UTM
UNIVERSITI TEKNOLOGI MALAYSIA

FACULTY OF COMPUTING
UTM Johor Bahru

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SECP2613 - SYSTEM ANALYSIS AND DESIGN (WBL)

PROJECT 2

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SECTION : 02

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1.0 Overview of the Project

The purpose of this project is to design a centralized car rental system for HASTA Travel Sdn. Bhd., streamlining operations such as vehicle booking, customer and staff management, penalty tracking, and accounting, while enhancing customer experience and staff efficiency. So far, we have conducted a meeting with HASTA Travel & Tours Sdn. Bhd. to understand the pain points of their current system and clarify their expected deliverables. Additionally, we distributed a questionnaire to users and gathered valuable feedback for further analysis.

Based on our AS-IS analysis, the current system at HASTA Travels is manual, with issues in booking, payment verification, and data management. To solve this, the new system has customer registration, booking, payment verification, accounting, and penalty tracking each with automated processes, and clear outputs. It also meets non-functional needs like 24/7 availability, fast response time, secure login and data backup.

2.0 Problem Statement

HASTA Travel Sdn. Bhd., a car rental company based at Universiti Teknologi Malaysia (UTM), primarily caters to students within the campus. Although the company has been operating for several years, many of its core processes are still done manually, which often leads to inefficiencies and unnecessary workload for the staff.

One of the main challenges is the manual verification process. Student information such as driving licenses and matric cards must be checked one by one by the staff, as there is currently no automated system to scan and verify these documents. This slows down the booking process and increases the chance of human error. Additionally, students sometimes may provide incorrect bank account numbers or bank names during payment, and there is no system feature to automatically verify these details, which can delay payment confirmation and cause confusion.

On the accounting side, the company lacks expertise in software development, particularly for financial management. As a result, they currently rely on external accounting software like Niagawan and MYOB, which unfortunately do not integrate with their system. This creates difficulties when generating audit reports, as staff must manually collect and organize data.

Furthermore, all booking communications are currently handled through WhatsApp, where replies are sent manually by staff. This method is time-consuming and it doesn't provide the efficiency and consistency that an automated booking system could offer. On top of this, all customer and transaction data must be stored for at least 3 years to meet LHDN requirements, but since they are storing the data in hardcopy form, it is inconvenient for the company to retrieve, update and organize in the long run.

Lastly, the company's targeted audience is limited to UTM students, which restricts the company’s market. Lastly, the company's targeted audience is limited to UTM students, which restricts the company’s market reach. Without an automated system, it is hard to expand the business or even maintain the company’s current workflw.

3.0 PROPOSED SOLUTION

To meet the needs of Hasta Travel & Tours Sdn. Bhd., a system is proposed. This system will cover both accounting and booking functionalities, enabling synchronization with the company's Maybank account for real-time financial tracking and an upgraded vehicle booking process for customers and staff.

3.1 Customer Login and Profile Page

Customers will have access to a secure login portal where they can register and manage their profiles. During the registration process, users are required to upload verification documents, such as their matric card and driving license, and provide their bank details. Once registered, the system will generate a personal dashboard for each customer. This dashboard allows customers to view their rental history—both current and previous—as well as monitor their payment status, categorized into completed and pending transactions. Furthermore, the system will introduce a loyalty point feature that is influenced by penalties. Any penalties incurred by customers will also be shown on their profile.

3.2 Staff Login and Report Module

The system will also feature a separate login interface designed for staff members. Through this portal, staff can efficiently manage operational activities and generate reports on a daily, weekly, and monthly basis. All reports will be archived for a minimum of three years, ensuring compliance with data retention policies. The report module will be equipped with tools for customer engagement analysis and targeted marketing, such as the ability to identify and reach out to less engaged faculties or colleges. Additionally, a blacklist feature will also be included to restrict problematic users.

3.3 Booking Page

The booking page will be user-friendly and offer flexible payment choices, including options for paying a deposit or the full payment. Customers can specify their estimated travel destinations and check real-time vehicle availability, with rental costs calculated dynamically through an AI-based pricing system. The system will automatically calculate the total rental cost and display applicable terms and conditions for the customer's review. To complete a booking, customers must upload payment receipts, which the system will verify automatically before sending booking confirmations via both email and WhatsApp.

3.4 Traffic Fines and Accidents

Additionally, the system will include a traffic fine and accident management module. Any fines or accident records will be displayed in the customer's dashboard to ensure full transparency. Notifications regarding fines will be sent through both the website and WhatsApp. Customers will be able to pay fines either directly through the platform or at the company's counter. This module is designed to help the company maintain accurate records and to simplify the handling of such incidents for both customers and staff.

Overall, this integrated system will significantly improve operational efficiency, reduce manual workload, enhance data accuracy, and offer a more convenient and satisfying customer experience for Hasta Travel & Tours Sdn. Bhd.

4.0 Information gathering process

4.1 Method used

We gathered insights from the stakeholders of the car rental system to understand the challenges they face with the current setup, while also gaining access to and evaluating the existing system. An interview session was conducted during our initial meeting with the partner, where they shared the requirements for the new digital car rental system. Additional questions were asked via text after the meeting to further align on the project deliverables. We also visited their office and meet the team to follow up on our system updates that we did and also to further understand the current's system pain and gain.

4.2 Summary from method used

Figure 1: First Meeting with HASTA Travel Sdn. Bhd.

From our meeting with HASTA Travel & Tours Sdn. Bhd., we gained valuable insights into their current operations, system limitations, and expectations for a new digital car rental system. Currently, they rely on WhatsApp, third-party apps, and manual processes for bookings and communication. They also use basic software like Niagawan and MYOB, which are not integrated and pose challenges, especially in accounting and document uploads. They face challenges with manual processes and a lack of integration between their booking, payment, and accounting tools. They also struggle with student data verification, inaccurate payment details, and limited technical expertise in accounting. HASTA Travel team expecting a centralized, automated system that streamlines bookings, payments, and user verification, while integrating with banking and accounting platforms. They suggested that features like dynamic pricing, auto-confirmation, blacklist tracking, and receipt authentication would add significant value to their operations.

Figure 2: Follow Up Meeting with HASTA Travel Sdn. Bhd.

We followed up with Hasta Travel by having a physical visit at their company. This physical visit to their office was a great opportunity to understand and visually see their current system's pain and gain and get the inspiration to further improve our system.

5.0 Requirement Analysis (based on AS-IS analysis)

5.1 Current business process (scenarios, workflow)

AS-IS System (Current Manual Car Rental System)

The scenarios and workflow of the current business process for the customers are as below:

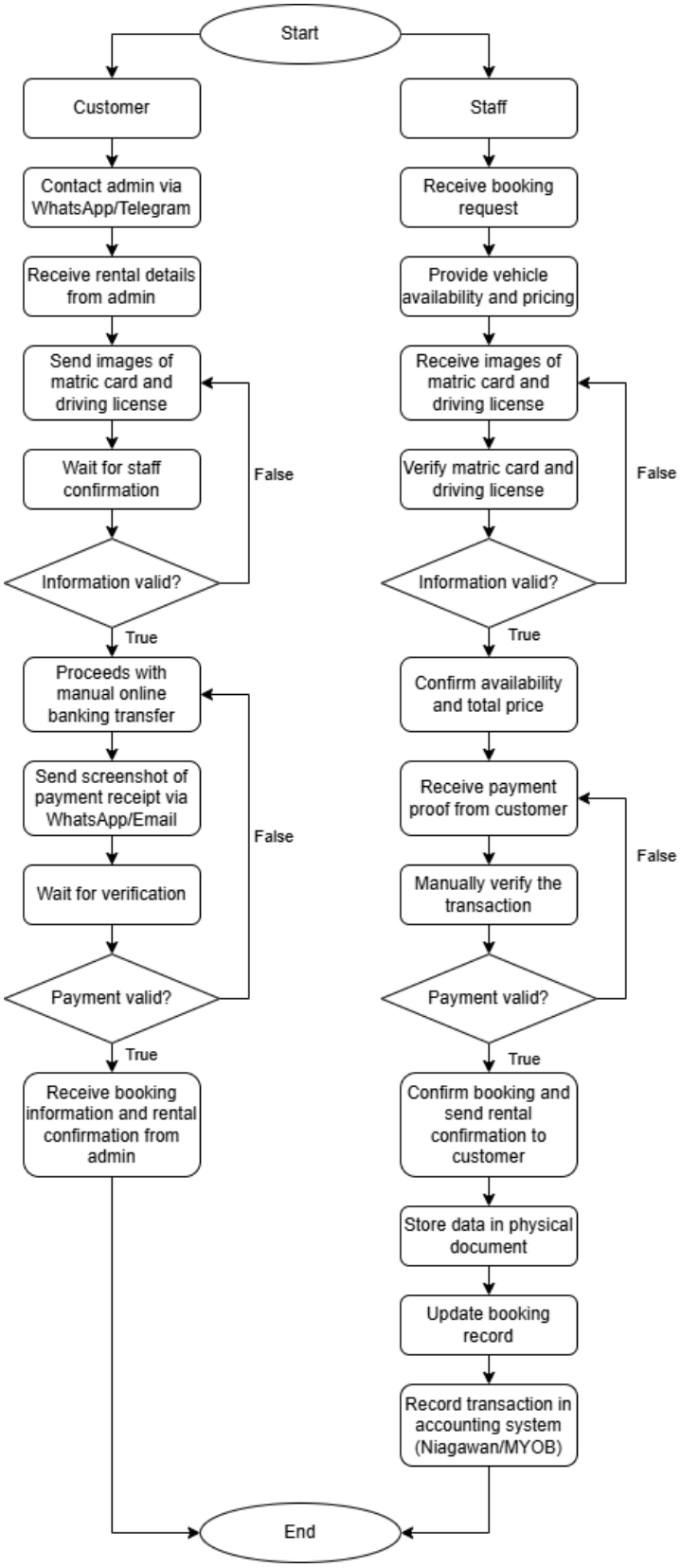
1. Customers contact the admin of Hasta Travel through WhatsApp or Telegram to make a booking inquiry.
2. The admin provides rental details such as vehicle availability, rental price, required documents, and payment instructions via chat.
3. Customers send pictures of their matric card and driving license through WhatsApp or Telegram for manual verification.
4. After document verification, the staff confirms vehicle availability and rental price to the customer.
5. Customers proceed to payment using online banking:
    - The customer transfers the payment manually to the company's bank account.
    - After payment, customers send a screenshot or PDF of the transaction receipt to the admin via WhatsApp or email.
6. Once payment is verified manually by the staff, the admin confirms the booking and sends a rental confirmation message via WhatsApp.

The scenarios and workflow of the current business process for the staff are as below:

1. Staff receives booking requests and customer inquiries via WhatsApp or Telegram.
2. Staff shares information on available cars, rental prices, and rental conditions manually.
3. Staff requests the customer's matric card and driving license, then manually verifies the authenticity of the documents.

4. Staff checks vehicle availability and calculates the rental price based on customer needs.
5. Staff provides the total price to the customer and waits for proof of payment.
6. After receiving the payment receipt (via WhatsApp or email), the staff manually verifies the transaction.
7. Upon payment confirmation, staff updates booking records and sends rental confirmation messages to the customer via WhatsApp.
8. Staff manually records the transaction in the accounting system (Niagawan or MYOB), and data is also stored in physical documents for compliance purposes.

AS-IS System (Current Manual Car Rental System) Workflow



TO-BE System (Proposed Online Car Rental System)

The scenarios and workflow of the proposed new business process for the customers are as below:

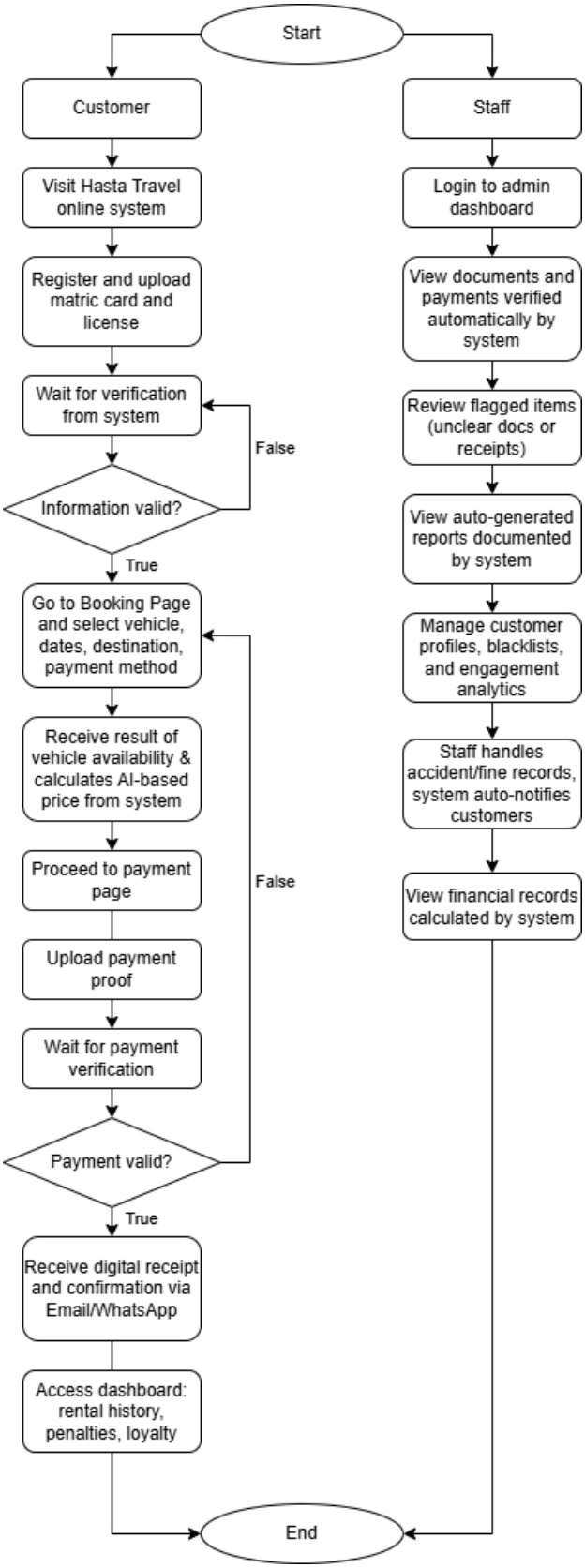
1. Customers visit the Hasta Travel online system via a web-based platform.
2. Customers register by filling in their personal details and uploading their matric card and driving license for verification by the system.
3. Customers proceed to the booking page where they select:
    - Desired vehicle
    - Rental date
    - Estimated travel destination
    - Payment method
4. The system automatically checks vehicle availability and calculates the rental price dynamically using an AI-based pricing system.

5. On the payment page:
    - For online banking, customers are directed to the payment gateway and required to upload the bank transaction receipt as proof.
    - For e-wallet payments, customers upload a screenshot of the completed transaction.
6. Once payment is confirmed by the system, an official digital receipt and booking confirmation are automatically sent to the customer via email and WhatsApp.
7. Customers can view rental history, payments, penalties, and loyalty points on their personal dashboard at any time.

The scenarios and workflow of the proposed new business process for the staff are as below:

1. Staff log in to the admin dashboard to monitor bookings and payments processed by the system.
2. Staff verify that uploaded documents (matric card, license) and payment receipts meet system requirements (automated document and payment checks minimize staff workload).
3. The system automatically generates daily, weekly, and monthly operational and financial reports, stored digitally for at least three years.
4. Staff review and manage customer profiles, blacklist problematic users, and perform customer engagement analysis through the report module.
5. Staff can also manage accident or traffic fine records, and notifications of fines will be automatically sent to customers via the platform and WhatsApp.
6. The system automatically calculates financial records and profit margins, reducing the need for manual accounting entries.

TO-BE System (Proposed Online Car Rental System) Workflow



5.2 Functional Requirement (input, process and output)

Module	Input	Process	Output
Customer Registration	Full name, matric card photo, driving license photo, bank details	Verifies student identity and stores profile details	Customer account created, verification status shown
Login Module	Username, password	Authenticates user	Access to dashboard
Booking System	Selected vehicle, rental duration, destination, upload payment receipt	Check availability, calculate total price (AI-based), confirm payment	Booking confirmation via email/WhatsApp
Payment Verification	Uploaded payment receipt	Matches receipt with system records	Status update: payment verified or rejected
Accounting Module	Rental and payment data	Tracks revenue, payroll, generates daily/weekly/monthly reports	Downloadable reports for accounting and audits
Report Generation	Filter selection (e.g., time period, customer activity)	Collects relevant data, generates analytical reports	Engagement and performance reports
Penalty/Fine Management	Traffic fine data, customer ID	Records fine, sends notifications	Fine status shown on customer dashboard, fine payment option
Blacklist System	Customer violation records	Reviews rule violations, flags users	Blacklist display, restricted booking access
Loyalty Points	Booking history, penalties	Adds/reduces loyalty points based on behavior	Display of loyalty points on dashboard

5.3 Non-functional Requirement (performance and control)

Performance Requirements

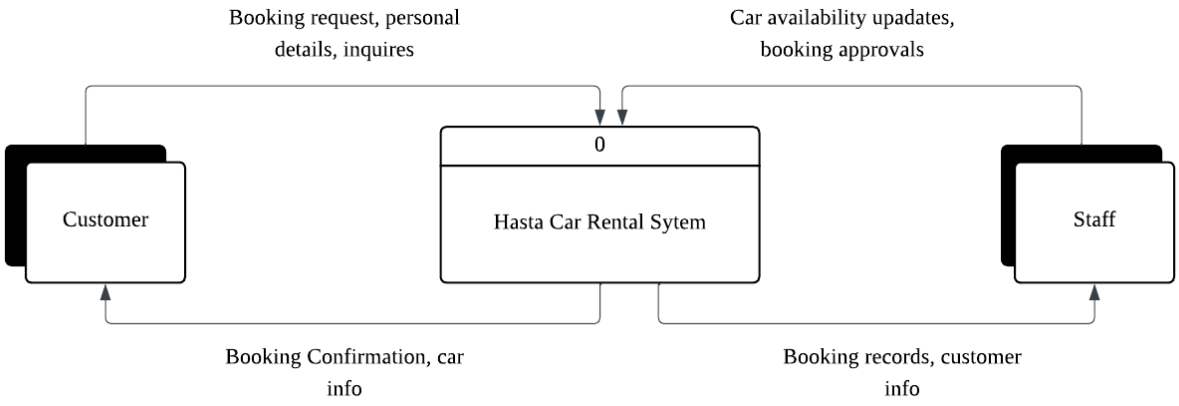
- System Availability: The web-based platform must be accessible 24/7 to support booking anytime.
- Response Time: All major functions (login, booking, receipt upload, report generation) should respond within 3 seconds.
- Data Storage: The system must retain data for at least 3 years to meet audit and taxation requirements.
- Scalability: Must support potential expansion beyond UTM students (e.g., alumni, external users).

Control (Security & Reliability) Requirements

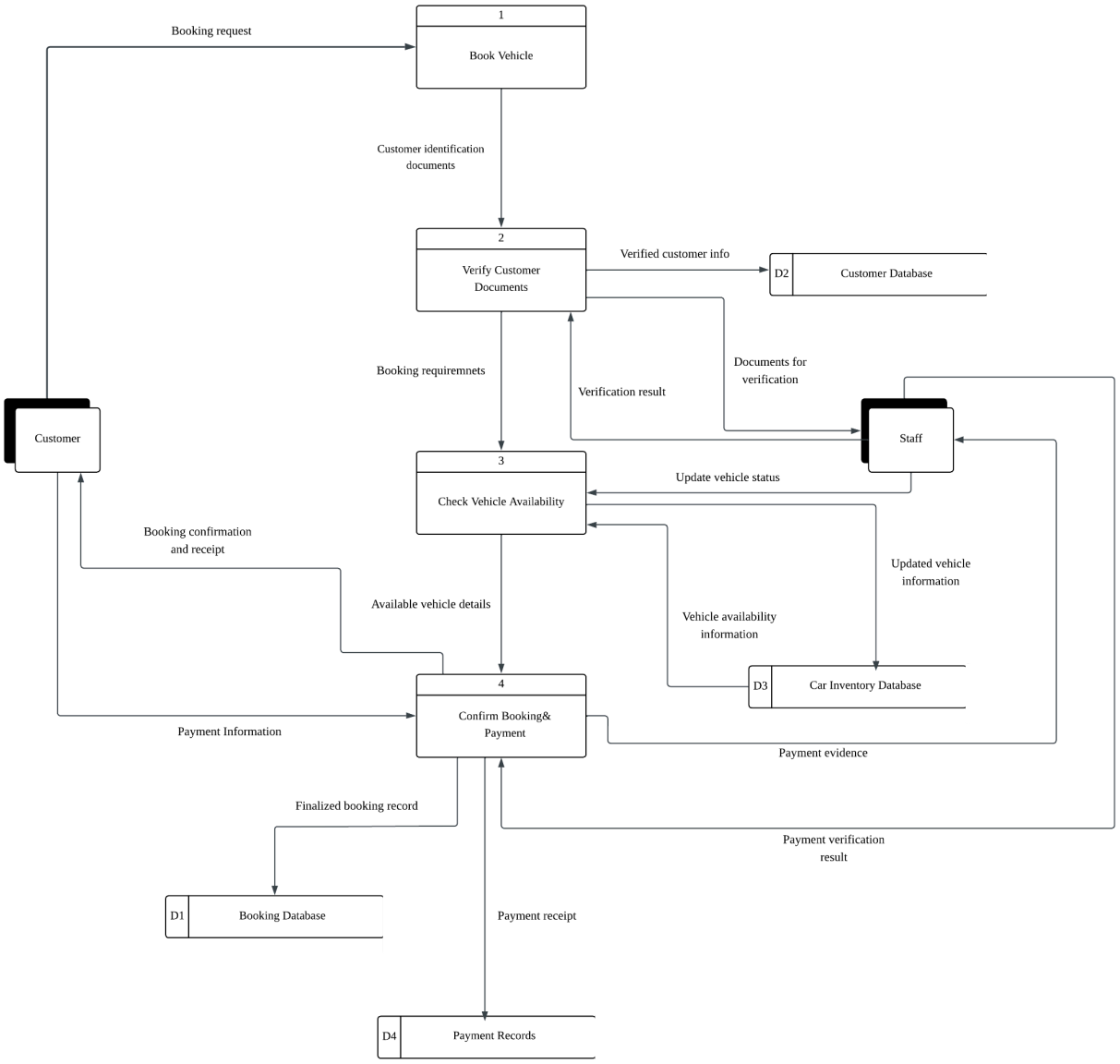
- Authentication: Secure login for both customers and staff using encrypted credentials.
- Authorization: Role-based access control—customers and staff have different views and permissions.
- Data Integrity: Validation for uploaded documents and payment receipts to prevent errors and fraud.
- Backup & Recovery: Regular data backups and recovery procedures must be in place to prevent data loss.
- Audit Trails: System must log all transactions (bookings, payments, fines) for accountability and traceability.
- Privacy: Sensitive user information (e.g., driving licenses, bank details) must be encrypted and stored securely in compliance with PDPA regulations.

5.4 Logical DFD AS-IS system (Context Diagram, Diagram 0, Child)

5.4.1 Context Diagram

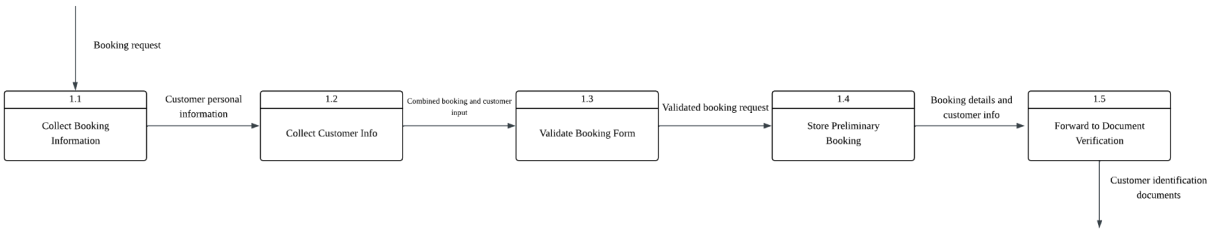


5.4.2 Diagram 0

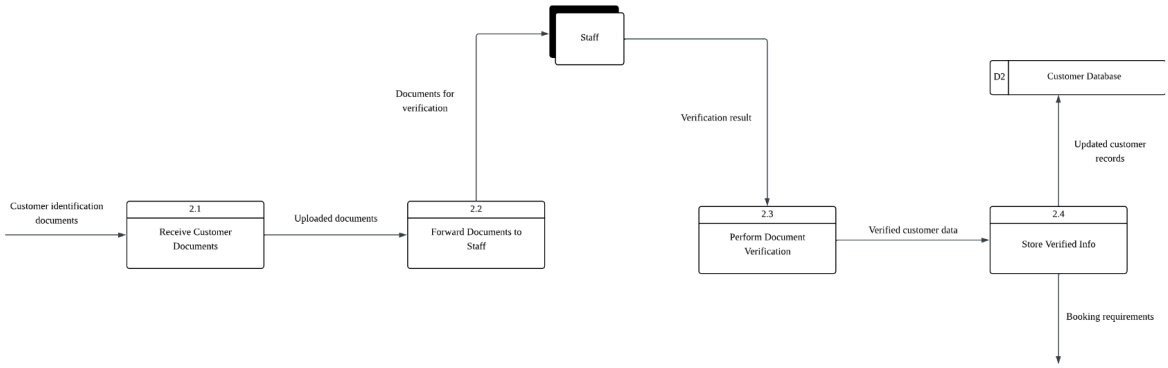


5.4.3 Child diagrams

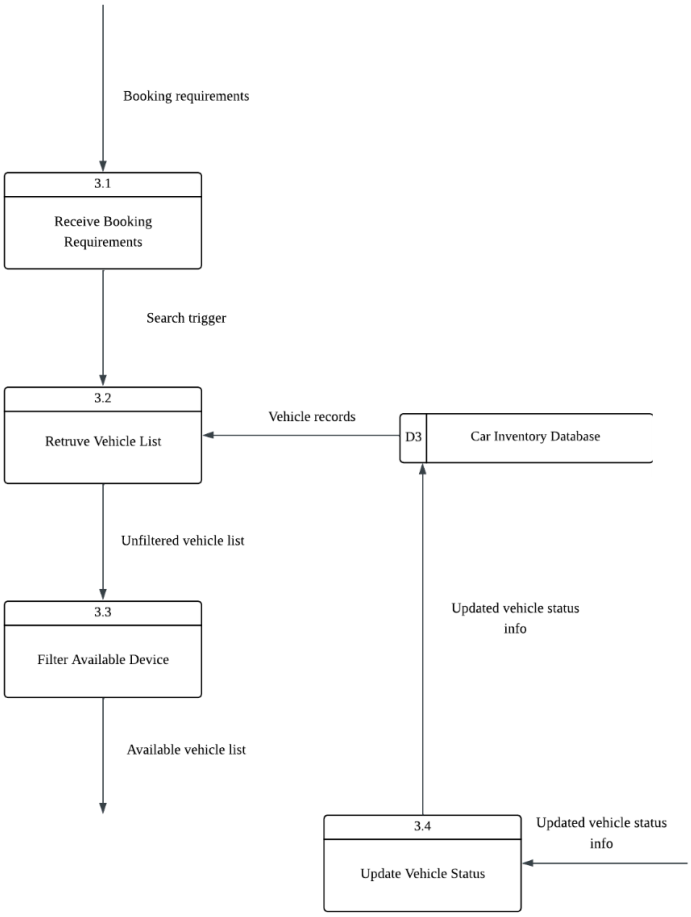
Process 1 : Book Vehicle



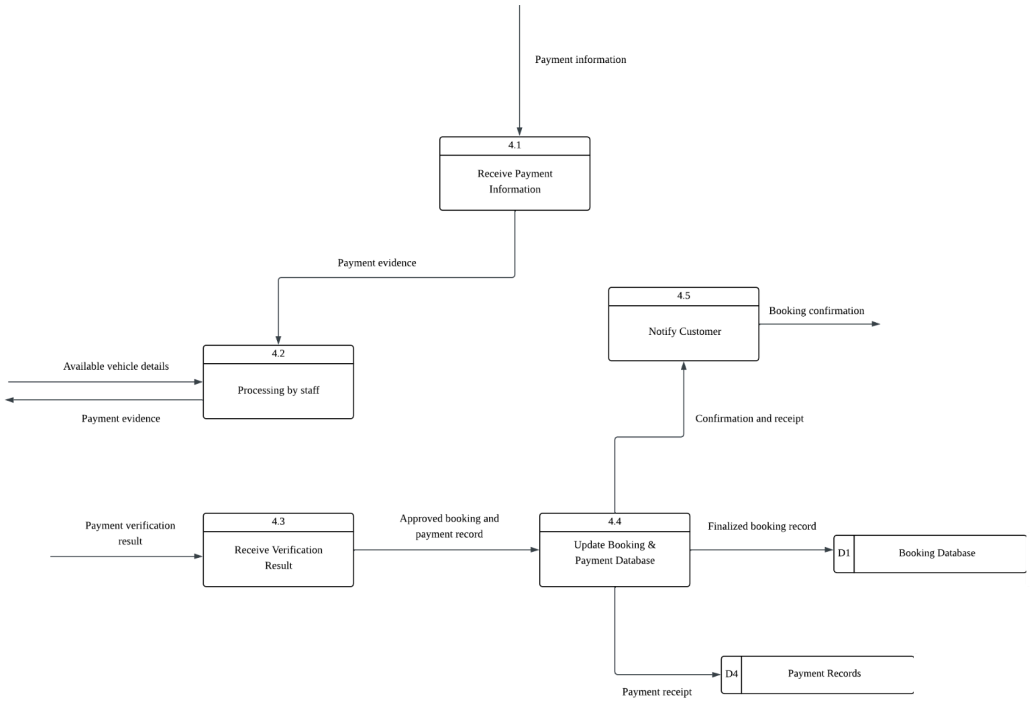
Process 2 : Verify Customer Documents



Process 3 : Check Vehicle Availability



Process 4 : Confirm Booking & Payment



6.0 Summary of Requirement Analysis process

The requirement analysis process began with a thorough evaluation of the current (AS-IS) car rental operations at Hasta Travel, which revealed a highly manual workflow that relies on communication through WhatsApp, Telegram, and email. The manual handling of document verification, vehicle availability checks, payment confirmations, and record-keeping has led to inefficiencies, limited scalability, and increased risk of human error.

Through the analysis of user scenarios and staff workflows, several key challenges were identified: lack of system automation, fragmented data management, delayed responses, and high staff workload.

The TO-BE system proposes a fully online and automated car rental platform aimed at streamlining operations, enhancing user experience, and improving data accuracy. It introduces self-service modules for customer registration, AI-powered vehicle availability and pricing checks, automated payment verification, real-time booking confirmations, and a comprehensive admin dashboard for staff operations. Additional modules for fine management, customer loyalty, and blacklisting enhance the overall robustness of the platform.

Functional requirements were clearly defined to guide the development of each module, detailing the required inputs, core processing logic, and expected outputs. Non-functional requirements addressed system performance, scalability, security, reliability, and legal compliance, ensuring the proposed system can meet operational demands while protecting sensitive data.

Overall, this requirement analysis lays a strong foundation for the system design and development phase, ensuring that the proposed solution aligns with both business needs and user expectations.