UTM

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FACULTY OF COMPUTING

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SYSTEM ANALYSIS AND DESIGN

PROJECT PHASE 1 – PROJECT PROPOSAL

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1.0 Introduction

E-Hailing is a service provided to book public transport services through electronic applications – a type of electronic system that allows users such as workers and students to travel around easily. An e-Hailing vehicle is a private vehicle used to provide public transport services to passengers who book through electronic applications. As simple as clicking a button, everything is possible from their houses and their desired destinations even miles away. With platforms such as *Grab*, *KumPool*, and *MyCar*, users now have easier and convenient ways to book their rides using their smartphone devices.

The common widespread uses of e-Hailing services throughout an area may include the increasing demand for public transportation. Users such as students can use these services to attend lectures and tutorial classes for their studies. Besides, factory workers who rely on public transportation can also benefit from e-Hailing services. In the modern era, smartphones are viable belongings in which everyone must have to do their work a lot easily. While doing their work, they also need to move around more efficiently. Thus, E-Hailing is a perfect solution for the users' travelling issues.

Several administrators and the workers of the e-Hailing service companies made a digital system design for e-Hailing services. This is to make sure users can access public transportation with just simple clicks on their devices. However, several issues related to the current system implementation with the end users sparked undeniable problems. In this project, we try to determine the problems of the current e-Hailing system, solutions to the problems, and to derive possibly a new and improvised system for the e-Hailing to ensure flexibilities and easier management among users.

2.0 Background Study

Firstly, we need to identify the users who encountered numerous issues with the current e-Hailing system. Several users complained about the complexities of the current e-Hailing system, especially for the older generations. Designers often include all possible features in e-Hailing systems, making them difficult for users unfamiliar with online services to navigate. As a result, these kind of users may find booking public transportation more of a hassle than necessary.

Secondly, due to a significant increase in technology usage in the modern era, e-Hailing has become a vital method of booking public transportation. Thus, many users will be keying in their personal information through the digital world. Many users are concerned about data privacy during the ordering process. Questions such as, “Is my information safe?”, “Is there a possibility where my information will leak online through irresponsible behavior of other people?” and “Are there any suspicious people who track down others using their submitted information online?” reflect widespread apprehensions about privacy and security, which can undermine trust in e-Hailing services among users.

Then, we are eager to know the efficacy of the e-Hailing system itself, whether the system is flexible enough to handle a large number of users across an entire place or even an entire country. Users have reported delays between ordering and driver pickup, particularly in urgent situations like being late for class or work. These delays often result from inefficiencies in the system’s coordination with the management, causing dissatisfaction among users who need immediate transportation.

3.0 Problem Statement

Based on the background studies, we identified **three** problems with the current e-Hailing system, which include...

- The current e-Hailing system design may be too complex for users (less user-friendly), especially for inexperienced users and older generations to book public transportation online.
- The current e-Hailing system design may lack data protection and security issues since the users will provide their personal information to the e-Hailing service drivers. This may lead to illegal ethical privacy issues among irresponsible people.
- The current e-Hailing system design may face high user traffic due to high ongoing demands since people nowadays especially younger generations prefer to apply for easier and convenient public transportations. This could cause major delays between users and the system with the services if not handled carefully.

By identifying these problems, we are able to proceed to the feasibility studies and to identify the needs of an improvised e-Hailing system design.

4.0 Proposed Solutions

4.1 Technical Feasibility

Technical feasibility assesses whether the technology required to develop the new e-Hailing system is available and capable of meeting the project's requirements.

System Architecture:

- **Application System Design**
    - Developing intuitive and user-friendly e-Hailing system is essential. The interfaces designed with simplicity in mind, especially for older users. For example, features like larger icons, voice commands, and simplified navigation.
- **Security Measures**
    - Implementing enhanced security measures, such as data encryption and securing authentication protocols. This will address user concerns about data privacy and protection.
- **Real-Time Data Processing**
    - Utilizing real-time data processing technologies like *Apache Kafka*, can ensure that user requests and driver availability are updated instantly, reducing delays and improving system efficiency.
- **Cloud-Based Infrastructure**
    - Implementing a cloud-based system can provide scalability, flexibility, and reliability. This can handle large volumes of data and user requests a lot efficiently.

Integration with Existing Systems:

- **GPS and Mapping Services**
    - Integrating with reliable GPS and mapping services like *Google Maps* can enhance route optimization and provide accurate estimated time arrival (ETA).
- **Payment Gateways**
    - Secured payment gateways needed to offer multiple payment options to ensure user convenience and data security.

Technological Innovations:

- **AI and Machine Learning**
    - Using AI for predictive analytics can improve demand forecasting, optimizing e-Hailing driver allocation, and personalize user experiences.
- **Internet of Things (IoT) and Telematics**
    - Incorporating Internet of Things devices and telematics can provide real-time vehicle diagnostics, improve safety, and to enhance overall system efficiency in general.

5.0 Economic Feasibility

Economic feasibility examines the cost-effectiveness of the proposed e-Hailing system and its potential for financial viability.

Cost Analysis:

- **Development Costs**

  This includes expenses for hardware tools, software development, and integration of third-party services like GPS system.

- **Operational Costs**

  These include server maintenance, customer support, marketing, and regular system updates.

- **Security Investments**

  Allocating budget for advanced security features and compliance with data protection regulations is crucial to protect user information and maintain trust.

Revenue Analysis:

- **Commission from Rides**

  Charging a commission fee on each ride is a primary revenue source of e-Hailing services.

- **Subscription Models**

  Offering premium features through a subscription model can generate additional revenue.

- **Advertisement**

  Integrating advertisements within the app can provide another revenue stream, provided it does not interfere with user experience.

Predictions made using *Cost-Benefit Analysis* (CBA):

Estimated Costs:

Training for drivers and support staff:	RM 20 000
Mobile Apps:	RM 10 000
Customer Support:	RM 5 000
Vehicle Maintenance:	RM 30 000

Expected Benefits:

Increased accessibility for users:	RM 2 000 per month
Reduction in traditional taxi service competition:	RM 25 000
Revenue generation through ride commissions:	RM 10 000

Assumptions:

Discount rate:	15%
Sensitivity factor (cost):	0.50
Sensitivity factor (benefit):	0.90
Annual increment (costs):	5%
Annual increment (benefit):	15%

Cost-Benefit Analysis (CBA) table is on page 10 (next page).

Cost-Benefit Analysis (CBA) for our team's E-Hailing Project Proposal

CRITERIA (RM)	YEAR

1. COSTS	YEAR 0	YEAR 1	YEAR 2	YEAR 3
A. Development				
Mobile Apps	5 000			
Training for drivers and support staff	10 000			
Total Development Cost	15 000			
B. Operational				
Customer Support		2 500	2 625	2 756
Vehicle Maintenance		15 000	15 750	16 538
Total Operational Cost (Annual)		17 500	18 375	19 294
Present Value (PV)		15 217	13 894	12 686
Accumulated Cost		30 217	44 112	56 797
2. BENEFITS				
Increased accessibility for users		21 600	24 840	28 566
Reduction in traditional taxi service competition		22 500	25 875	29 756
Revenue generation through ride commissions		9 000	10 350	11 903
Total Benefit (Annual)		53 100	61 065	70 225
Present Value (PV)		46 174	46 174	46 174
Accumulated Benefit		46 174	92 348	138 522
Gain/Loss		15 957	48 236	81 725
Profitability Index	5.448			

The estimated profitability index (PI) value for our e-Hailing project proposal is **5.448**.

Based on our prediction of data, we obtained a PI value higher than 1.00. Thus, we estimated this as a good investment.

6.0 Operational Feasibility

User Training and Support:

- **Training Programs**
    - Offering training sessions and convenient tutorials to users, especially older generations to be familiar with the improvised user-friendly e-Hailing system.
- **Customer Services**
    - Provide users with customer feedback and reviews on the improvised e-Hailing system to enhance system reliability.

Scalability:

- **Pilot Implementation**
    - Testing the improvised e-Hailing system among smaller community to gain feedback before launching it officially to the public.

Operational Workflow:

- **Driver Management**
    - Implementing a streamlined driver management system to handle onboarding, scheduling, and performance tracking.
- **Incident Management**
    - Setting up a comprehensive incident management process to address and resolve issues swiftly, ensuring minimal disruption to services.

Regulatory Compliance:

- **Safety and Regulations**
    - Making sure the improvised e-Hailing system secured from illegal data and information incidents through multiple stages of indirect digital communication between users and the administration.

7.0 Objectives

Based on our achievable feasibility studies and the problem statements derived, we can determine three achievable project objectives to look for a newly improvised e-Hailing system based on our three proposed problems, which include…

- Develop and design a generalized user-friendly design from the current e-Hailing system, to ensure everyone including younger and older generations to utilize e-Hailing services efficiently by reducing the system complexities.
- Implementing a high data and privacy security for the current e-Hailing service systems, to ensure data ethical and safety among users whenever entering their personal information online and among administrations collecting users' data for future uses.
- Develop and design multiple ordering channels under a single e-Hailing service system, to ensure multiple users can access e-Hailing services quickly, hiring more e-Hailing drivers to allocate users' time efficiently and to reduce traffic delays compared to lesser order channels.

By referring to our objectives, we are able to identify the hotspots for improving the current e-Hailing system to ensure flexibility, reliability, and reusability.

8.0 Scope of the Project

Our scopes of the project may include…

- User-friendly design of the e-Hailing system.
- Enhanced security authorization and data protection when entering data via online booking of public transportations, or in other words netiquette.
- Providing multiple ordering channels and e-Hailing driver slots to ensure a quicker user experience.

We aim to reduce…

- System complexities to ensure all users regardless of their age range will be easier to book for e-Hailing transportation on digital world.
- Users concern about data privacy and security issues online.
- Delay issues within the e-Hailing system and the users – to minimal time latency issues among users who are in need of urgency.

9.0 Project Planning

The important phase is the project planning, where we planned and discuss the possible ways to achieve our goals. There are four parts in our project planning, which are Human Resource, Work Breakdown Structure (WBS), PERT chart and Gantt chart.

10.0 Work Breakdown Structure (WBS)

For every journey towards the final touching of our project, we have defined detailed steps in identifying project studies, backgrounds, problems, objectives, scopes, thorough analysis, estimations, developing and designing the system and implement the system to the targeted users. A periodical maintenance is crucial to ensure the e-Hailing system's efficacy and up-to-date.

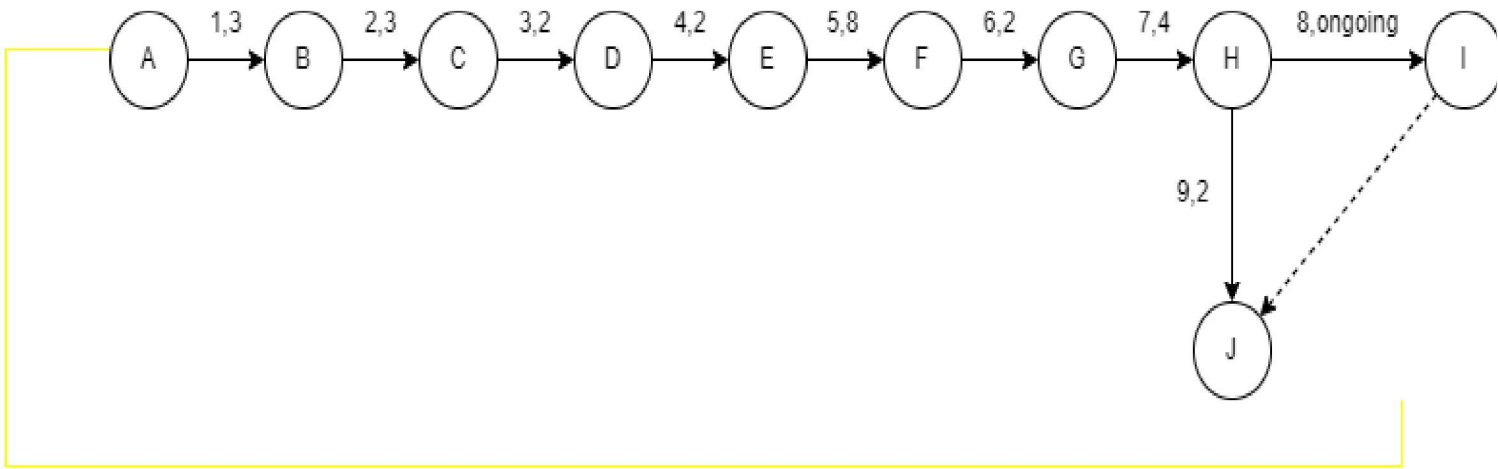
No.	Tasks	Duration (weeks)	Predecessor
1	Identifying Backgrounds, Problems, Opportunities, Objectives, and Project Scopes	3	
2	Conduct surveys and interviews with users for the current e-Hailing system	3	1
3	Analyzing Feedback of Current e-Hailing System	2	2
4	Estimating project budget, time, and resource requirements	2	3
5	Developing and Designing a new e-Hailing system	8	4
6	Testing and Documentation	2	5
7	Phased Implementation	4	6
8	Improvised e-Hailing System Maintenance	Ongoing	7
9	Post-Implementation Reports	2	7,8
		⩾ 26 weeks	

Work Breakdown Structure (WBS) for our proposed improvised e-Hailing system

We predicted a minimal total of 26 weeks required to complete our proposed improvised e- Hailing system. The rest weeks are only for maintenance of the new system.

11.0 PERT Chart

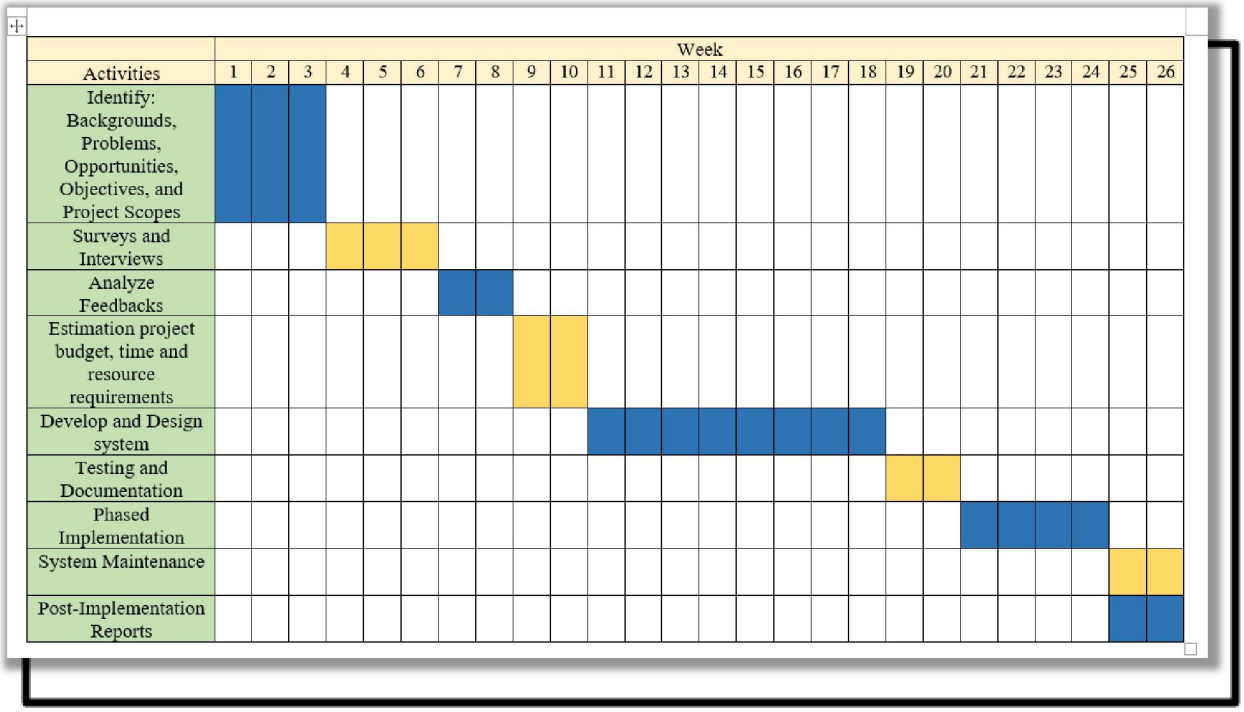
Our PERT diagram is a conversion of our Work Breakdown Structure (WBS) to identify a detailed flow of our project processes more collectively. This is to help us keeping the project at the right track within a certain period easily.



PERT Diagram for our proposed improvised e-Hailing system

12.0 Gantt Chart

A modified version of our PERT diagram. Gantt chart allows us to see any overlapping activities and/or activities with completed predecessors to make sure we can achieve an optimal time spent on the project.



Gantt chart for our proposed improvised e-Hailing system activities

13.0 Benefit and Overall Summary of Proposed System

In conclusion, we aim to achieve optimal performance by developing and designing an improved e-Hailing system that enhances user expectations and satisfaction. Our proposed project objectives ensure users benefit from a simplified user interface for easier e-Hailing management across all ages. Additionally, users will enjoy enhanced data protection and security through secure digital transactions when booking public transportation online. Furthermore, users will benefit from quicker e- Hailing transport arrival, reducing delays and improving their overall experience.

We propose an improved e-Hailing system that aims to revolutionize the transportation experience for users of all ages. By addressing the complexities of the current system, enhancing data privacy and security measures, and optimizing transportation service efficiency, our goal is to provide a user-friendly system design, enhanced data protection, and quick response to user needs.

By prioritizing these objectives, we believe our proposed e-Hailing system will help users easily book public transportation online, regardless of age. Additionally, their personal information will remain safe and secure, and they will benefit from quick estimated times of arrival to ensure user satisfaction.

Hence, our proposed e-Hailing system represents a step forward in the ongoing journey towards creating smarter, more efficient, and user-centric transportation solutions. With the support of stakeholders and the dedication of our team, we are confident that this system will positively influence users across the entire country.

14.0 References

Ministry of Transport Malaysia, (2024). *e-Hailing Services*. Retrieved from https://www.mot.gov.my/en/land/infrastructure/e-hailing-services

Kendall, K.E. & Kendall, J.E., 2024. *System Analysis and Design*. 11th Ed. Essex: Pearson.

15.0 GitHub Link for Project Phase 1

https://github.com/Mathan0702/SYSTEM-ANALYSIS-AND-DESIGN