UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

SECD2523
SECTION 10

LECTURER: ROZILAWATI BINTI DOLLAH @ MD ZAIN

PROJECT TITLE:
HASTA CAR RENTAL
(PHASE 1)

GROUP: MEOW

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Phase 1

1.0 Introduction

We are enrolled as undergraduate students at the University of Technology Malaysia, currently in our second year, first semester, pursuing a Bachelor's Degree in Computer Science with Honors, specializing in Graphic and Multimedia Software. The development of this project proposal aligns with the academic requirements of our SECD2523 Database course, specifically Section 10, under the guidance of our esteemed lecturer, Dr. Rozilawati Binti Dollah @ Md Zain. The focus of our project revolves around addressing a crucial challenge faced by an e-commerce entity, HASTA car service rental. As they do not have a digital system yet, we want to conceptualize and construct an integrated digital system and ensure details tailored to enhance efficiency and align seamlessly with the objectives and purposes of HASTA's operations.

2.0 Background Study

HASTA Car Rental is a car rental service offering vehicles for both short-term and long-term rentals which is manually operated through WhatsApp or walk-in into their office where they do not implement any digital system in support of their business. Operating within a highly competitive car rental industry that prioritizes flexibility, cs responsiveness, and a seamless customer experience, we acknowledge the necessity of embracing technology to refine fleet management and elevate overall customer satisfaction. This project aligns with the objectives outlined in the SAD Project Requirements document, aiming to provide students with valuable knowledge and skills in problem-solving and programming techniques through relevant academic and research activities. Additionally, it encompasses essential information regarding the phases of supervision, procedures, and evaluation.

3.0 Problem Statement

The development of a car rental service e-commerce system for HASTA brings forth several critical challenges. First and foremost, the efficient integration and management of diverse data sources are. Insufficient data integration poses a significant risk, potentially leading to operational inefficiencies, delays, and a bad customer experience. Secondly, ensuring scalability is crucial to meet the increasing demand for the services. Scalability issues could restrict the ability to accommodate a growing customer base, reducing the ability to deliver a seamless and reliable rental experience. Moreover, creating a user-friendly interface is a pressing concern. A complex interface design can discourage potential customers and slow down the mission to provide a hassle-free rental process. Lastly, addressing security and privacy concerns is of utmost importance. As data breaches and cybercrimes rise as significant threats, safeguarding customer data and complying with data protection regulations are essential to maintain trust and protect sensitive information.These four challenges demand our full attention

and innovative solutions as we strive to enhance the car rental experience and ensure the success and satisfaction of the users.

4.0 Proposed Solutions (include feasibility study-technical,operational,economical-CBA)

Problem 1: Data Integration and Management.
Solution: User Management

The User Management feature plays a crucial role as a solution for this problem by supporting various user roles such as customers, admins, and car providers as HASTA had been involved with various users. The users can effortlessly create accounts with a unique username and password, and admins have the authority to manage these user accounts effectively. This feature also serves as a gateway for associating user-specific data, such as rented cars, providing a comprehensive view of the user's rental history, preferences, and current bookings. Therefore, this feature lays a solid foundation for establishing a secure, personalized, and data-rich user experience within the HASTA car rental system.

Problem 2: Scalability
Solution: Inventory Management

In this context, the Inventory Management feature is needed. It allows car providers to efficiently track and manage their fleet's inventory. To invent the HASTA car rental system, this feature ensures a smooth handling of an increasing number of vehicles. Car providers can easily update and manage the availability of cars, receive timely notifications for low stock, and contribute to the system's scalability. The Inventory Management feature is instrumental in supporting the growth of the car rental platform, ensuring a scalable and optimized process for managing a larger volume of vehicles and providers.

Problem 3: User Experience and Interface design
Solution: Search and Filtering Management

Search and Filtering Management ,this is an important feature in enhancing the overall user experience by allowing customers to easily search for cars using keywords.We notice that HASTA needs information such as category,price range and hours of usage in the booking process, so this feature will make it easier. It contributes to an intuitive and user-friendly interface by providing efficient filtering options, enabling customers to quickly find the most suitable vehicles based on their preferences. The Search and Filtering feature plays a key role in improving UX, ensuring a seamless and visually appealing interface that enhances the overall usability and satisfaction of users interacting with the HASTA car rental system.

Problem 4: Security and Privacy Concern
Solution: Checkout and Payment Management

Checkout and Payment Management feature. It serves as a keystone for securing sensitive user information during transactions. As HASTA has been dealing with its business with user's private details, we think this feature is important as it ensures a secure and encrypted environment for customers entering their payment details, such as credit/debit card information and billing details. By supporting multiple payment options and implementing robust security measures, including secure sockets layer (SSL) encryption, the Checkout and Payment feature safeguards user privacy and financial information. This module plays a pivotal role in instilling confidence among users regarding the security of their data, fostering a trustworthy and secure environment while using the HASTA car rental system.

Technical feasibility: Implement a robust data management system that allows for seamless integration of various data sources,employ cloud-based infrastructure to easily scale resources up or down as demand are changing,conduct usability testing and gather user feedback to refine the interface continually and regularly update security protocols to address arised threats.

Operational feasibility: Regularly assess system performance and resource usage. Form a user experience team to address user concerns promptly and comply with data protection regulations, such as GDPR or CCPA, to ensure customer data privacy.

Economical feasibility:

Costs	Year 0	Year 1	Year 2	Year 3
Development costs				
Software	10,000			
Hardware	20,000			
License	6,000			
Employee training	3,000			
Data Profiling	1,500			
Quality control tools	3,000			
Total	**43,500**			

Production costs Data Storage and Hosting Maintenance and Support Supplies		 2,750 3,190 2,640	 2,888 3,350 2,825	 3,032 3,518 2,966
Annual Prod Costs (Present Value)		8,580 6,660	9,063 5,363	9,516 4,331
Accumulated Costs		50,160	55,523	59,854
Benefits	Year 0	Year 1	Year 2	Year 3
Costs Savings Increased Sales Long-Term Viability **Total**		30,000 25,500 18,300 **73,800**	3,300 28,050 20,130 **51,480**	3,630 30,855 22,143 **56,628**
(Present value) Accumulated Benefits		56,769 56,769	30,462 87,231	25,775 113,006
Gain or Loss		6,609	31,708	53,152
Profitability Index		1.22		

5.0 Objectives

i) Develop a user friendly system that allows staff and students of UTM to rent a car.

ii) Make sure the system provides real-time information to prevent double booking.

iii) Ensure compliance with legal and university - specific policies regarding vehicle rental, data protection, and user privacy.

6.0 Scope of the project

The scope of the HASTA car rental project is to create an efficient platform for UTM students and staff for renting vehicles. This project aims to develop a comprehensive system so that the entire HASTA car rental system ensures a hassle-free and secure experience to users and upgrade from manually conducted to digitally conducted.

We will develop a user authentication system to verify the users who attempt to use the system are either UTM staff or students or outsiders. This authentication process will only ensure that only eligible users can rent the car using this system. We also will make this system a car inventory management module. It can manage the inventory of available cars, such as either Myvi or Axia models. Our users will be able to view the availability of each car, preventing double bookings and ensuring that only one car can be rented at any given time.

Additionally, users will have the experience of browsing available cars, selecting their preferred vehicle type, and providing necessary information such as IC number, matric number, license number, name, and phone number to proceed the booking process. Then it will be directed to secure online payment gateway for rental payments.

To ensure the privacy of user information, a secure data management system will be established. We will develop a privacy policy and terms of service that show how user information will be collected,used and kept within our system. We also will ask for an agreement from the users before collecting their data. Our system will only collect the appropriate data from the users.

As part of customer support, regular maintenance and updates will also be scheduled to keep the system up-to-date and running efficiently. The system will be in place to address any user inquiries and issues. To sum up, the HASTA car rental system project aims to create an efficient platform for UTM staff and students to access cars for rental.This project also seeks to provide a secure car rental experience for the UTM community and outsiders as well.

7.0 Project Planning

7.1 Human Resource

- Project Manager:
  We assigned a project manager to the leader of this group who will oversee the planning phase. The project manager is responsible for coordinating the planning activities, setting project goals, and ensuring that the project stays on track.

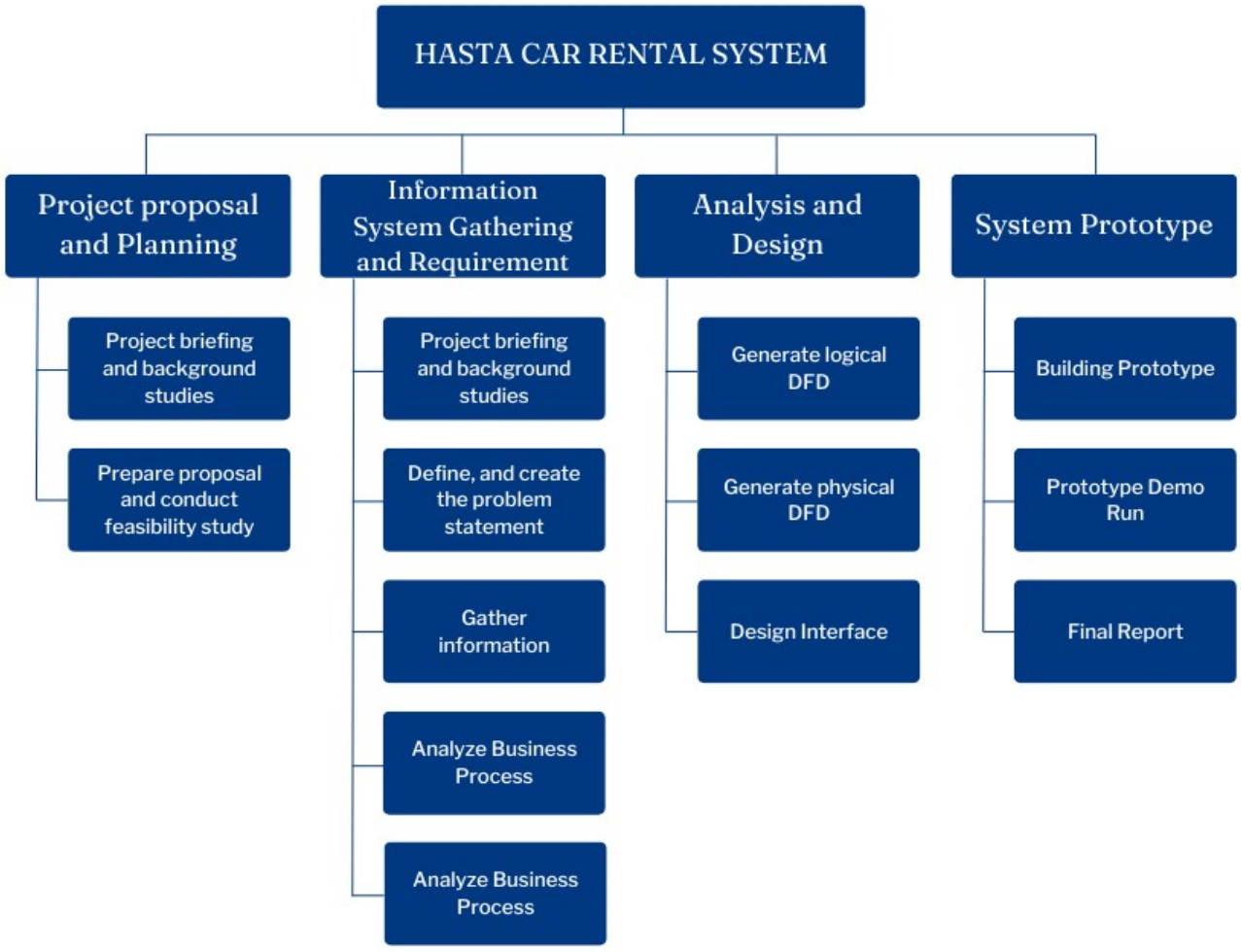
- Development Team:
  They will be responsible for designing and developing the software, including the reservation system, vehicle management, billing, and reporting features.

- User Interface (UI) and User Experience (UX) Designers:
  UI and UX designers are needed to create user-friendly interfaces and ensure a positive customer experience.

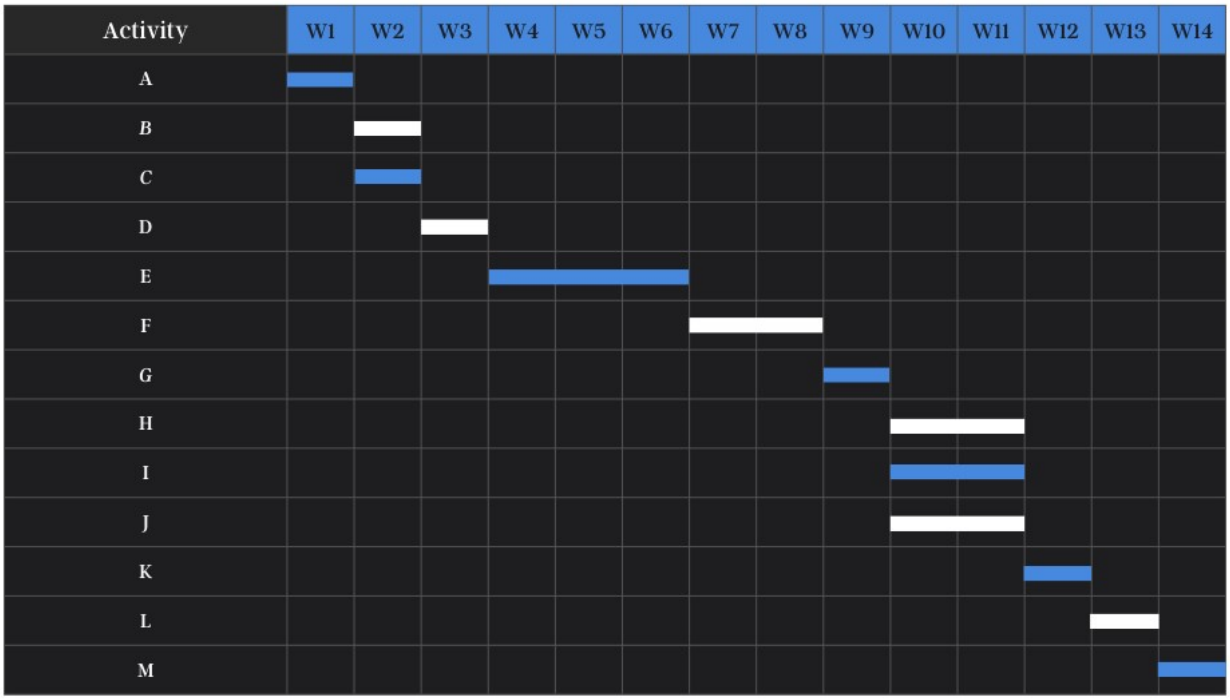
- Project Communication Manager:
  A communication manager or specialist to develop and execute a project communication plan. Effective communication is crucial for keeping stakeholders informed about project progress and changes.

- Business Analysts:
  Business analysts will work closely with stakeholders to gather and document detailed requirements for the car rental system. Business analysts bridge the gap between business needs and technical solutions, ensuring that the system addresses all necessary functionalities.

7.1.2 Work Breakdown Structure (WBS)



7.1.3 Gantt Chart



8.0 Requirement Analysis (based from AS-IS AAnalysis)

8.1 Current Business Process(Scenarios,workflow)

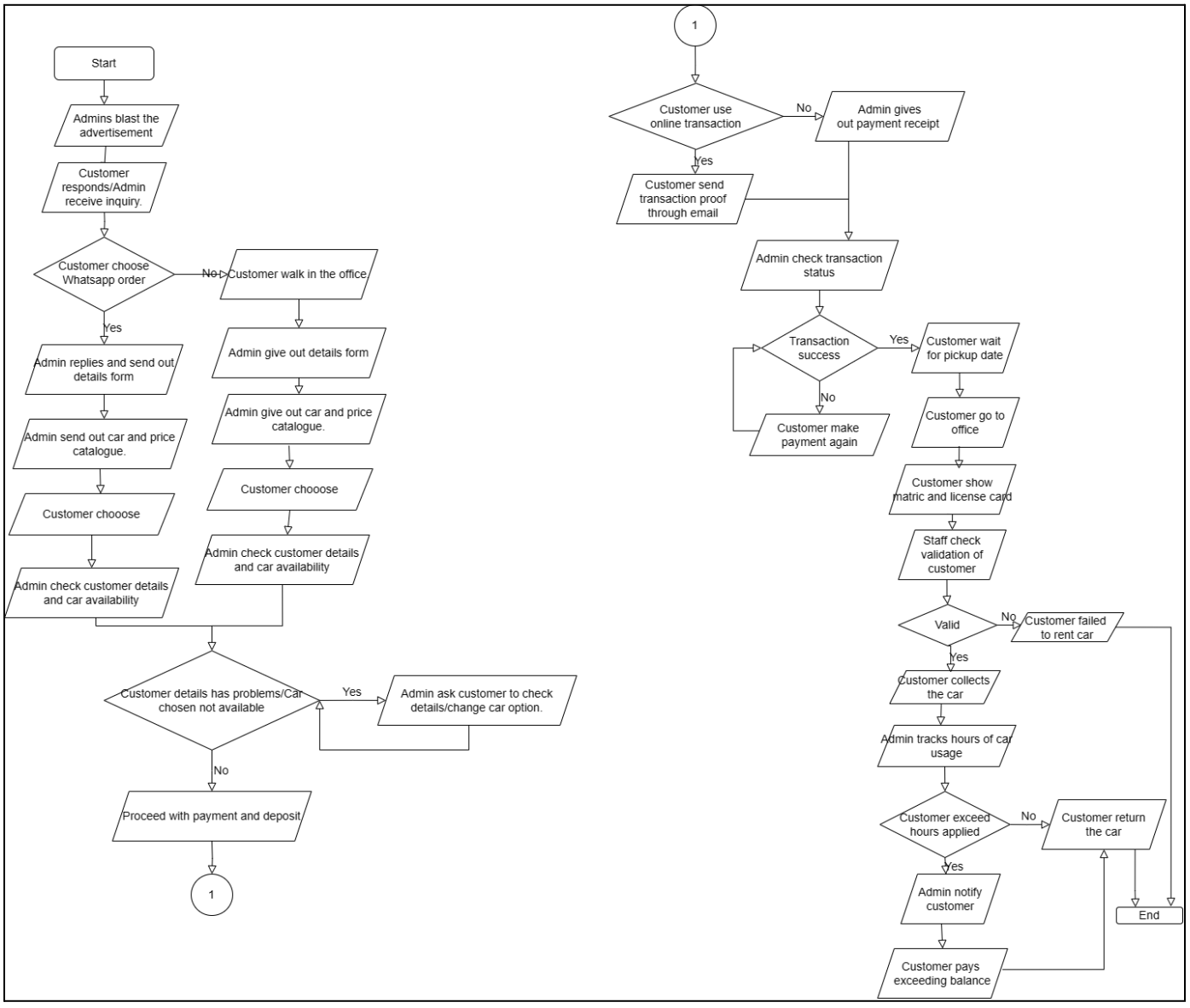
Scenario:

Two days ahead of the Deepavali holiday, Raju, a UTM student, plans to journey home for the celebration. Considering a car rental over a bus for its convenience and cost-sharing benefits with friends, he searches for any car rental service near UTM on the internet and discovers HASTA car rental through an advertisement. The service, offering walk-in or WhatsApp business orders.He chose the Whatsapp business order as walking is not his thing.

He texts the contact and asks for details.Upon inquiry, the staff promptly sends him a form containing essential details: name, Matric No, IC/Passport, phone number, race, college, faculty, email, pickup and return date and time. Payment details like deposit, rental, duration, and refundable information such as account bank number, bank name, and account name are included. The catalog of car types and hourly rates is also provided. Noting the RM 50 minimum deposit, Raju proceeds to fill in the form.

Choosing the car type and required hours, he makes the payment by transferring the specified amount to HASTA's bank account. Confirming the transaction, he sends proof to the provided email. With the reservation complete, he awaits the pickup date. On the appointed day, Raju, accompanied by his friends, visits the HASTA office at the specified time to collect the rented car. Before that, he needs to show his matric card and identification card to the staff. Everything checked, he then drove back home. After holiday ends, he needs to return the car back on the date he filled in before.Throughout the process, inquiries or concerns are addressed via WhatsApp or during a visit to the office.

Workflow:



9.0 Transaction requirement (data entry,data update/delete,data queries)

User management

Data Entry
Enter the details of staff and students (such as name, matrics number, staff ID, contact number).

Data update/deletion
Update / delete the details of users profile.

Data queries
List details of all users (staff and all students).
List details of inactive user accounts.
List details of active user accounts.
Identify users with overdue reservations.
Identify users with outstanding payment.
List details based on rental history.

Inventory Management

Data Entry
Enter the details of the cars (such as model, registration number, and availability status).
Enter the details of the cars that have already been booked.

Data update/deletion
Update / delete the availability of car status.
Update / delete the maintenance activity of the cars.

Data queries
List of the details of available cars.
List of the details of maintenance history such as maintenance activities and service dates.
List details of cars with expired road tax.
List details of broken car.

Search and Filtering Management

Data entry
Enter the details of specific search criteria.

Data update / deletion
Update / delete search criteria.
Update / delete search history.

Data queries
List of search results.

Checkout and Payment Management

Data entry
Enter transaction's detail (payment amount and payment method)
Enter customer's detail (such as name, billing address and contact information)

Data update / delete
Update / delete payment amount
Update / delete payment method
Update / delete customer's details

Data queries
List history of completed transaction

10.0 Benefit and Summary of Proposed System

Numerous advantages are provided by the planned integrated digital system for HASTA vehicle service rental, which will improve the process' overall effectiveness and customer satisfaction. By using User Management, the system lowers the possibility of operational inefficiencies by streamlining account creation and offering thorough views of rental history, preferences, and bookings. By supporting the expansion of the platform, streamlining procedures for managing a greater number of vehicles and suppliers, and enabling the seamless management of an expanding number of vehicles, the Inventory Management feature assures scalability. With its simple and easy-to-use interface, the Search and Filtering Management tool greatly enhances the user experience by making the process of selecting a car based on client preferences easier. Furthermore, the feature for Checkout and Payment Management creates a secured and encrypted environment for transactions, protecting sensitive user data and encouraging user trust

in the security of their information. A positive Cost-Benefit Analysis and a Profitability Index of 1.22 demonstrate the proposed system's economic viability while also addressing important difficulties in data integration, scalability, security, and user experience. These results will show significant benefits over time. The system's overall goal is to improve customer happiness and operational excellence while elevating the automobile rental experience for HASTA users.

11.0 Summary

The primary aim of the project is to create a robust digital system for HASTA's car rental service, tackling issues related to data integration, scalability, user experience, and security. Proposed solutions include features like User Management, Inventory Management, Search and Filtering Management, and Checkout and Payment Management. The project engages a diverse team comprising a Project Manager, Development Team, UI/UX Designers, Project Communication Manager, and Business Analysts. Thorough project planning is delineated through a detailed work breakdown structure (WBS) and a Gantt Chart, ensuring effective coordination and implementation. A comprehensive feasibility study delves into technical, operational, and economic aspects, substantiating the system's economic viability through a Cost-Benefit Analysis (CBA) and a favorable Profitability Index of 1.22. Beyond addressing challenges, the project strives to enhance customer satisfaction and operational excellence in HASTA's car rental experience. In summary, the system's diverse benefits and well-crafted functionalities position it as a valuable asset for enhancing overall efficiency and user satisfaction.