



**UTM**  
UNIVERSITI TEKNOLOGI MALAYSIA

**PROJECT PHASE 2**

SECD2613 - SYSTEM ANALYSIS AND DESIGN

SEMESTER II 2024/2025

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## **1.0 Overview of the Project**

Hasta Travel and Tours Sdn. Bhd., a car rental company primarily serving Universiti Teknologi Malaysia (UTM) students, currently manages its entire booking process manually. This reliance on manual methods has led to significant operational challenges, including human errors, fragmented workflows, lack of real-time fleet visibility, and difficulties in data management. These issues collectively impede operational efficiency, hinder growth, and affect customer satisfaction. To address these systemic inefficiencies, a web-based booking system with an integrated invoice reporting system is proposed. This new system aims to automate the booking and accounting processes, thereby modernizing operations, minimizing errors, and enhancing overall efficiency and customer satisfaction. A comprehensive feasibility study has affirmed the technical, economic, and operational viability of this proposed solution, projecting a positive return on investment and enabling the company to scale effectively.

## 2.0 Problem Statement

Before designing a new system, the problem faced by the current system must be identified first. Hence, we had identified the some notable operation issues faced by Hasta Travel and Tours Sdn. Bhd. due to them still using a manual system. The current process often leads to frequent booking mistakes, slow messaging, and poor data handling. All these problems cause waste of time and resources while also impacting the customer experience negatively. By identifying these problems, it is clear why the company requires a digital solution to improve business operations and allow for growth in the future.

The problem statement are as follow:

- **The Booking Process is a Bit Clunky:** Right now, the whole booking process relies on old-school methods like paper forms and messaging apps. This setup is a recipe for human error—think wrong entries, missed bookings, or even double-booking the same time slot. All of this can really put a damper on the customer experience.
- **Scheduling Conflicts Are Common:** Without a centralized platform to keep track of availability, it's not uncommon for scheduling conflicts to pop up. When multiple customers try to book the same vehicle at once, it creates a lot of frustration and confusion for everyone involved.
- **Lack of Real-Time Updates:** The current system doesn't provide real-time updates on vehicle availability, which leaves customers in the dark about whether the car they want is actually free. This often leads to delayed responses and, at times, booking cancellations.
- **Keeping Records Manually:** Juggling customer information, bookings, and vehicle statuses by hand makes it tough to keep accurate records. It's hard to access customer data and generate useful reports quickly, and this manual approach also raises the risk of losing important data.
- **Hindrance to Business Growth:** Because of the inefficiencies tied to the manual system, the business is hitting a wall when it comes to growth. As rental demand increases, the current setup struggles to keep up with the higher volume of transactions, resulting in more mistakes and delays.

### 3.0 Proposed Solution

To overcome the problems currently faced by Hasta Travel and Tour Sdn. Bhd., we proposed to make a web-based booking system with an invoice reporting system where the system may automate the booking process and accounting process for invoice reporting.

#### **Feasibility Study :**

The aim of this feasibility study is to evaluate the practicality of developing a web-based booking system for a car rental business. The business currently relies on manual methods, which are prone to errors and inefficiencies. This new system seeks to streamline operations and improve scalability.

#### 1. Technical Feasibility

**Technology Stack:** The system can be built using widely available technologies such as:

- Frontend: HTML, CSS, JavaScript, React or Vue.js
- Backend: Node.js, PHP, or Python with frameworks like Express or Django
- Database: MySQL, PostgreSQL, or MongoDB
- Hosting: Cloud platforms such as AWS, Google Cloud, or DigitalOcean

**Availability of Skills:** The required development skills are common in the industry, and hiring developers or outsourcing is viable.

**Infrastructure:** The business will need internet access and basic hardware (PC or laptop) for the admin dashboard. No specialized infrastructure is required.

**Conclusion:** Technically feasible

## 2. Economic Feasibility

- **Estimated Costs:**

- Development Cost: RM75,000
- Operational Cost : RM18,000

- **Expected Benefits:**

- Reduced administrative workload
- Improved booking accuracy
- Enhanced customer satisfaction
- Better data tracking and reporting
- Scalability for business growth

- **Return on Investment (ROI):**

- Faster booking cycles can increase the number of customers served.
- Reduced labor costs and fewer errors lead to long-term savings.

**Conclusion:** Economically feasible with positive ROI

## 3. Operational Feasibility

- **Ease of Use:** User interfaces can be designed to be intuitive for both customers and staff.
- **Training Requirements:** Minimal training needed for staff to use the admin panel.
- **Customer Adoption:** Online booking is a familiar process for most users, so adoption should be smooth.

**Conclusion:** Operationally feasible

### CBA (COST-BENEFITS ANALYSIS)

This section provides a financial overview of the target system by comparing its development and operational cost to the expected long-run advantages. It shows clearly how the investment can reduce manual workload, improve accuracy, and enhance customer satisfaction. With measures like return on investment (ROI) and benefits accumulated over five years, this evaluation enables the economic justification of the implementation of the system:

| COST                       | YEAR 0        | YEAR 1        | YEAR 2         | YEAR 3         | YEAR 4         | YEAR 5         |
|----------------------------|---------------|---------------|----------------|----------------|----------------|----------------|
| DEVELOPMENT COST           |               |               |                |                |                |                |
| HARDWARE                   | 30,000        |               |                |                |                |                |
| SOFTWARE                   | 20,000        |               |                |                |                |                |
| CONSULTANT FEES            | 15,000        |               |                |                |                |                |
| STAFF TRAINING             | 10,000        |               |                |                |                |                |
| <b>TOTAL DEVELOPMENT</b>   | <b>75,000</b> |               |                |                |                |                |
| OPERATIONAL COST           |               |               |                |                |                |                |
| CLOUD LICENSES             |               | 5,000         | 5,250          | 5,513          | 5,789          | 6,078          |
| IT SUPPORT & MAINTENANCES  |               | 10,000        | 10,500         | 11,025         | 11,576         | 12,154         |
| SUPPLIES COST              |               | 3,000         | 3,150          | 3,308          | 3,473          | 3,647          |
| <b>TOTAL</b>               |               | <b>18,000</b> | <b>18,900</b>  | <b>19,846</b>  | <b>20,838</b>  | <b>21,879</b>  |
| <b>TOTAL PRESENT VALUE</b> |               | <b>17,100</b> | <b>16,245</b>  | <b>15,433</b>  | <b>14,661</b>  | <b>13,928</b>  |
| <b>ACCUMULATED COST</b>    |               | <b>92,100</b> | <b>108,345</b> | <b>123,778</b> | <b>138,439</b> | <b>152,367</b> |

**Table 1: System Development and Operational Costs**

| BENEFITS                           | YEAR 0                         | YEAR 1          | YEAR 2         | YEAR 3         | YEAR 4         | YEAR 5         |
|------------------------------------|--------------------------------|-----------------|----------------|----------------|----------------|----------------|
| OPERATIONAL GAINS                  |                                | 30,000          | 31,800         | 33,708         | 35,730         | 37,874         |
| INCREASED BOOKING                  |                                | 17,000          | 18,020         | 19,101         | 20,247         | 21,462         |
| CUSTOMER LOYALTY                   |                                | 10,000          | 10,600         | 11,236         | 11,910         | 12,625         |
| <b>TOTAL BENEFITS</b>              |                                | <b>57,000</b>   | <b>60,420</b>  | <b>64,045</b>  | <b>67,887</b>  | <b>71,961</b>  |
| <b>PRESENT VALUE (5% DISCOUNT)</b> |                                | <b>54,150</b>   | <b>57,399</b>  | <b>60,843</b>  | <b>64,493</b>  | <b>68,363</b>  |
| <b>ACCUMULATED BENEFITS (PV)</b>   |                                | <b>54,150</b>   | <b>111,549</b> | <b>172,392</b> | <b>238,885</b> | <b>305,248</b> |
| <b>GAIN/LOSS</b>                   |                                | <b>(37,950)</b> | <b>3,204</b>   | <b>48,614</b>  | <b>114,554</b> | <b>152,881</b> |
| <b>PROFITABILITY INDEX</b>         | <b>152,881 / 75,000 = 2.04</b> |                 |                |                |                |                |

**Table 2: Projected Benefits and Financial Gains**

Discount rate = 5%

Operational costs annual increase = 5%

Operational gains and benefits annual increase 6%



## 4.0 Information Gathering Process

In this section, the methods for obtaining information about the current system are outlined. These include structured interviews and document study. The objective is to get a full picture of how the manual system works, what its weaknesses are, and what customers and employees truly need. By collecting real feedback and learning about the workflow, the team ensures that the new system will address the actual issues the company is facing firsthand.

### 4.1 Method Used

To gather information, there are various ways that we may conduct to obtain information required to analyse the current system in use by Hasta Travel And Tour Sdn. Bhd. , that includes interactive methods and unobtrusive methods. For the interactive method, we decided to obtain information by conducting interviews with Hasta Travel and Tour Sdn. Bhd. representative, meanwhile for unobtrusive methods, we decide to use two methods which are observation and document analysis.

- 1) **Structured Interviews** – Conducted meetings with Hasta Travel and Tours Sdn. Bhd.'s operations team, management, and IT professionals to better understand the manual workflow and difficulties. The interview was conducted on 23 April 2025 and 22 May 2025, where the location of the interview is at N28a, Faculty of Computing.
- 2) **Document Analysis** – Internal documentation, booking form and past booking data were reviewed to identify inefficiencies and redundancies. All these documents were provided by Hasta Travel And Tours Sdn. Bhd. and are also available on their social media.

## **4.2 Summary from Method Used**

This part summarizes the findings from the information gathering process. It was discovered that the current system heavily depends on WhatsApp and paper-based records, which leads to double bookings, slow responses, and poor record tracking. Staff often struggle to find information quickly, and customers feel uncertain about their bookings. Many users expressed a desire for an online system that provides real-time updates, faster confirmations, and a more professional user experience.

### **Structured Interview:**

From the interview with the representative of Hasta Travel and Tours Sdn Bhd, It is found that Hasta Travel and Tours Sdn Bhd present system is fragmented and relies heavily on human processes. The primary mode of communication and booking confirmation is through WhatsApp, which, although convenient for quick messaging, but it does not integrate with any of the internal database or record-keeping systems. This requires employees to manually record customers' data from WhatsApp into spreadsheets or paper logs, which is time-consuming and error-prone.

Structured interviews with the operations and management teams also revealed that double bookings and missed reservations are typical and reoccurring issues, particularly during busy periods. There is no coordinated infrastructure for checking vehicle availability in real time, resulting in conflicting schedules and customer dissatisfaction. Furthermore, the whole process of verifying car conditions before and after rentals is done manually with paper checklists. These checklists are kept in folders with inconsistent filing systems, making it impossible to track down previous records in the event of a dispute over damages or security deposits.

Customers expressed great dissatisfaction with the current method. Many customers noted delays in booking confirmation and a lack of confidence in the accuracy of available automobiles. Customers stated a desire for an online platform with features such as real-time availability of information on car rental, email or SMS confirmations, and a simple and interactive user interface. Most significantly, clients felt anxious about the status of their reservations and would like a system that could provide frequent updates.

**Documented Analysis:**

Analysis of the documentation of Hasta Travel And Tour Sdn Bhd showed inefficiencies in areas such as repeated data entry, long turnaround times for booking confirmations, as well as limited visibility on fleet conditions. Before confirming a vehicle's availability, staff workers had to check numerous sources, which may include manual logs, WhatsApp discussions, and physical car keys. The lack of solid and centralised reports also had an impact on management's capacity to make data-driven decisions.

## **5.0 Requirement Analysis**

This part prescribes what the new system must be able to accomplish to resolve the current issues. The requirements were constructed from the information collected and include functional requirements, such as online booking and billing, and non-functional requirements, including security and usability. Through specifying these requirements, the development team can build an efficient, reliable, and usable system that ultimately streamlines the way the business operates and services its customers.

### **5.1 Current Business Process**

The current process (AS-IS) for Hasta Travel & Tours involves several manual steps that lead to inefficiencies. Here's an outline of the current business process:

Key Steps:

1. Customer Booking:
  - Customers reach out via WhatsApp or phone calls to inquire about car availability.
  - Staff manually checks vehicle availability and confirms the booking by text or phone call.
  - Details are manually recorded on paper or in spreadsheets.
2. Vehicle Status Reporting:
  - Before and after rental, customers must report the condition of the car, often manually written down.
  - There is no real-time vehicle status update in the system.
3. Invoice & Payment:
  - Invoices are manually created after each booking.
  - Payments are tracked manually, and refunds are issued after verifying the vehicle condition.

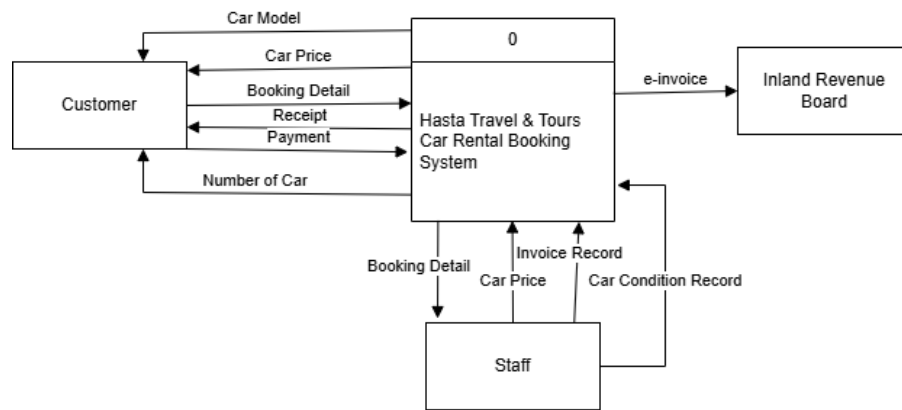
4. Operational Issues:

- Double bookings may occur due to the lack of a centralized booking system.
- Scheduling conflicts may arise, especially when multiple customers want to book the same vehicle at the same time.
- Manual data entry increases the risk of mistakes in booking details, vehicle status, and payment information.
- Current pricing for car rental are not dynamically updated, which causes pricing to remain fixed and not enticing for student to rent car

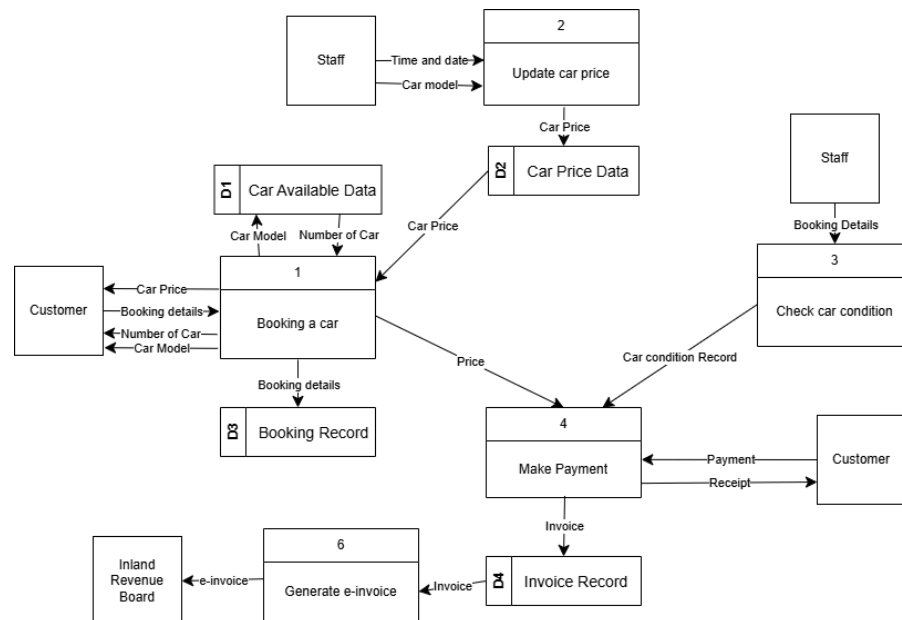
## 5.2 Logical DFD AS-IS System

This section presents the data flow diagrams (DFD) for the current manual system used by Hasta Travel and Tours for their booking system. The diagrams help visualize how data moves within the system, identify inefficiencies, and understand how different processes interact.

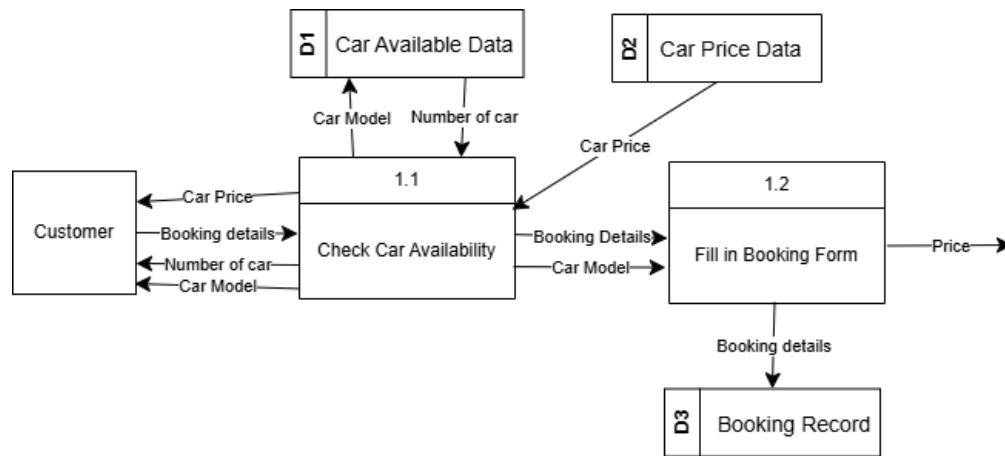
To analyse in detail on the data flow of the system, logical DFD of AS-IS system is illustrated as followed:



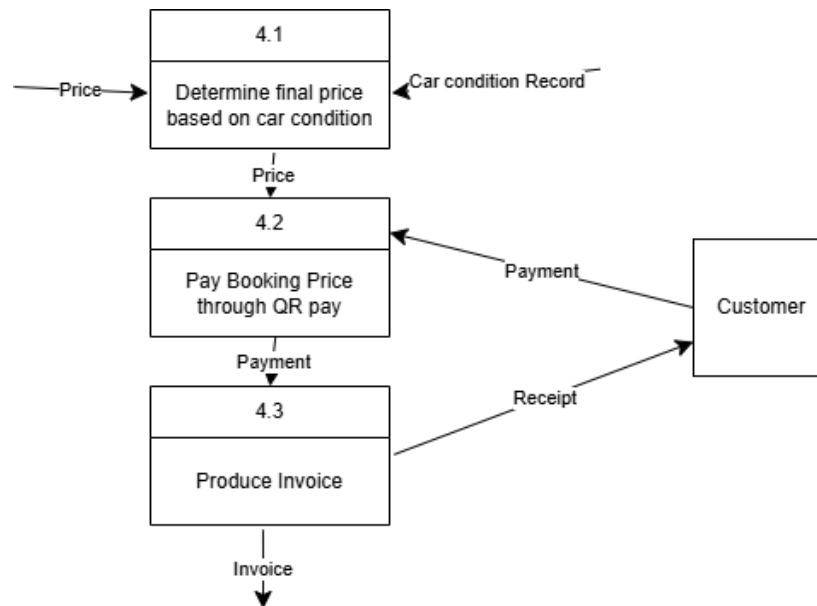
**Figure 1: Context Diagram of Current Manual Booking System**



**Figure 2: Level 0 DFD of Current System**



**Figure 3: Child Diagram (Process 1) of Current System**



**Figure 4: Child Diagram (Process 4) of Current System**

### 5.3 Functional Requirement

This section outlines the key features the system must include to meet user needs. These features include user registration, car browsing with filters, real-time booking and payment, invoice generation, and rental management. It also supports feedback collection, notifications, and loyalty rewards to improve user experience and business efficiency:

→ **User Registration & Authentication:**

Customers and staff can register and log in securely. Role-based access: admin, customer, operations staff.

→ **Vehicle Browsing & Search:**

Customers may search vehicles by model, price, availability, or destination. Allow option to filter results (e.g., SUV, manual/automatic).

→ **Online Booking & Payment**

Customers are allowed real-time booking for car rental with date/time selection.

Centralised database that may store payments made by customers and automatically produce invoice.

→ **Rental Management**

Managers may track active, upcoming, and completed rentals. Managers may also track late return, cancellations, and refunds.

→ **Fleet Management**

Managers can add, update, or remove vehicle listings. Manager able to track vehicle condition, maintenance, availability through digitalised database.

→ **Customer Feedback & Support**

Managers may collect ratings and reviews from customers after rentals for feedback. May provide a chat or ticketing system for support.



→ Report Generation

System may generate usage statistics, financial summaries (invoice report), and customer reports and reviews.

→ Discounts & Loyalty System

Provide promo codes, discounts and dynamic pricing for car rental. Track customer history and reward repeat customers.

→ Notification System

Send emails/SMS for booking confirmations, reminders, or alerts.

→ Location Services

Integrate Google Maps API to show car pickup/drop-off points.

## 5.4 Non-functional Requirement

This section deals with the quality aspects of the system like performance, security, and usability. The system must be timely, secure, user-friendly, and web and mobile compliant. It must be reliable, scalable, and industry compliant for long-term use and future growth.

- ★ Performance

Support at least 500 concurrent users with <3s page load time.

- ★ Scalability

Must accommodate new features (e.g., car subscription plans) and more users.

- ★ Security

Use HTTPS, input validation, and role-based access. Encrypt sensitive user and payment data (PCI DSS compliance).

- ★ Usability

Web-based responsive UI. Simple, intuitive navigation for all age groups.

- ★ Availability

Ensure 24/7 access with minimal downtime (<0.5% monthly).

- ★ Maintainability

Use a modular codebase (MVC architecture) for easy updates.

- ★ Portability

Accessible via web browsers and mobile devices (Android/iOS).

- ★ Interoperability

Integrate with external APIs (map, vehicle tracking, CRM).

- ★ Compliance

Adhere to local laws (e.g., driver's license validation, rental terms). GDPR compliance for user data privacy in applicable regions.

- ★ Agility

Development should follow Agile methods (Scrum sprints, CI/CD pipelines).

## **6.0 Summary of Requirement Analysis Process**

After conducting the requirement analysis process, it is found that there are many manual processes in the workflow of Hasta Travel And Tour Sdn Bhd car rental system. From the requirement analysis process, we have also identified a few processes that can be computerised to increase workflow efficiency and improve business processes. Those processes are as follows:

- Car Rental Booking Process
  1. Car Availability Update
  2. Dynamic Pricing
  3. Booking Record Management
  
- Invoice System
  1. Automatic Report Generation
  2. Booking Payment Calculation
  3. Invoice Record Management

Hence, from the gatherings from the requirement analysis process, a useful and intuitive car rental system can be designed and developed by fulfilling the requirements that have been analysed.