital era.

2.1 Conceptual Framework

The conceptual framework of this research focuses on developing a web-based car rental management system that facilitates effective and efficient management of renter data, vehicle data, rental transactions, and return data for Travel Lathifa Maju Sentosa. This system is designed using PHP programming language and MySQL database, allowing operations to be conducted online and in real-time. The goal is to transform the business process from a manual system to a computerized and automated system.

The framework integrates the principles of the Research and Development (R&D) methodology and the System Development Life Cycle (SDLC) to ensure a systematic development process starting from needs analysis, system design, implementation, to evaluation and refinement. This approach is essential to produce an information system product that meets user needs and real-world conditions (Halim, 2013).

Furthermore, this system is expected to address previous problems such as data loss risk, slow data processing, and service limitations restricted to local customers only (Pratama & Sariana, 2019). By utilizing web technology, the service becomes accessible to customers anytime and anywhere, improving marketing effectiveness and transaction convenience.

3. METHODOLOGY

3.1 Research Methods

This study employs the Research and Development (R&D) method combined with the descriptive research approach to design and develop a web-based car rental management information system for Travel Lathifa Maju Sentosa. The R&D method is chosen as it allows the systematic process of creating, testing, and refining a product—in this case, the information system—aimed at solving existing operational problems faced by the company.

3.2 Case Study Selection

Bukittinggi, a heritage tourism city in West Sumatra, Indonesia, was selected as the study area due to its historical significance, high tourism intensity, and limited environmental carrying capacity. The city's urban core, especially the areas surrounding major heritage landmarks, has experienced increasing pressure from hotel development over the past decade. The hotel project examined in this study represents a typical case of tourism-oriented urban investment in a dense historic environment. This case is analytically relevant because it meets formal licensing requirements while simultaneously generating public debate regarding spatial conformity and environmental impacts.

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This situation provides a suitable basis for assessing the presence of an administrative compliance gap. The study aims to explore how the implementation of a computerized management information system, such as the web-based car rental system developed for Travel Lathifa Maju Sentosa, can help address operational and management challenges in this context.

3.3 Data Sources and Collection

Data for this study were collected from both primary and secondary sources relevant to the car rental business in Bukittinggi, specifically focusing on Travel Lathifa Maju Sentosa. Primary data included observations, interviews, and direct interaction with the company's management and customers to understand the current manual data management processes and operational challenges. Secondary data involved reviewing existing documents, records, and literature on car rental management systems, information technology applications in business, and previous studies related to web-based rental systems.

The collected data were then classified and analyzed to identify key issues and design requirements for developing a web-based car rental management system. The objective of data collection was to obtain comprehensive information to support the design and implementation of an effective computerized system that could address the limitations of the current manual system.

3.4 Data Analysis

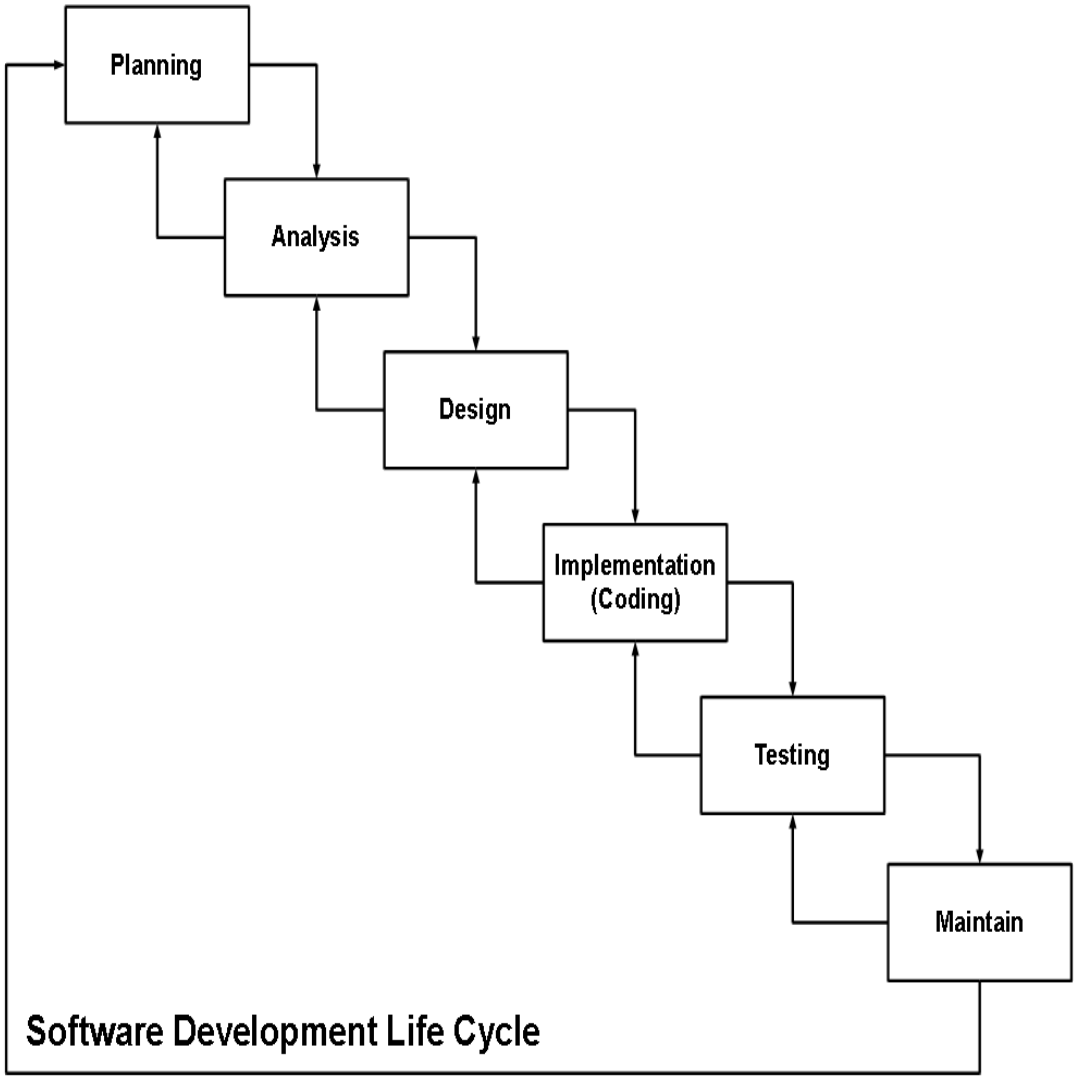
The collected data were analyzed using descriptive and comparative methods. Descriptive analysis provided a detailed understanding of the existing system and its limitations. Comparative analysis was used to relate theoretical frameworks and best practices in information systems to the observed situation, guiding the system design.

System Development Life Cycle (SDLC)

Following data analysis, the development of the information system followed the System Development Life Cycle (SDLC), which consists of several phases: planning, analysis, design, implementation, testing, deployment, and maintenance. Each phase was carefully executed to ensure the system meets functional requirements, facilitates efficient data management (including rental data, car data, customer data, transaction data, and return data), and resolves problems such as data redundancy and limited access.

The analysis employs descriptive methods, which provide a comprehensive explanation of the issues encountered. Comparative methods are used to compare existing theories with the practices observed in this study and to draw conclusions. Based on the results of the comparison, the System Development Life Cycle (SDLC) was applied. The research method used was the Research and Development (R&D) approach, a process for developing a product system, and the System Development Life Cycle (SDLC), which consists of seven sub-cycles, namely:

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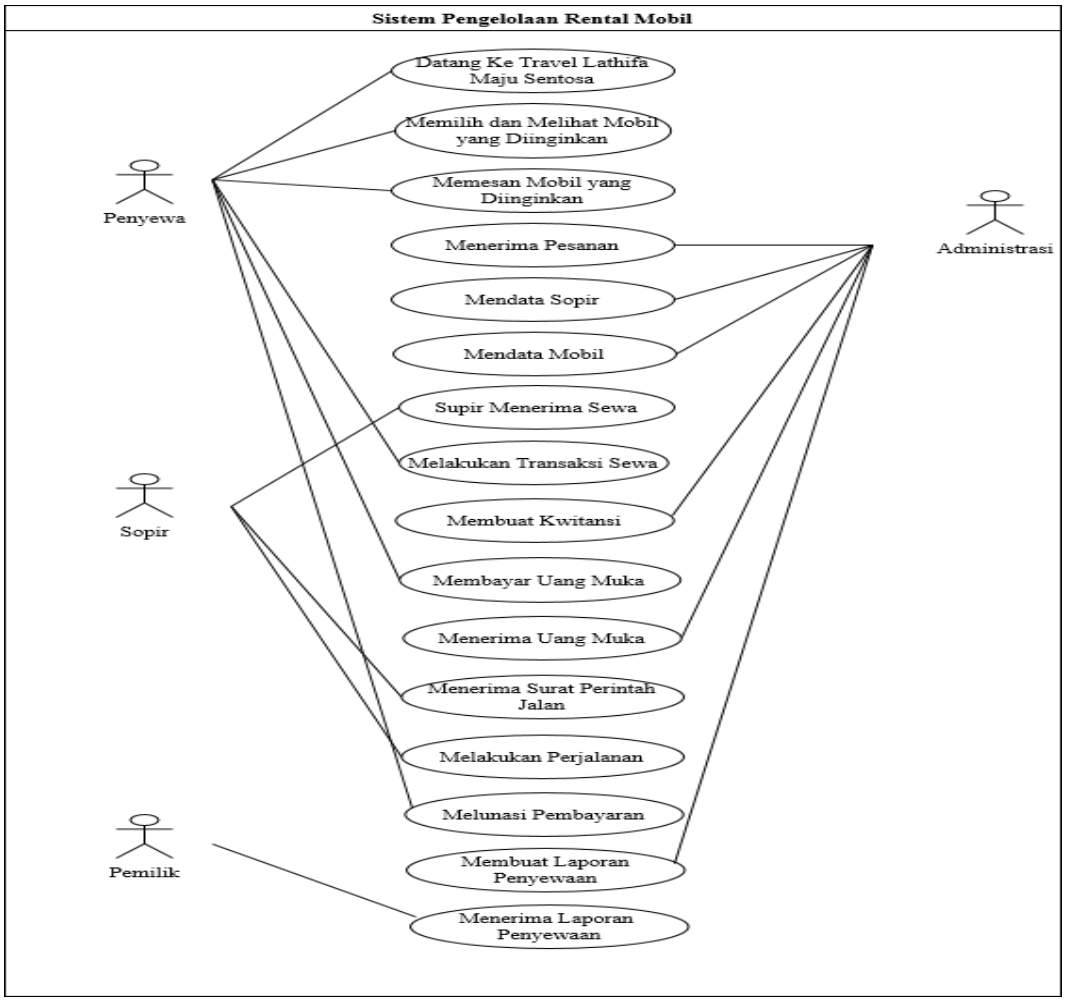


Gambar 3.1 System Development Life Cycle (SDLC)

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3.5 Analysis of the Current System

The purpose of this system analysis is to design a new system. The UML model is used to identify the relationship between users and the system, and to illustrate the interactions between the main actors (environment) in the process; this is expressed through a use case diagram containing verbs and is currently manual.

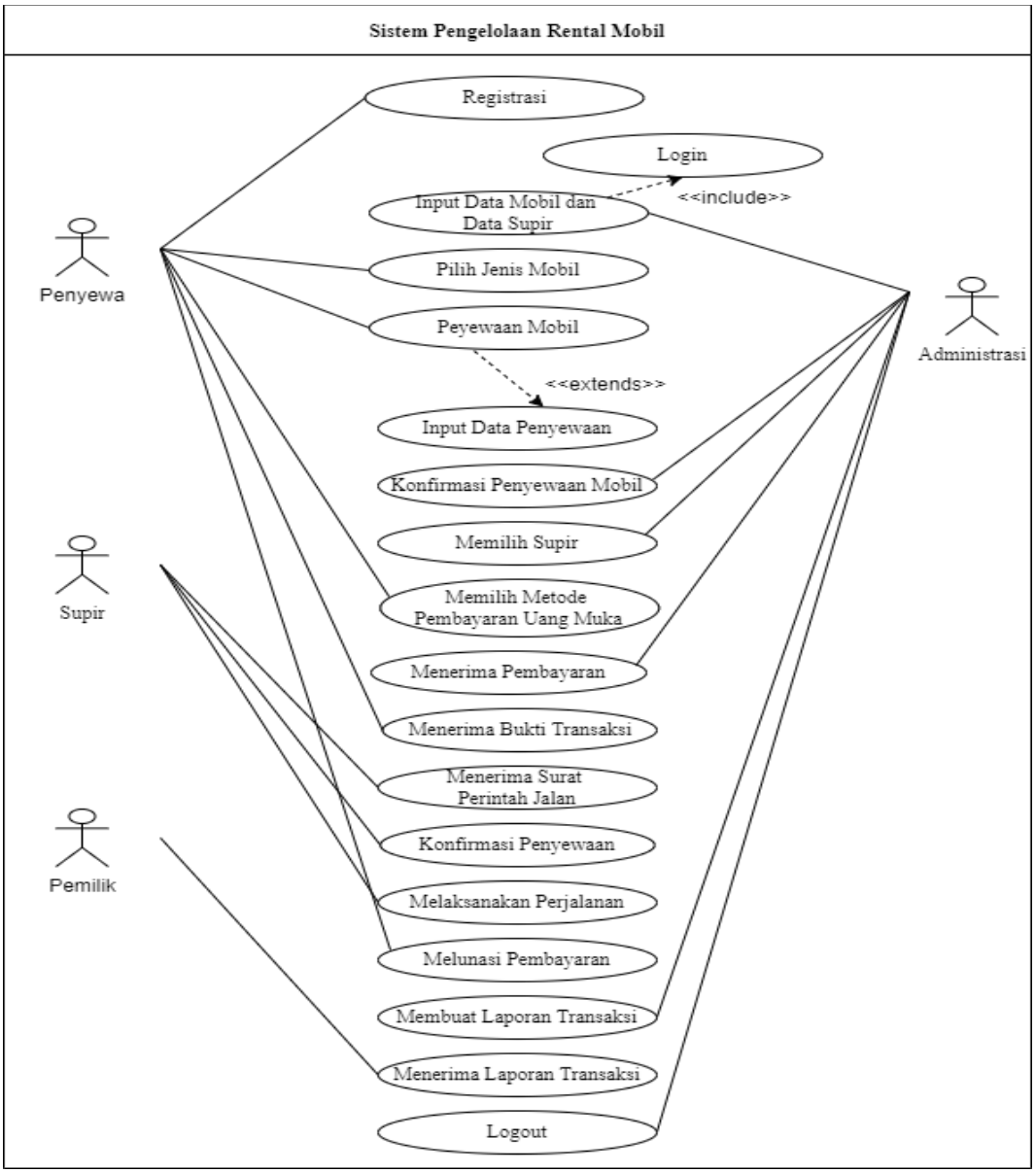


Ficture 4.2 ***Old Use Case Diagram***

3.6 Design of the New System

The new Use Case Diagram illustrates the processes carried out by actors, both manually and using the system.

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Ficture 4.3 N*ew Use Case Diagram*

4. RESULTS AND DISCUSSION

The development of the web-based car rental management system for Travel Lathifa Maju Sentosa has demonstrated significant improvements over the previous manual processes. Prior to the system implementation, the company relied heavily on manual data recording and paper-based ledgers, which posed numerous challenges such as data loss, inefficiency in record retrieval, and limited accessibility for customers outside Bukittinggi.

The newly developed system, which utilizes PHP programming language and MySQL database, successfully automates the management of rental transactions, customer data, vehicle information, return data, and overall rental operations. The use of the System Development Life Cycle (SDLC) method and Research and Development (R&D) approach ensured a structured development process and effective

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problem-solving through continuous iterations. UML modeling and use case diagrams facilitated the clear identification of system actors and their interactions, enabling a comprehensive design that addresses all business needs. The system supports essential functionalities such as registration, login, vehicle data input, driver data entry, transaction processing, and car return entry, which collectively streamline operational processes and enhance administrative efficiency. One key outcome is the system's ability to significantly reduce redundancy and errors in data management, which were common in the manual system. Furthermore, the development of a web-based platform expands service accessibility, allowing customers from outside the city to utilize car rental services without needing to visit the office in person. This feature is expected to broaden market reach and improve customer satisfaction.

The system also improves the dissemination of information related to rental services, which previously relied on word of mouth. The web-based system provides real-time access to up-to-date information regarding available vehicles, pricing, and rental conditions, thereby enhancing the user experience and operational transparency.However, the transition to a computerized system requires adequate training and adaptation from staff to fully leverage the system's capabilities. Future work may focus on integrating additional features such as payment gateways, automated booking confirmations, and mobile-friendly interfaces to further improve usability and customer engagement.

4.1 Input and Output Design

Input design refers to the display output by the system via the monitor screen, where input design constitutes the layout of the various data entry forms found on a website (Halim, 2013). Meanwhile, the output of a system is a crucial factor for users in determining whether or not to use the system.

1. Registration

Registration of customer details or car hire



Figure 4.8 Registration Input DesignLogin

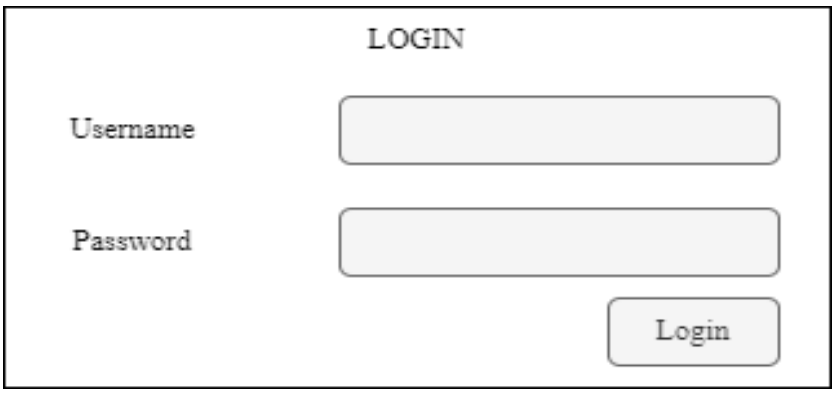


Figure 4.9 Login Input Design

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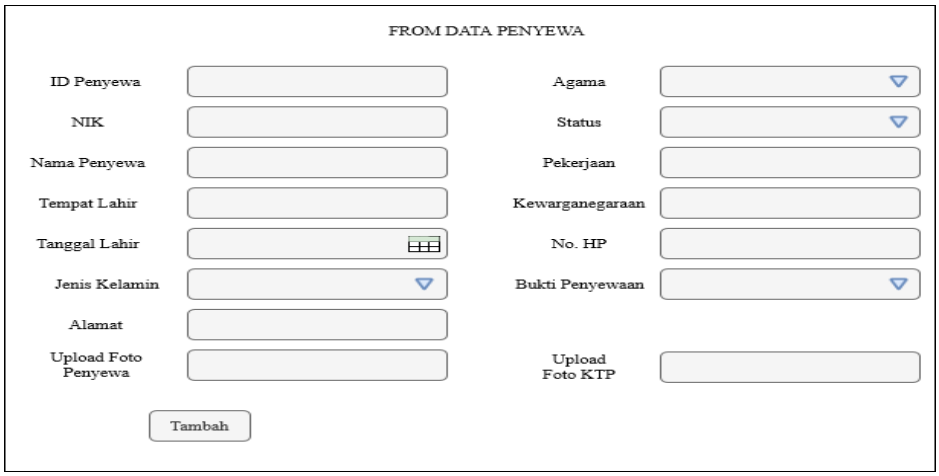


Figure 4.10 Tenant Data Input

1. **Vehicle Data Entry**

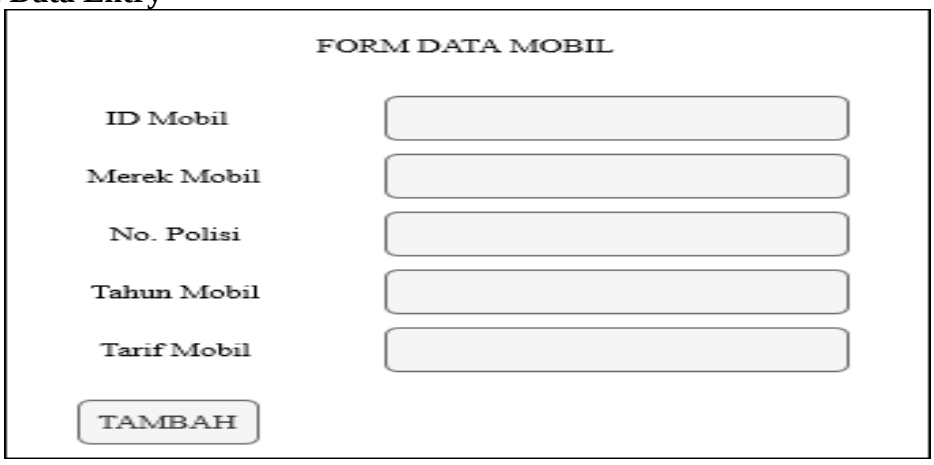


Figure 4.11 Car Data Input Design

2. **Input Data Driver**

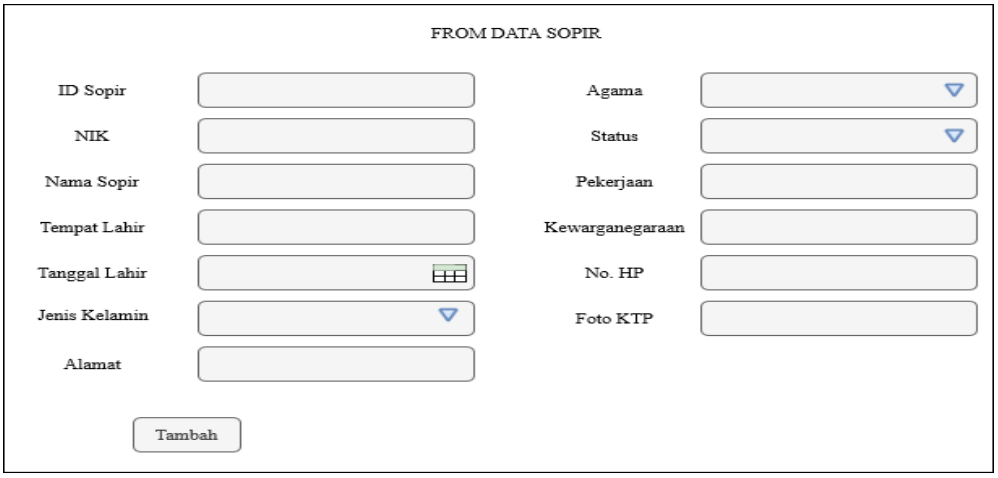


Figure 4.12 Driver Data Input Design

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3. Transaction Input

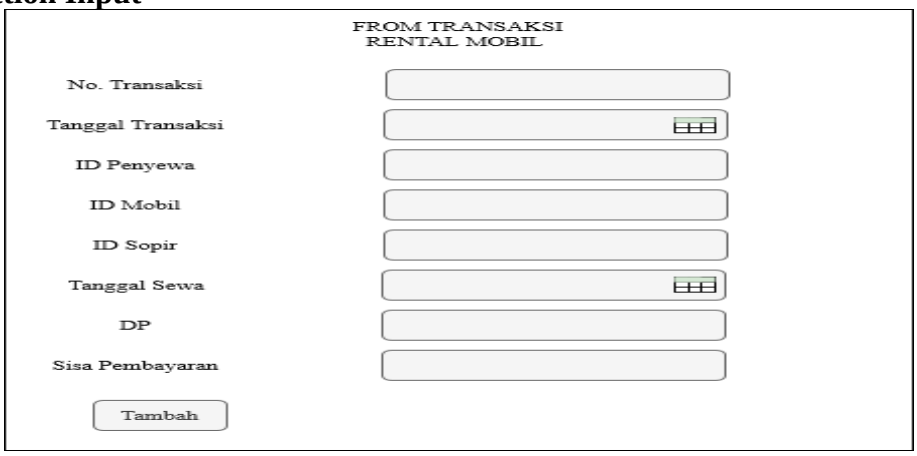


Figure 4.13 Transaction Input Design

4. Car Return Data Entry

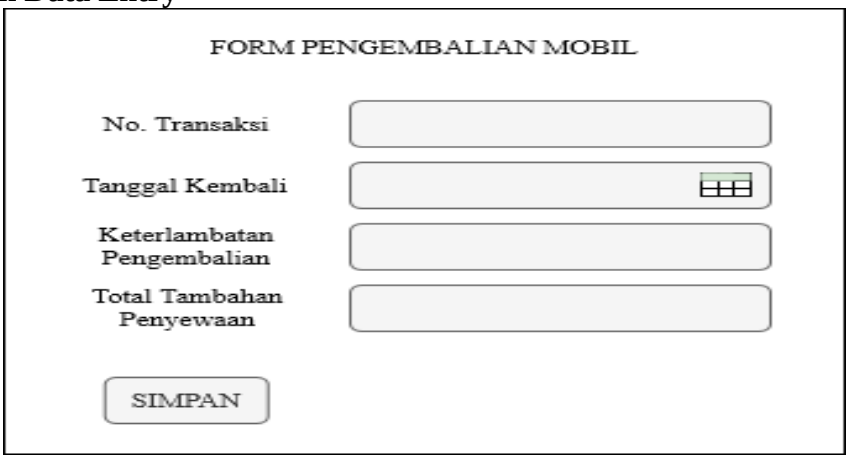


Figure 4.14 Car Return Input Design

5. CONCLUSION

The development of a car hire information system for Travel Lathifa Maju Sentosa using the Research and Development (R&D) method has greatly benefited the company, which previously relied on a manual system involving data recording, paper-based media, and handwritten entries in ledgers. This manual process made it difficult for office management to oversee operations and effectively manage the car rental service. Each time a renter arrived, the company had to perform manual recording, and the scope of marketing or information dissemination was very limited, relying solely on word of mouth. Furthermore, the service was inaccessible to renters living outside the city because the company had not yet developed a web-based information system application (Arifin, Mahendra and Handayani, 2007). By implementing a computerized and online information system using PHP and MySQL in accordance with the System Development Life Cycle (SDLC), the management of renter data can now be performed more efficiently, facilitating the handling of tenant data without redundancy. This system also simplifies the retrieval of renter information and the preparation of financial reports related to rental services. Additionally, it improves operational management by minimizing errors associated with manual processes, enhances service delivery, and expands the marketing reach beyond the local area by providing accessible web-based information. Overall, the new web-based car rental management system enables smoother operations, better

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organization of data, and optimized service for both administrators and customers, addressing previous challenges such as data loss, delayed vehicle delivery, and limited accessibility.

6. DECLARATIONS

Sofia Tunnengsih, Dina Ediana equally contributed as the main contributors to this paper. All authors read and approved the final version of the paper.

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