

MOBILE APPLICATION FOR INVENTORY CONTROL IN A MINIMART

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Abstract - The goal of the research was to design a mobile application of inventory system in a minimart. In an application of using the mobile-based inventory minimart, J2EE system development used Waterfall method with the stages of analysis, design, coding, and implementation. The control of application inventory items at the minimart was intended for mobile-based users who controlled the supply of goods on the markets. It was to facilitate employee minimart in organizing, processing, monitoring the movement of inventory items that occurred in the minimart. The application of control inventory-based mobile minimart was to make users inventory, with a menu that was available in the form of product items, a promotion that had a limited promotion item reservations. The application can make employees in a minimart organize, process, and monitor the movement of inventory item more easily.

Keywords: inventory control, mobile application

I. INTRODUCTION

Competition is rapidly growing in business requiring entrepreneurs to create product excellence and to study the behavior of consumers. One of the advantages that can be done by entrepreneurs is utilizing technologies under the development. Technological developments enable employers in small, medium and large companies to do business by using Internet. Now the development of Internet can be integrated with mobile devices such as mobile phones to make the flow of information more widely. The Internet can be accessed anytime and anywhere. Through the Internet, small, medium, or large companies can show product information, price, the term of purchase, ordering, and payment, as well as deliver goods to customers, potential buyers, and business partners worldwide. Internet serves as a way to reach customers without limited space and time. It has become popular in the business world today. For example, Android phenomenon of new technologies has become a trending topic among users in the gadget. It is the mobile operating system developed by Google that has been widely used in many countries (DetikInet, 2013).

Several researches of making Android-based applications have been made. First, there is research conducted by Athoillah and Irawan (2013). They conducted research on the design of Android-based mobile information systems to control inventory in the warehouse. With this system, the warehouse employee no longer needed to store the record of goods manually. It had been copied to be stored in the database server. Moreover, the head of the warehouse did not have to go to his/her office and accessed the computer to control the data. This system was designed using the Android operating system with MySQL as the

database server and PHP as a bridge of communication. It allowed users to access the database provided by the mobile everywhere.

Second, Astuti and Nugroho (2014) analyzed the fixed asset inventory system in SDN Sidomukti, Ambal, Kebumen. The researchers made the system regarding inventory of fixed assets, so there was no longer delay in processing the fixed assets. In the system of inventory of fixed assets provided, some of the facilities could use by users. It included the input of data items based on Kartu Identitas Barang (KIB), the details of the data input about goods, input of mutator, the input of economic value, item inventory reports, warehouse reports, and economic value reports.

Third, Rubianto *et al.* (2012) discussed the system of libraries by using traditional waterfall method in SMAN 8 Garut. This application described the modeling of library information systems by using traditional waterfall method. It consisted of identifying problems, opportunities, and interest; determining requirements; analyzing system requirements; designing the system; developing and documenting the software; and using flow map or flowchart, Data Flow Diagrams (DFD), and Entity Relationship Diagram (ERD) for the model.

Fourth, Raf (2012) examined the influence of the motivating factors for consumers to shop in the modern market in Jambi. The analysis of the coefficient of determination contained the product variables, including the quality, availability, and diversity of the brand. These were the most dominant variables in consumers' decision to shop in the modern market compared to other variables.

Fifth, Hastanti *et al.* (2015) investigated the sales system based on the web (e-commerce) in Tata Distro in Pacitan. The results of the research were the creation of promoting media and sales-based online website, design, and manufacture to facilitate management, sales, promotions, and buyers. The consumers could more easily select models fashion without coming to the store. Promoting products had to be accompanied by easy and interesting in line with demand by consumers and society. This research was expected to create a more effective marketing tool than the previous system in Tata distro in Pacitan to increase sales turnover.

Then, every company whether it is trading companies, factory, or service companies, it always holds the inventory. In the absence of supplies, the employers will face the risk that its business in certain time can not meet the demand of customers.

Inventory is finished goods stored or used for sale in the upcoming periods. It may take the form of the raw materials, stored goods in the manufacturing process, and the finished goods stored or processed for sale. Inventory simplifies or streamlines the operations of the company or plant operations that should be done to produce goods and

deliver it to the customer. Inventory is a must for the process of operation/production can go smoothly, and consumers' demands can be met.

This research designs an Android application for controlling the mobile-based inventory items that can help improve performance and accommodate transactions inventory items in stores. Hence, it can provide optimal results in the speed, precision, and accuracy in performing data processing supplies. The goals are to conduct an analysis of the system so that the application made can be implemented on Android, and design an application of inventory items to control inventory at a minimart and improve performance in controlling inventory items.

The research focuses on designing procurement applications by using Android platform to facilitate the control of the procurement of goods on the markets. To design the application, researcher uses several stages by using waterfall method. The method has several stages, namely, system analysis, design, coding, and implementation.

II. METHODS

In general, the information system is an integrated system that can provide useful information for its users. Information system consists of components called as the building block. It consists of component of inputs, model, output, technology, hardware, software, database, and components of the control. All these components are interconnected with one another in achieving the goals. The information system can be developed as needed for the user who will use the system. Therefore, for the development of an effective and efficient system, it requires planning, implementation, evaluation, and setting.

According to Pressman (2010), Software Development Life Cycle (SDLC) is the process of developing or changing a software system by using a model that is used to develop software systems. waterfall method is also called as linear sequential, life forms, or classic life cycle. It is an approach to supply sequential software with the stages of analyzing, designing, coding, filing, and supporting. The stages of Waterfall model can be seen in Figure 1.

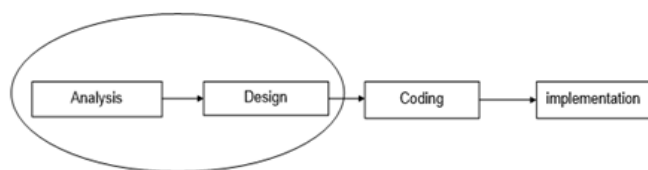


Figure 1 Design Methodology

Based on Figure 1, the design method is in accordance with Sukanto and Shalahuddin (2014). First, it is for the software requirements analysis. It is the process of requirements done intensively to determine the software that it should be able to understand the other software. Thus, that software can be understood as required by the users. Second, software design is a multi-step process focused on making the design of software programs. It includes data structures, software architecture, interface representations, and coding procedures. The translation stage of software requirements analysis is to design representation that is implemented to the next phase of the program. There is preparation of program code. The design must be translated into a software program. The results of this phase are a

computer program in accordance with a design that has been made in the design stage. Moreover, there is a test. The submission of software regarding logical and functional is tested. Third, coding is when the programmer inserts code to the script programming software to produce applications in the design. Programming software used must be adapted to the design of the system which is made. Last, the software that has been delivered to the customers is bound to change. Such changes can be caused by errors because the software must adapt to the new environment (new operating systems), or the customer requires functional development.

III. RESULTS AND DISCUSSIONS

Android is an operating system released by Google Inc. It is under the coordination of the Open Handset Alliance (Felker, 2011). Android was originally developed by Android Inc. with financial support from Google, who then bought it in 2005. This operating system was officially released in 2007 along with the founding of the Open Handset Alliance. It is a consortium of corporations hardware, software, and telecommunications that aim to advance the open standard of the mobile device.

In addition to the Android operating system, there is also middleware consists of a key application provided by Software Development Kit (SDK) as the tools and Application Programming Interfaces (APIs) to create applications based on Android platform using the Java programming language. Figure 2 is an architecture diagram of Android 2.1 platform, Tomcat Engine. Android is created by the open-source Linux Kernel 2.6 that provides many major features of an operating system. It develops an open-source Android operating system and Android-based applications. This can also be referred as a major abstraction of hardware and software stack that is later developed as a back order intact in the Android operating system in smartphone. The architecture diagram from Android can be seen in Figure 2.

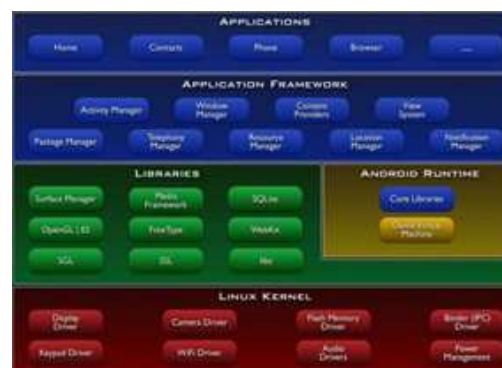


Figure 2 Architecture Diagram of the Android Platform

In Figure 2, the architecture on Android consists of Linux Kernel. The Linux Kernel provides a driver screen, camera, keypad, WiFi, Flash Memory, audio, and Interprocess Communication (IPC). Those are used to regulate the application and security holes. Moreover, library contains media and graphic library. Then, Android runtime which is a virtual machine with the Android applications becomes more resilient with existing library package. In the Android Runtime, there are two main parts, namely, core libraries and Dalvik virtual machine. Next, application

framework is an application framework which provides classes that can be used in developing Android applications. In addition, it provides a generic abstraction for accessing the device and set up display user interface and application resources. Applications are the layer that is most visible to the users when they run the program or open the Android applications. Users can only view the program when it is used without knowing the process is happening behind the application layer. This layer runs in Android runtime by using available classes and service in the framework of the application.

Android-based applications are created with the Java programming language and the Android SDK will be compiled and converted into an Android Application Package (APK). Then happened the installation will be done by the overall ability of Android devices into Android-based applications. Android-based application steel structure consists of several points. First, the activity is represented as a place to store users' UI in the application has the layout of a specific acupuncture point. An application can have many activities. However, it is not allowed if an application does not have activities. Second, service runs in a background to do a relatively long operating time. For example, at the same time when the application runs a music player. Other provisions are not allowed to provide service UI. Third, the content provider is represented as a section. It provides access to SQLite databases on the web and local access. Fourth, broadcast receivers is a section that provides a message or data to other application. For example, an application consumes the energy of the battery quickly. Then the running applications will do the broadcast receiver to inform that the battery will be run out. Fifth, the intent is the caller activity. It is in the beginning when the application is running.

This requirement aims to be the expected design. After the analysis of hardware and application software, the specifications of the hardware are required for application development. The specifications of Android-based smartphone are in Table 1. Meanwhile, the specifications required for laptop are in Table 2.

Table 1 The Specifications Required for Smartphone

| Item | Specification |
|-------------------------|--------------------------------|
| Operating System | Android |
| Android Version | 4.0.0 (Ice Cream Sandwich) |
| Chipset | ARM |
| Memory | 128 MB RAM; 256 MB Flash |
| Page | HVGA (320 pixels x 480 pixels) |
| Camera | 1,3 Mega Pixels |
| Network | GSM/CDMA |
| SD Card | 2 GB |

Table 2 The Specifications Required for Laptop

| Item | Specification |
|-----------|-----------------|
| Processor | 2 Ghz |
| RAM | 4 GB |
| VGA Card | 128 MB |
| Input | Keyboard, mouse |

Software requirement specifications for application development are Windows 8, Eclipse Android Developer Tools (ADT) for Android, Java Development Kit (JDK) 1.6, Android Software Development Kit (SDK), MySQL 5.0, and SQLite. ADT is a plugin for Eclipse providing tools that are integrated with the Eclipse Integrated Development Environment (IDE). ADT provides features that help to develop Android applications quickly. It also makes the GUI access many command SD line tools with the UI design for the user interface of the application. Because it is a plugin for Eclipse, it obtains a stable IDE function with specific Android features merged with ADT. Meanwhile, Android SDK provides the necessary tools and APIs to develop applications on the Android platform by using the Java programming language. Android SDK is a great tool for programmers to develop Android-based applications. It also is a set of comprehensive development tools. It consists of a debugger, libraries, handset emulator, documentation, sample code, and tutorials.

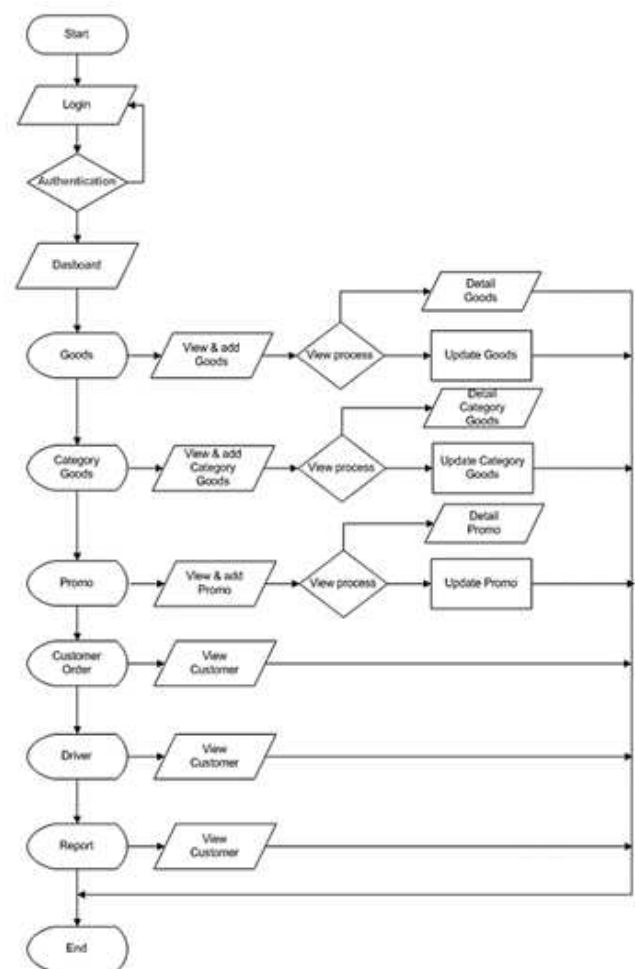


Figure 3 Flowchart of Inventory Application in Minimart

The planning of the analysis is based on the analysis that has been done. Then, from the analysis, it obtains the design for inventory management application based on Android for Minimart. Figure 3 is the draft of flowchart from application regarding inventory in minimart using Android applications. In the design, to start the inventory management application, users need to log into the login menu before entering the dashboard menu to select the

desired page. Moreover, in the inventory flowchart, there are features of goods. In here, the admin can see the data of available items, and add and edit data, if there is an error in the data item. In goods category, admin classifies the goods in accordance with the types of items to make it easier to record stuff. The admin can also see, add, and edit the promotion about for customer order, only admin can view the orders, and the address of the customer. Then, there is the menu of driver in this feature. Only admin can view which drivers that deliver the goods. There is also a feature for report. This feature will report the items which are still available and has low stock to the manager. So, the manager can buy the goods from the supplier. Furthermore, in goods category and promotion, the admin can add data items and promos like updating the list items and promotion.

For planning interface, the design of the interface of this application is the basic design of page application made. The design adapts to the standard page of the mobile device.

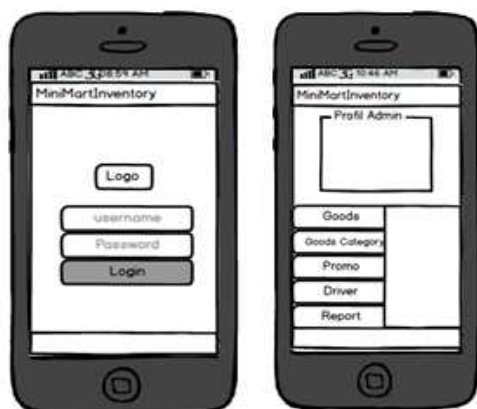


Figure 4 Design of Login Page

The design of Login page can be seen in Figure 4. First admin logs in the application by using the appropriate username and password. If the admin does not enter the username and password correctly, there will be an alert that the admin enters the wrong username and password. In this home, there is an admin profile according to the admin who has logged in. The admin profile matches with data registered. Moreover, there is a menu bar contained in inventory. For example, there are home, goods, goods category, promo, driver, report, and others. Moreover, the logo will be made in accordance with the logo of the minimart.

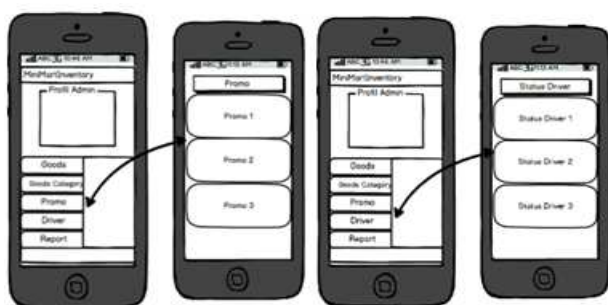


Figure 5 Design of Goods Page

In the page of Goods Category, admin checks the category, edit, and add the data about the category of the goods. Categories of goods are used to categorize the goods that will be sold in stores. In here, admin adds and edits the data. Then, the data will be saved in the database so that it can be edited again or seen by admin.

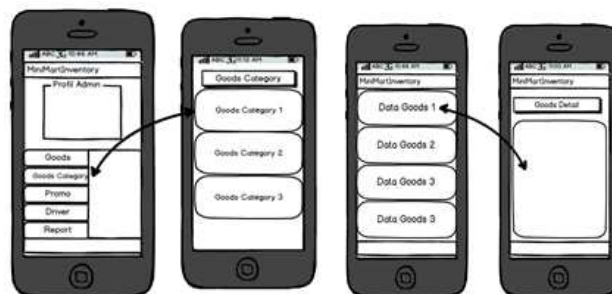


Figure 6 Design of Promotion Page

In Figure 6, it is a page that describes the name of the goods, the start date and the end of the promotion, promotion images, and the price. On this page, the admin can add data from promotion and edit promotion data listed. Moreover, the status page of the driver contains data about the employees who work as the drivers. The admin can view the status of the active drivers for delivering the order.

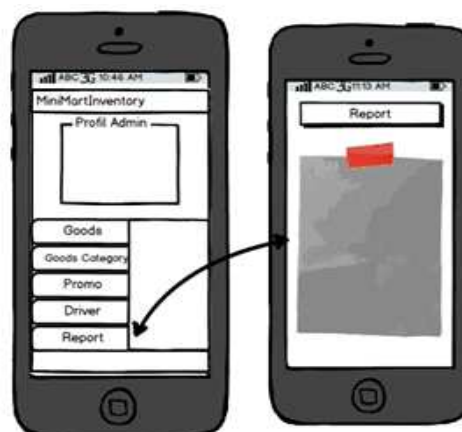


Figure 7 Design of Report Page

The page of monthly and yearly report also has the same look with the database. This page reports the data of each item per month. The data will be submitted to the manager as a monthly report. It can be seen in Figure 7.

The system implementation is the stage of testing the feasibility of the system made so that the application does not deviate from the design of the system. This application is created by using the Eclipse ADT for Android using the Java programming language. The specifications of the hardware based on Android on the smartphone that is used for application development are processor Intel® Core (TM) i5-3210M, 64-bit operating system, RAM 3,88 GB, hard disk 500 GB. Meanwhile, the specifications of the software used for application development are System operation Windows 7 Ultimate, ADT 21.1.0 as IDE application programming. Then, there is Xampp 1.8.3-

2 consisting of Apache 2.4.4 as web server, Php 5.4.19 as a programming language application development, Mysql 5.5.32 as database server, and Phpmyadmin 4.1.8 as database administration tool.

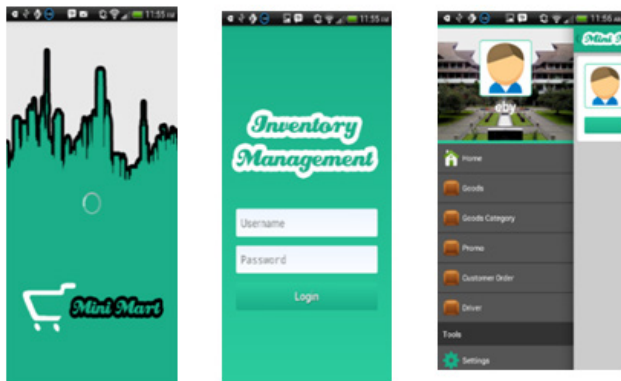


Figure 8 Login Page

The loading pages are before entering the login page of the application. When the application is run, the page that appears first is the screen before the main menu display as seen Figure 8. To enter the admin page, the users must fill their username and password in the application. Then, the menu page contains the users' profile who have logged in the application. There are some menus that have not worked yet. The menu on the sidebar can be scrolled down.

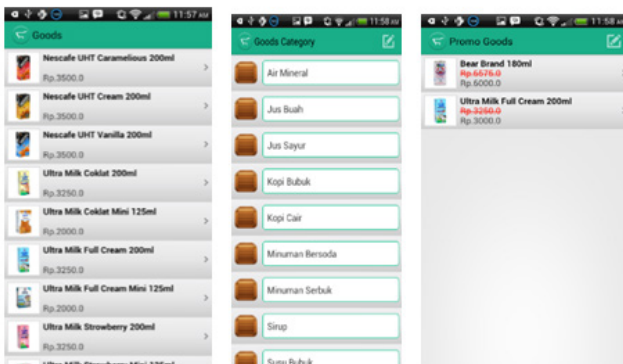


Figure 9 Product Page

The products that have been placed before by the admin can be seen in Figure 9. It is the detail of items entered. In the product page, admin can edit, and make the list of goods based on the category. Admin can access data about barcode, item name, category, stock, price, usage period, and description. In addition, for the promotion, admin can change the price as well as the end date of the promotion.

This page is the detail of the promotion goods which the example can be seen in Figure 10. On this page, there is information about the goods. For example, there will be the picture, name, description, normal price, promotion price, and end date of the promotion.

The customers' order can be seen in Figure 11. Customers can order through online by filling out the data like the address so that it can be processed. The application

can process the transaction. Then, the goods will be packaged by admin in the minimart in accordance with customer orders. Then, the driver will deliver goods. Moreover, the customers can view the drivers who deliver their order.

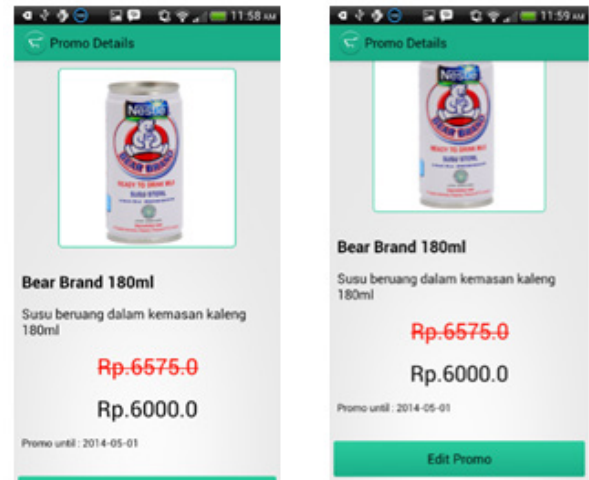


Figure 10 Detail of the Promotion and Editing the Promotion

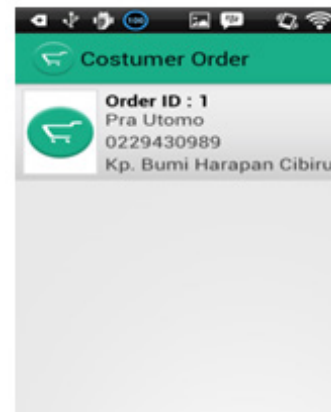


Figure 11 Customer Order Page

IV. CONCLUSIONS

Based on the results and discussion, conclusions can be drawn. From the results of the analysis and design of application preparation used to control items that exist in the application, there is no menu login in the stock markets before entering the dashboard menu to select the desired page. On flowchart, there are items, inventory feature, category, promotion, customer order, driver, and reports. For the goods and promotion, the admin can add, delete, and update the data of goods and the promo featured. The admin can also add, delete, and edit data on the promotion. The customer can find the promotion list that has been added by the admin and can see the promotion details. Hence, the customer can determine the limits of the initial price, promotion items, and the price. The customer can buy the goods through the online application by entering the address of the customer. Then, the admin can create list of reservations, and choose driver to perform the delivery

of the goods to the customer. Moreover, the admin can monitor drivers who deliver the goods. Last, the application of inventory in the minimart can facilitate the performance of the admin in doing data processing and controlling the inventory.

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