

# DEVELOPMENT OF PERSONAL FINANCIAL PLANNING APPLICATION USING FIREBASE CLOUD MESSAGING TECHNOLOGY AND API ONLINE SHOP BASED ON ANDROID

Muhammad Guntur Priyantono 1, Eko Budi Setiawan 2  
<sup>1,2</sup>Informatics Engineering – Indonesian Computer University  
Street.Dipatiukur No. 112 Bandung, West Java 40132  
E-mail: [m.gunturpriyantono@gmail.com](mailto:m.gunturpriyantono@gmail.com)<sup>1</sup> , [eko@email.unikom.ac.id](mailto:eko@email.unikom.ac.id)<sup>2</sup>

## ABSTRACT

*Financial planning is the process of managing financial expenditures so that the needs and goals to be achieved can be met. The purpose of financial planning is that financial expenditure is not greater than income. in the process of course it is necessary to consider things that are related to the process. for example shopping at an online store. Shopping at online stores is a new style of shopping so there is no need to meet with buyers and can be done anywhere and anytime. At present it is difficult in financial planning because the results of financial planning cannot be known immediately. and less comparing prices in online stores makes planning less effective. The purpose of this research is to make it easier for people to plan their finances and compare the cheapest prices in several online stores. By utilizing Firebase Cloud Messaging (FCM) technology to provide the cheapest goods information from online stores and with methods for financial planning and implemented on Android Smartphone devices. After testing with the black box method and conducting a questionnaire, the conclusion obtained is the need for an application that can plan finances and compare the lowest prices at online stores.*

*Keywords: Financial Planning, Technology, Firebase Cloud Messaging, Online Store, Android*

## 1. INTRODUCTION

### 1.1 Background

Knowledge and understanding of personal finance is needed for individuals to be able to make the right decisions in finance [1]. A financial planning is indeed needed by someone to overcome financial problems that occur in everyday life [2]. Doing a plan in finance makes a person's life more orderly and organized in achieving a goal so it is far from wasteful. Financial difficulties can also arise if there are mistakes in financial management (Missmanagement) [1].

To get the maximum results from financial planning, there are some things that need to be considered so as not to fall into error by considering and determining measurable financial goals and determining specific targets of what you want to achieve [3]. To achieve specific targets in financial planning, practical technologies and media such as smart phones are needed. In the rapid development of technology, a smart phone-based financial planning application is needed [4]. Based on a survey of the questionnaire conducted on October 13, 2018. There were 40 respondents recorded income and expenditure with books and mobile phones. Recording using books and notes on mobile phones and is still difficult as making monthly reports that are still manual and sometimes forget not to record expenses or income, this is evidenced by 77.5% of 40 respondents consisting of students and also workers find it difficult to do financial planning.

Managing money spending is also included in financial planning. To achieve specific targets in financial planning requires a plan in buying goods or products. Based on the questionnaire, 80% of 40 respondents claimed to have bought products / goods in the Online Store. Reasons to buy goods at the Online Store vary from discounts, practical and not complicated. But of the 40 respondents 82.5% never compare the price of goods purchased with other Online Stores. This causes ineffective savings because there is still the possibility of low prices at other Online Stores. Online shop itself is a new way for sellers to market their merchandise, where traders do not need to come to the store but rather simply visit the website of the online store [5]. In making a purchase planning, a reminder is needed so that the money being saved is enough to buy the desired item or product as well as a recommendation of what item or product is being discounted. Information and reminders can be obtained by utilizing one of the technologies in smartphones

through notification technology from Firebase Cloud Messaging (FCM).

FCM is a service that is used for notifications FCM is a service used for notifications on Android, iOS and Web-based applications [6]. The advantages of FCM are Upstream or Downstream without limits, overcoming the queue and delivery aspects [7]. With Notifications, information about items / products that are being discounted or the cheapest in the Online Store can be obtained, as well as with financial planning to buy a product or item can be reminded with a notification.

Therefore it need a solution how someone can manage their finances well. Make efficiency and make savings to manage expenses [8]. And smart in managing financial spending. Therefore, a research on financial management will be made that is rooted in the problems that have been explained before, using the media of Android devices and also using Firebase Cloud Messaging technology as a notification for reminders in conducting financial management.

### 1.2 Android

Android is a linux based operating system designed for touch screen mobile devices such as smartphones and tablet computers. Android is a collection of software for mobile devices that covers the operating system, middleware and main mobile applications [9].

### 1.3 Firebase Cloud Messaging

Firestore Cloud Messaging is a service that is used for notifications on Android, iOS and Web-based applications [6]. FCM makes it easy to deliver messages for free, independent of the size of a message, besides that FCM services will manage every message sent to match the destination mobile device (receiver) [10].

The Firestore Cloud Messaging implementation includes two main components for sending and receiving messages namely the application server that is used to create and send messages as well as those that receive messages such as Android.

Firestore cloud messaging can send messages in the form of notification messages and data messages. Notification messages are used if you want FCM to handle the appearance of notifications on behalf of the client application. And data messages are used if you want to process messages on the client application.

### 1.4 Purpose and objectives

The objectives to be achieved in the development of Financial Planning Applications Using Firestore Cloud Messaging Technology and the Android Based Online Shop API based on the identification of the above problems are as follows:

1. Make it easy for users to plan their finances through an Android-based financial planning application.

2. Make it easy for users to get the lowest prices on existing products in the online store so that it can help in financial expenditure problems.

### 1.5 Research methodology

The research phase consists of two stages, namely the stage of data collection and application development [11]. Following the research methodology as Figure 1.

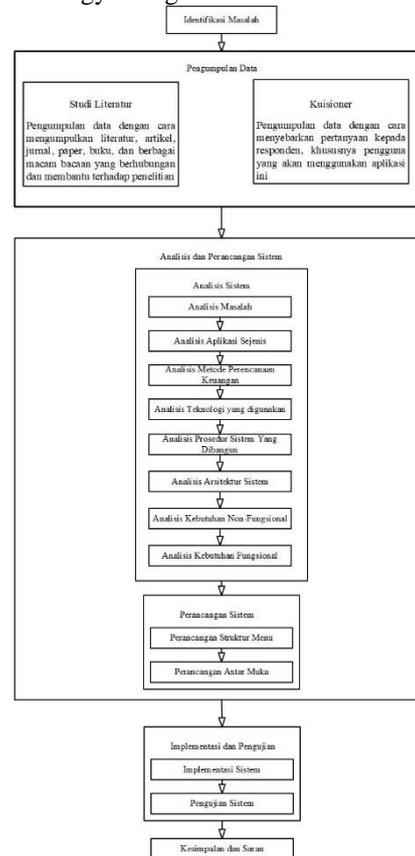


Figure 1. Research Stages

### 1.6 A Method Of Software Development

The method used in software development in this study is the waterfall method [12]. The following picture software development methods such as Figure 2.

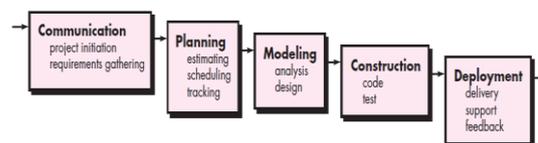


Figure 2. Waterfall method

## 2. RESULTS AND DISCUSSION

### 2.1 Analysis Of System Architecture

The system to be built is a personal financial planning application using Firestore Cloud Messaging and the Online shop API. The system architecture to be built can be seen in Figure 3.

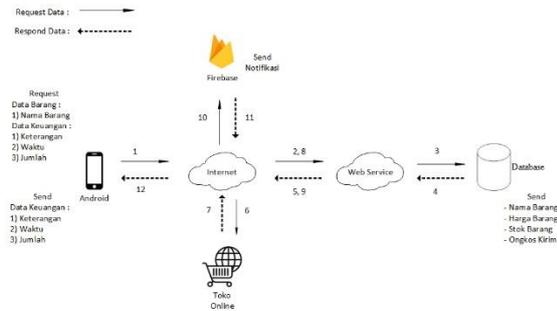


Figure 3. Arsitektur System

## 2.2 Analysis of The Problem

Based on a review of the system analysis that has been done by evaluating the application to be built. Some of the problems that are the result of the analysis carried out serve as a background in the construction of a system that was built. Here are the problems from the results of the analysis conducted:

1. How to build applications that can plan finances according to the needs of application users.
2. How to build applications that can compare the lowest prices on online stores.

## 2.3 Analysis of The Procedures That Will Be Built

The procedure to be developed is a proper sequence of activities from the stages that explain what process will be carried out, who will work on the process, and how the process can be done. Analysis of the system to be built is can be seen in Figure 4.

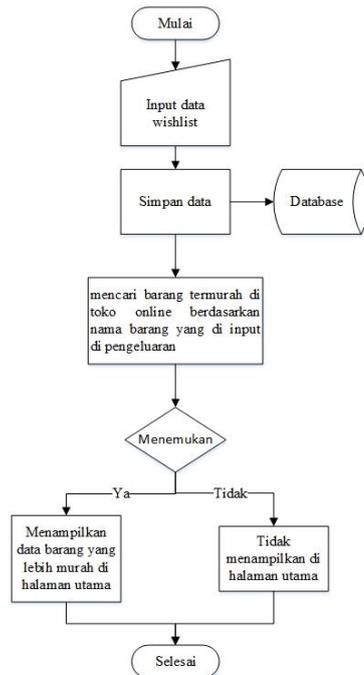


Figure 4. Analysis Of Built Procedures

## 2.4 Analysis of The technology used

Technology analysis aims to find out what technology will be used in a system that is built. The technology used in the system built, among others:

1. Firebase Cloud Messaging

Firestore technology is used to give messages to users. How it works on the application is as follows:

- a. Users get one notification per the 1st of the following month which contains items - goods that are cheaper than items that have been purchased in the previous month. Users also get planning reports with or without financial methods

## 2. Online Shop API

API or application Programming interface that is used in the development of android-based financial planning applications, namely the online shop api bukalapak and Tokopedia, the Online Shop API is used to connect to bukalapak and tokopedia sites, the following are the uses of the Online Shop API in application development:

- a. The user enters the name of the item in the search form on the Online Store
- b. Users get information on goods in the form of name of goods, stock, price of goods, shipping cost.

## 3. RajaOngkir API

RajaOngkir API is used as an intermediary application with Rajaongkir to get prices from online stores. Following are the uses of RajaOngkir fire:

- a. Application users open data from the Bukalapak Marketplace or Tokedia
- b. Application users see the shipping costs listed

## 2.5 Functional Requirement Analysis

The system that will be built consists of two types of development architecture namely OOP (Object Oriented Programming) design analysis stages using UML including use case diagrams, activity diagrams, and class diagrams. Analysis of functional requirements will be explained as follows:

### 2.5.1 Functional Requirements Specifications

Functional requirements specifications are system specifications provided to users. Specifications of the functional needs of users can be seen in Table 1.

Table 1. User Functional Specifications

| Functional Requirements Specifications |   |
|--|---|
| Code                                   | Software Requirements Specification                           |
| SKPL-F-01                              | The system provides facility to register                      |
| SKPL-F-02                              | The system provides facility to login                         |
| SKPL-F-03                              | The system provides facility to finance expenditure planning. |
| SKPL-F-04                              | The system provides facility to add the financial income      |

| Functional Requirements Specifications |  |
|--|--|
| Code                                   | Software Requirements Specification                                  |
| SKPL-F-05                              | The system provides facility to add the financial outlay.            |
| SKPL-F-06                              | The system provides a facility to remove financial data              |
| SKPL-F-07                              | The system provides facility to change the financial data            |
| SKPL-F-08                              | The system provides facility to see the financial statements         |
| SKPL-F-09                              | The system provides facility to add to wishlist                      |
| SKPL-F-10                              | The system provides facility to remove the wishlist.                 |
| SKPL-F-11                              | The system provides facility to search for items in the store online |
| SKPL-F-12                              | The system provides facility for user logout                         |

## 2.6 Use Case Diagram

Use case diagrams are used to describe the relationships that occur between actors with activities on the system. Use case diagrams in this application are as in Figure 5 below.

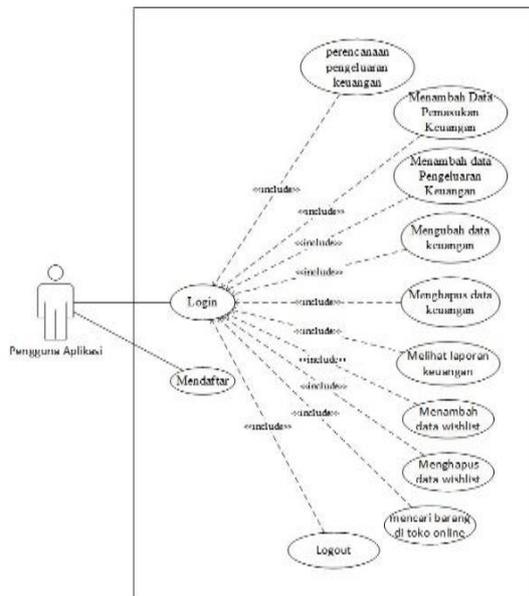


Figure 5. Use Case Diagram

## 2.7 Use Case Scenario

Use case scenario aims to explain how the steps of each process exist in each use case. The use case scenario created can be seen in Table 2.

Table 2. Use Case Scenario Adds Wishlist Data

| Use Case Name            | Adds Wishlist Data   | UniqueID: SKPL-F-09 |
|--------------------------|--|---------------------|
| Actor                    | user Applications  |                     |
| Description              | Scenarios for adding wishlist data                         |                     |
| Trigger Event            | Click the save button                                      |                     |
| user Applications        | System   |                     |
| Main scenario            |  |                     |
| 1. Click add data        |  |                     |
|                          | 2. displays the wishlist data field                        |                     |
| 3. input item name       |  |                     |
| 4. Click the save button |  |                     |
|                          | 5. Data is stored in a database                            |                     |
|                          | 6. Search for items in the online store                    |                     |
|                          | 7. Displaying data items from online stores based on input |                     |
| Alternative scenario     |  |                     |

## 2.8 Class Diagram

Class Diagram is used to describe the classes involved in the analysis of a system to be built. The class diagram that is created is shown in Figure 6.

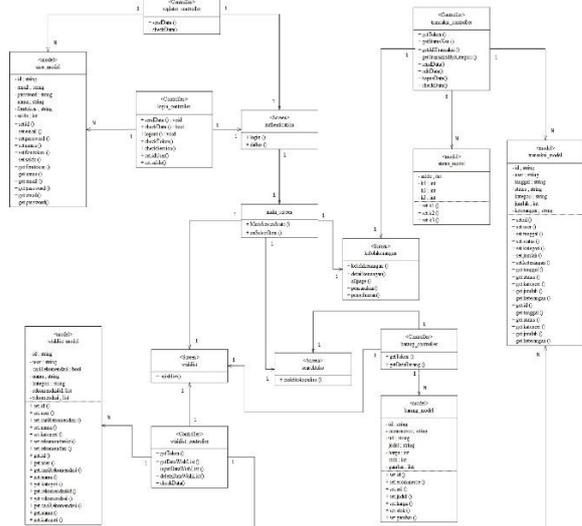
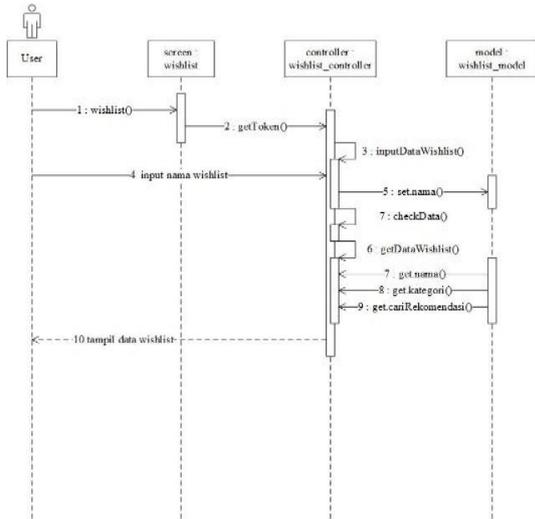


Figure 6. Class Diagram

## 2.9 Sequence Diagram

Sequence Diagram is describing the interaction between objects that serves to indicate communication between these objects. There are several sequence diagrams in the system that is built, such as Figure 7.

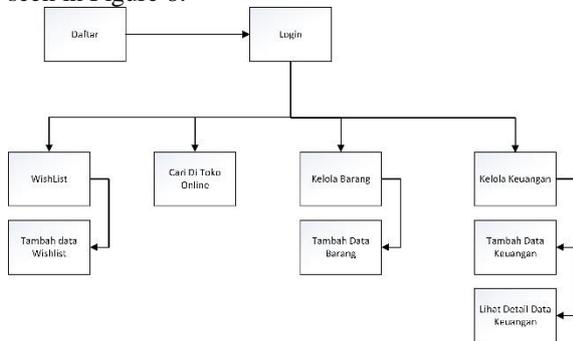


**Figure 7.** Sequence Diagram Adding Data Wishlist

## 2.10 System Design

### 2.10.1 Menu Structure Design

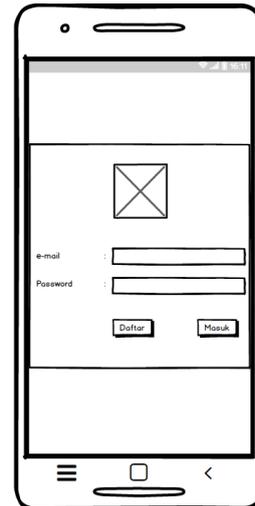
The design of the menu structure is a description of the path of application usage so that applications that are built are easy to understand and easy to use. The following application menu structure can be seen in Figure 8.



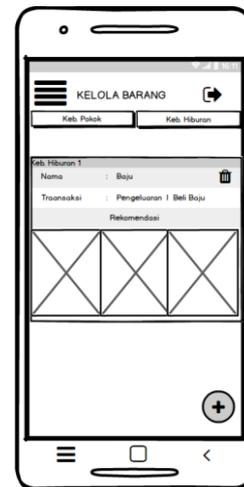
**Figure 8.** Applications Menu Structure

### 2.10.2 Interface Design

The design of the interface describes the display plan in the application, making it easier for implementation and application development. Here is an overview of the application interface that is built :



**Figure 10.** interface login



**Figure 11.** Manage Item Menu Interface



**Figure 12.** Menu Interface Financial Statements

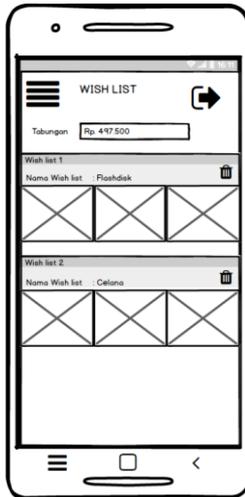


Figure 13. Menu Interface Wishlist

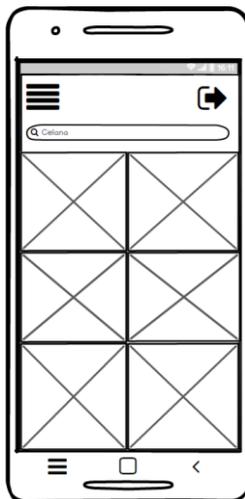


Figure 14. Menu Interfaces Search In Online Stores

### 3 CLOSE

#### 3.1 Conclusion

Based on the results of the design made, the design of personal financial planning applications using Firebase Cloud Messaging technology and online store APIs are in accordance with what is expected for further testing.

#### BIBLIOGRAPHY

- [1] AN Yushnita, "The Importance of Financial Literacy For Personal Financial Management," *Nominal*, Vol. VI No. 1, pp. 11-26, 2017.
- [2] M. Nastiti and A. Sunyoto, "Designing Personal Financial Management applications based on Android," *TIE*, vol. 13 No.2, pp. 38-43, 2012.
- [3] AM Sundjaja, "Financial Planning To Achieve Financial Objectives" *ComTech*, Vol. 1 1, pp. 183-191, 2010.
- [4] NF Rozy and S. Alisyahbana, "Financial Planner Application Platform Based On Smartphone Multiplatform with Phonegap

Framework," *Tech. Inform.*, Vol. 10 No. 1, pp. 67-72, 2017.

- [5] Asrul and BE William, "Data Retrieval System For Cheap Prices Goods Shop Online Using Web Services," *IT*, Vol. 14, pp. 16-23, 2014.
- [6] Yogiswara and DR Astriyanto, "Application Web Service And Firebase Notification On Rice Wrap Application Development Movement-Based Android Jember," *Inform. Polinema*, Vol. 4 2, pp. 161-167, 2018.
- [7] AO Ramadan, H. Tolle, and L. Fanani, "Supporting Module Development Classroom For Brawijaya Messenger Application With Firebase Platform," *Pengemb. Teknol. Inf. and Science Komput.*, Vol. 2 No.4, pp. 1630-1637, 2018.
- [8] S. Hatidjah, Sulfaidah, and Musdalifah, "Analysis of Financial Management Strategy Household in Makasar," *Economix*, Vol. 5 No. 2, pp. 7-11, 2017.
- [9] Witono T. and R. Susanto, "Cinema Ticket Booking Application Based Mobile," *Sist. Inf.*, Vol. 7 No.2, pp. 143-151, 2012.
- [10] R. Fajrin, "Development of a Geographic Information System-based Node.js For Engineering And Tracking Engineer Mapping With Geolocation Utilization at PT IBM Indonesia," *Informatics*, Vol. II, 2, pp. 127-134, 2017.
- [11] EB Setiawan and MV Yusman, "Development of E-Learning As a Means of Learning Online In SMP Negeri 8 Bandung," in *National Seminar on Technology and Multimedia*, 2014, pp. 3.04-1-3.04-6.
- [12] RS Pressman, *Software Engineering: a Practitioner approach*, New York: McGraw Hill, 2010.