



Faculty of Computer Science and Information Technology

PBTPAY MOBILE APPLICATION USING FLUTTER FRAMEWORK

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ABSTRACT

PBTPay app is a mobile version of the PBTPay portal, which was designed to enable taxpayers to pay their taxes to the Local Government Department (PBT). The app includes additional features such as a notifications function for outstanding or new tax bills. Although there are several tax payment applications on the market, the majority of them are designed for tax payment of specific city councils. The probability that a taxpayer has many assets and requires him to make payments to several city councils is high. As a result, using the PBTPay application, taxpayers can make payments to all local authorities except Sabah and Sarawak. Furthermore, with the mobile version of PBTPay may make tax payment easier for the taxpayer because the user does not need to search for the PBTPay link to make a payment. As the application has been developed, 97.06% of the respondents (33 respondents) agreed that all of the application's capabilities are working well, with no problems or lags. A system usability score (SUS) was also determined through usability testing, and the total for the SUS values is 90.81 for mean and 8.45 for standard deviation with 34 respondents. This implies that this application has a high average for system usability.

ABSTRAK

Aplikasi PBTPay ini ialah versi mudah alih bagi PBTPay portal yang direka untuk membolehkan pembayar cukai membayar cukai mereka kepada Jabatan Kerajaan Tempatan (JKT). Aplikasi ini termasuk ciri tambahan seperti fungsi pemberitahuan untuk bil cukai tertunggak atau baharu. Walaupun terdapat beberapa aplikasi pembayaran cukai di pasaran, sebahagian besar daripadanya direka untuk pembayaran cukai bagi majlis bandaran tertentu sahaja. Kebarangkalian bahawa pembayar cukai mempunyai banyak aset dan memerlukan dia membuat pembayaran kepada beberapa majlis bandaran adalah tinggi. Hasilnya, dengan menggunakan aplikasi PBTPay, pembayar cukai boleh membuat pembayaran kepada semua majlis bandaraya kecuali Sabah dan Sarawak. Tambahan pula, dengan versi mudah alih PBTPay boleh memudahkan pembayaran cukai kepada pembayar cukai kerana pengguna tidak perlu mencari pautan PBTPay untuk membuat pembayaran. Memandangkan aplikasi ini telah dibangunkan, 97.06% daripada responden (33 responden) bersetuju bahawa semua keupayaan aplikasi berfungsi dengan baik, tanpa masalah atau ketinggalan. Skor kebolegunaan sistem (SUS) juga ditentukan melalui ujian kebolegunaan, dan jumlah bagi nilai SUS ialah 90.81 untuk min dan 8.45 untuk sisihan piawai dengan 34 responden. Ini menunjukkan bahawa aplikasi ini mempunyai purata yang tinggi untuk kebolegunaan sistem.

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Chapter 1: INTRODUCTION

1.1 Introduction

Local Government Development (JKT) is one of the departments under Ministry of Local Government Development (KPKT) that based in Putrajaya. JKT has created a payment portal for users to make tax assessment, rent, or compound payments imposed by local governments (PBT). The portal is called PBTPay, and it allows users to create multiple accounts to pay taxes from different locations under different PBTs. Customers no longer need to visit multiple websites to pay their taxes.

As conversion of PBTPay portal, this proposed project will be utilised by JKT as the PBTPay mobile version that will be used by different local authorities. List of local authorities can be referred as in the provided link (<https://pbtpay.kpkt.gov.my/home/pbt>).

As stated by Samsukha (2022), mobile payments are a more efficient, simple, and convenient way to make payments from anywhere and at any time. The users are no longer required to browse the portal and make a payment. Furthermore, the internet connection would be more secure than using a payment portal because the user could use mobile data instead of public Wi-Fi. According to Dr. Mohd Heikal Husin, senior lecturer at Universiti Sains Malaysia, the Malaysian Communications and Multimedia Commission's recent Handphone Users Survey 2021, the country's overall smartphone penetration rate was 94.8% (Hilmi, 2022). The fact indicates that consumers prefer to conduct all of their business over the phone.

In addition, mobile application development is always required in various platforms such as Google Play and Apple App Store. Using Google's Flutter open-source framework, the developer could create natively compiled multiplatform applications with a single codebase (Heller, 2022). Due to this fact, the process to release the code into Android Package Kit (APK) and iOS App Store package (IPA) could be easier than native applications. Dart is also a

programming language used in the flutter framework, which is designed for web and mobile applications. Thus, it exemplifies that the flutter framework is quite compatible for developing a mobile applications and sharpening skills in learning new programming languages.

1.2 Problem Statement

Local government departments (JKT) in Putrajaya struggle to notify customers about bill arrears or new payments due to existing web portals. Furthermore, they cannot directly notify users of portal maintenance or promotional announcements. JKT's current strategy is to send messages to all users about the bills they need to pay via Short Message Service (SMS). This has caused issues for users who have multiple accounts because they will receive multiple messages about new bills notifications that must be paid. Furthermore, users who need to make a payment on a specific date but only recently discovered JKT's portal is down may be affected. The mobile version of PBTPay can provide direct information to users via push notifications as an additional feature.

In addition, mobile application development could be focused on one platform either Android or iOS if using native application. Flutter adheres to the concept of "write once, run anywhere," allowing developers to write code once and have it run on two different platforms (Sharma, 2022). Dart is a programming language used by Flutter that can be compiled into fast native code that runs smoothly on all supported platforms. However, this project only required for the application to be deployed in the Android Package Kit (APK). In developing Android applications, most mobile applications are developed by the Android Studio software. Existing knowledge can be a barrier to learning a new programming language for developers. As a result, the flutter framework can reduce application development time and sharpen skills in learning new programming languages.

1.3 Aim and Project Objectives

The PBTPay mobile application which built on the flutter framework is intended to make the payment app more usable by allowing users to pay their utilities through mobile. Based on the stated problem statement, the following project objectives are listed as below:

- To design an interactive and user-friendly user interface for PBTPay application by using flutter framework.
- To develop a notification function for enhancement of the PBTPay mobile application.
- To evaluate the usability of PBTPay mobile among the taxpayer compared to the existing PBTPay payment portal.

1.4 Scope

This proposed project is intended for taxpayers to use a mobile application to pay their bills to Local Governments Putrajaya (PBT) more efficiently. The current PBTPay payment portal will be converted into a mobile app with enhanced features. As the national language of Malaysia, Bahasa Malaysia has been chosen as the platform language for PBTPay mobile. The following aspects should be emphasised:

1. This PBTPay mobile application will be built with the Flutter framework in order to learn a new programming language which is Dart.
2. This application includes a notification features to notify users of any news from local governments.

1.5 Brief Methodology

This project employs the Mobile Application Development Lifecycle (MADLC) methodology.

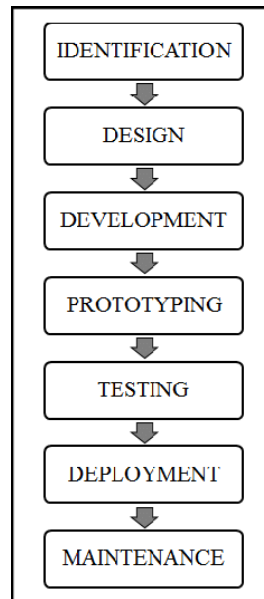


Figure 1.1 Mobile Application Development Lifecycle Model (Vithani & Kumar, 2014)

MADLC phases include identification, design, development, prototyping, testing, and maintenance. The first phase is identification, in which ideas are collected and categorised. In order to enhance the application, the proposed ideas will be compared to similar existing applications. Following that, the design phase is an initial design of a mobile application that includes wire frames, a use-case diagram, and a class diagram to explain the application's flow. The third phase is development, which is the phase for actual application coding. The application is coded in response to the previous phase requirement.

Furthermore, the functional requirements of the prototypes are examined during the prototyping phase by testing and receiving feedback from end users. The necessary changes are implemented during the development phase in response to feedback. Development, prototyping, and testing stages are repeated until the finalised prototype is completed. Furthermore, the testing phase will begin with an emulator or simulator and will be followed by testing on the actual device. After testing is completed and final client feedback is received,

the application is ready for deployment. The maintenance phase is the final phase that is required to make improvements or bug fixes based on users' feedback.

1.6 Significance of Project

There are several issues with the current PBTPay payment portal that must be addressed. The PBTPay mobile application has the potential to solve the current problem by incorporating several new features. Users can be notified about their new bills as well as receive information or promotions from the local government. Users no longer need to be concerned about their connection if they want to conduct bill transactions because they can use their own mobile data by using the mobile app. It is safer than public Wi-Fi. Consumers can pay their taxes whenever and wherever they want if they have their phone with them.

In addition, the flutter framework allows developers to learn new coding languages in order to create the applications. Dart will be used in this project to achieve the goal of learning new programming languages.

1.7 Project Schedule

This project will be followed up on in accordance with the time frame set for the final year project, which is for one year. The period has been divided into two parts. The first phase will involve creating a interface design and analysing feedback from end-user questionnaires. The first part will run from October 12th, 2022, to January 12th, 2023. Then, from March 20th to July 4th, 2023, the second part will be scheduled to develop the actual application for the system. A Gantt Chart illustrating the duration of the project schedule can be referred in **Appendix C**.

1.8 Expected Outcomes

The expected project outcome would be a functional mobile application that allows the local government in Putrajaya taxpayers to pay their bills using the PBTPay mobile application with additional new features. This project aims to create a notification function as a new feature to keep users up to date on new billing and local government news. It will make it easier for local governments to provide consumers with the most up-to-date information. Furthermore, the application will be developed using cross-platform software, which is designed to work in multi-platform applications from a single codebase. However, this project only required for the application to be deployed in the Android Package Kit (APK). The PBTPay mobile application would be a convenient application that allows users to pay their bills anywhere and at any time without fear of clicking on the wrong link.

1.9 Project Outline

This report is broken down into chapters. The second chapter compares current applications and the proposed application based on several aspects such as notification feature. The third chapter examines the requirements for developing the proposed application, which use the Mobile Application Development Lifecycle Model (MADLC) as its development approach. The requirements are classified into two types: functional requirements and non-functional requirements. The fourth chapter examines the methods for implementing the proposed application, including software, hardware, and user interfaces. Chapter 5 describes the testing of the planned application prior to market launch. Chapter 6 summarises the project timetable and lists the potential future works for the proposed applications.

Chapter 2: : Literature Review

2.1 Introduction

There are several town councils under Putrajaya local government. Each municipality has its own payment portal or application for paying district taxes. However, several user comments mentioned their negative experiences with those payment platforms. As a result, the Putrajaya local government devises a solution to establish one payment portal for all town council taxpayers to pay their taxes. Regrettably, the payment portal continues to have issues with its notification features and accessibility.

The PBTPay mobile application has been proposed as a solution to the problem. As a result, a comparison of existing payment portals and applications was carried out in order to evaluate and enhance each feature that should be used.

2.2 Review of Existing Applications and System

There are four existing applications chosen for the comparison purposed in this project, namely the ecukai@mbpj, e-bayaran mbkt, myManjung and PBTPay portal. These existing applications and system were chosen for review and comparison in this section as they all share a tax payment concept. Several criteria are explained, including functionalities, user interface designs, and usability.

2.2.1 ecukai@mbpj

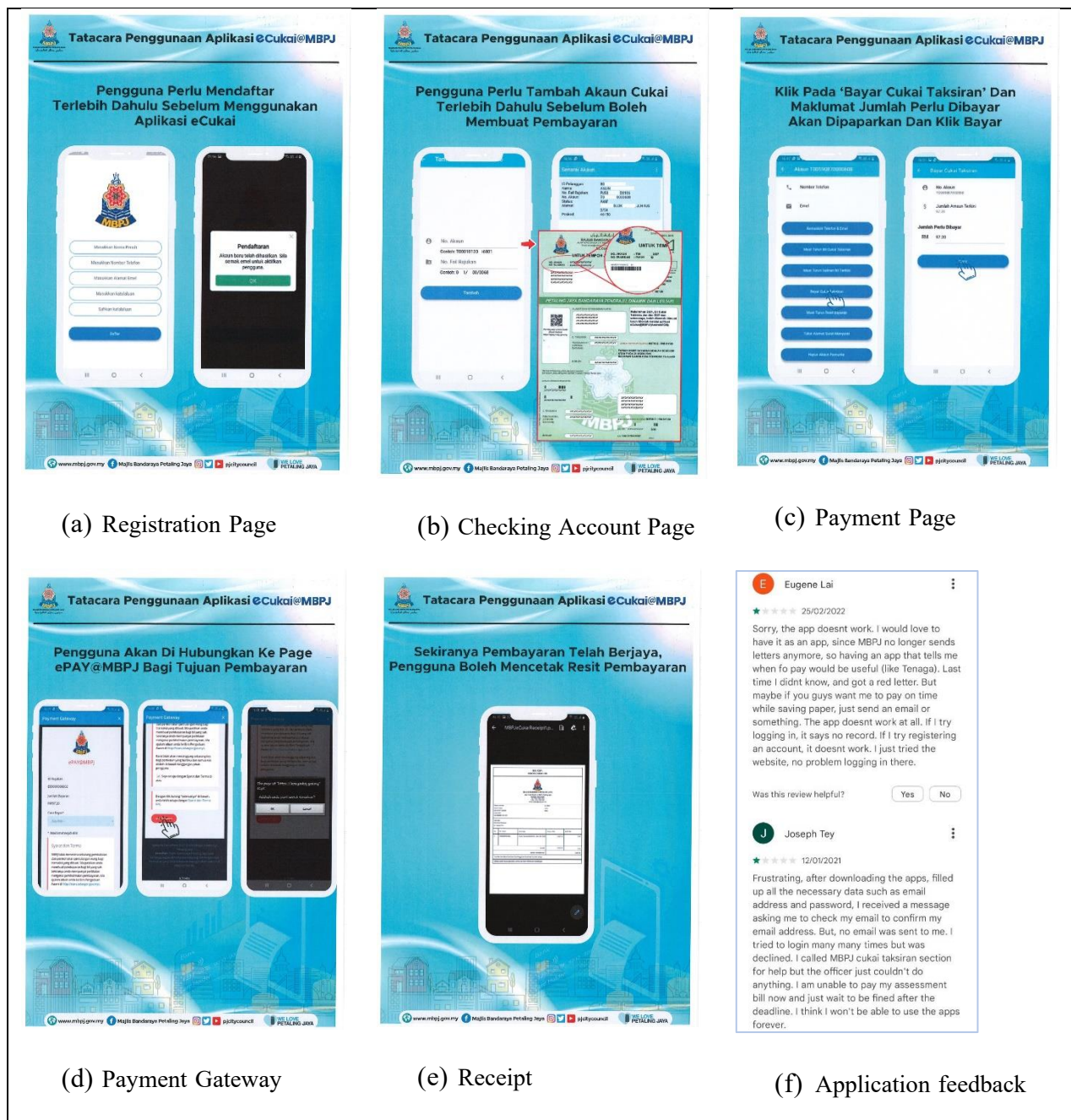


Figure 2.1 User interface design of ecukai@mbpj (ecukai@mbpj, 2021)

Ecukai@mbpj is a mobile application developed by the Petaling Jaya city council which available on both the Play Store and the App Store in 2021. The purpose of ecukai@mbpj has been developed exclusively for Petaling Jaya taxpayers who pay their taxes via mobile application. The Petaling Jaya city council has prepared a user manual for the application, as shown in Figure 2.1(a), (b), (c), (d), and (e).