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ANALYSIS AND DEVELOPMENT OF A REAL-TIME RESELLER INFORMATION SYSTEM BASED ON MOBILE KOTLIN TECHNOLOGY AT PT. SCUTO INDONESIA

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ABSTRACT

PT. Scuto Indonesia (Scuto) has a reseller whose job is to offer automotive maintenance services to prospective customers who are outside of Scuto outlets. Problems arise when the resellers spread throughout Indonesia have to wait a long time from the data that is sent manually to the center via email. Thus, Scuto does not yet have a system to facilitate the process from resellers offering potential customers to claim bonuses from the sales that have been made by resellers in real-time. A technology approach that is suitable for real-time data problems with regard to operational aspects, then what is used is a mobile-based technology. In addition to these problems, the next problem is making the desired system must be in accordance with a budget that is quite efficient. Because, Scuto itself is a company that is still developing and does not have the resources or budget that is large enough to fund large system-making projects. One solution is to use the latest mobile technology, Kotlin. Kotlin technology can be run on two versions, namely mobile (Android and iOS) and also the web version with only one programming. Thus, the use of Kotlin technology can save the resources of a team of programmers who previously needed many different teams simultaneously, namely Android programmers, iOS programmers, and web programmers, now only become one team of programmers.

Keywords*:* System, Real-Time, Mobile, Web, Kotlin

1. INTRODUCTION

PT. Scuto Indonesia (Scuto) has resellers whose job is to offer automotive maintenance services to potential customers who are outside of Scuto outlets [11]. Currently, existing resellers are spread in various cities and districts in almost all of Indonesia. These resellers are third parties or partners who have a partnership with Scuto to offer Scuto's automotive maintenance products and services. Problems arise when these resellers spread throughout Indonesia have to wait a long time for data to be sent manually to the center via email. Thus, Scuto does not yet have a system to facilitate the process from resellers making offers to potential customers to claiming bonuses from sales made by resellers in real-time.

The second problem is that considering Scuto is a company that is still starting out, Scuto wants a system that doesn't cost too much in the manufacturing process. Meanwhile, the system that Scuto wants with reference to individual reseller transactions is based on mobile technology. Currently, there are two mobile operating system ecosystems used by Scuto resellers, namely Android OS and iOS. If we make a system based on these two system ecosystems, two different teams will be needed. Thus, the cost of creating a real-time reseller system will be double or 2x greater.

1.1 Formulation of the problem

Based on the description of the background, it can be formulated a subject matter in this study as follows:

1. Reseller operations that are still manual in nature result in difficulties and long waiting times in processing offers to potential customers to claim bonuses from the sales that have been made
2. Scuto does not have a large budget to fund the project for making the required system.

1.2 Research purposes

The purpose of this study is to carry out analysis and design of the following:

1. Developing an information system for real-time reseller operations to overcome manual reseller operations
2. Using mobile and web-based technology for a reseller operational approach that is individual in nature and has the character of picking up the ball to customers and can also be managed by the center. So that the system embedded in their mobile gadget becomes more practical and easy to carry anywhere in order to offer services or products to prospective customers.
3. Implementing Kotlin technology as a solution for efficiency in forming the required programmer team.

2. LITERATURE STUDY

2.1 Information Systems

Information System (IS) is a combination of information technology and the activities of people who use that technology to support operations and management [12]. In a very broad sense, the term information system is often used to refer to interactions between people, algorithmic processes, data, and technology. In this sense, the term is used to refer not only to an organization's use of information and communication technologies (ICTs), but also to the ways in which people interact with these technologies in support of business processes [9].
The information system has the following components [1]:

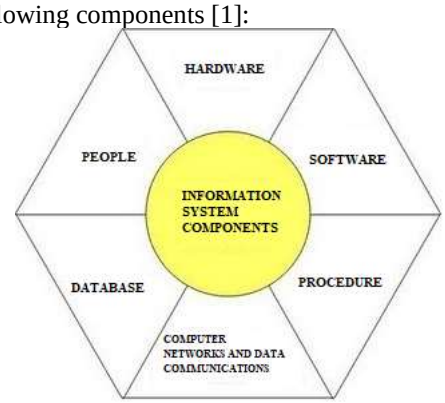


Figure 1 Information System Components
Source: Clovar (2008)

1. Component input: Data that goes into the information system.
2. Component model: A combination of procedures, logic, and mathematical models that process data stored in the database in a predetermined way to produce the desired output.
3. Component output: The results of quality information and useful documentation for all levels of management and all users of the system.
4. Technology components: Tools in information systems, technology is used in receiving input, running models, storing and accessing data, producing and sending output, and monitoring system controls.
5. Database component: A collection of related data stored on a computer using database software.
6. Control components: Components that control disturbances to information systems.

2.2 Mobile Operating System

A mobile operating system is an operating system for a mobile phone, tablet, smartwatch, 2-in-1 PC (which can convert to laptop mode or detach and function as tablet mode) or other mobile devices [13]. While computers such as laptops are typically 'mobile', the operating systems typically used on them are not considered mobile, having originally been designed for desktop computers which historically did not have or require certain mobile features. This distinction is blurred in some of the newer operating systems for which hybrids are created for both uses.

Mobile operating systems combine features of personal computer operating systems with other features useful for mobile or handheld use, and usually include a wireless modem and a SIM tray for phone and data

connections. In the 1st Quarter of 2018, more than 383 million smartphones were sold with 86.2 percent running Android and 12.9 percent running iOS [5].

Table 1. Worldwide Smartphone Sales to End Users by Operating System in 1Q18 (Thousands of Units) Source: Gartner (2018)

Operating System	**1Q18 Units**	**1Q18 Market Share (%)**	**1Q17 Units**	**1Q17 Market Share (%)**
Android	329,313.9	85.9	325,900.9	86.1
iOS	54,058.9	14.1	51,992.5	13.7
Other OS	131.1	0.0	607.3	0.2
Total	**383,503.9**	**100.0**	**378,500.6**	**100.0**

2.3 Androids

Android is a mobile operating system based on modified versions of the Linux kernel and other open source software, designed primarily for touchscreen mobile devices such as smartphones and tablets. Android is developed by a consortium of developers known as the Open Handset Alliance, with the main contributor and commercial marketer being Google [7].

The Android architecture is a component software stack to support the needs of mobile devices. The Android software stack contains the Linux Kernel, a collection of C/C++ libraries exposed via application framework, runtime, and application services.

The following are the main components of the Android architecture:

1. Applications
2. Android Framework
3. Android Runtime
4. Platform Libraries
5. Linux Kernels

Within these components, Linux Kernel is the main component in android to provide its operating system functions for mobile and Dalvik Virtual Machine (DVM) which is responsible for running mobile applications. Following is a pictorial representation of android architecture with various components.

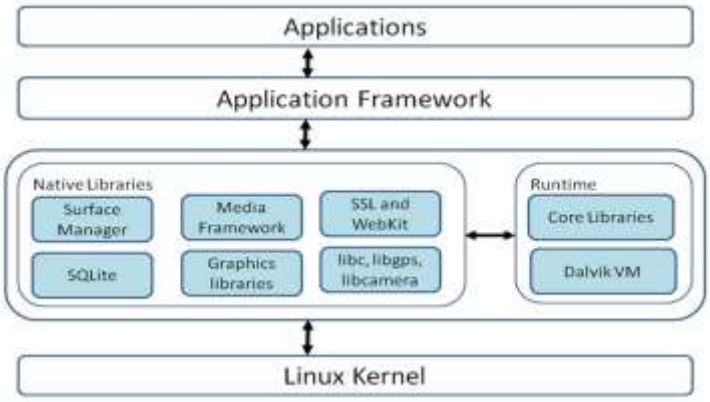


Figure 2. Android Runtime (Source : edc4it (2014)

2.4 IOS

IOS (formerly iPhone OS) is a mobile operating system developed and distributed by Apple Inc. This operating system was first released in 2007 for the iPhone and iPod Touch, and has been developed to support other Apple devices such as the iPad and Apple TV [14]. Unlike Microsoft's Windows Phone (Windows CE) and Google's Android, Apple does not license iOS for installation on non-Apple hardware.

The iOS user interface is based on the concept of direct manipulation using multi-touch gestures. The interface control elements include sliders, switches and buttons. Interaction with the OS includes gestures such as swipe, touch, pinch, and pinch open, each of which has its own meaning in the context of the iOS operating system and its multi-touch interface. Its internal accelerometer is used by some applications to allow it to respond to shaking the device (eg canceling an action) or rotating it in three dimensions (eg switching from portrait to landscape mode).

iOS is descended from OS X, which has a Darwin foundation and is therefore a Unix operating system. iOS is a mobile version of the OS X operating system used on Apple computers.

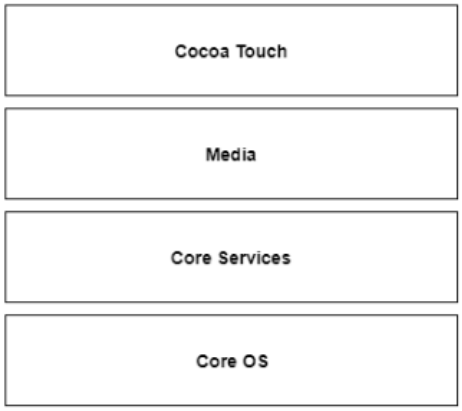


Figure 3. iOS Architecture source: Barnes (2018)

2.5 Kotlin technology

Kotlin is a multiplatform, statically typed, general-purpose programming language or technology with type inference. Kotlin was designed to fully interoperate with Java, and the Java Virtual Machine (JVM) version of its standard library relies on the Java Class Library, but type inference allows the syntax to be more concise [8]. Besides kotlin using JVM, but can also compile JavaScript or native code (via LLVM). The development of the Kotlin language is carried out by JetBrains, while the Kotlin Foundation manages the license from Kotlin [15].
Some of the features and advantages of Kotlin are [6] :

1. Open Source : Kotlin is distributed under the Apache License, Version 2.0. The compiler (Kotlin compiler), IntelliJ IDEA plugin, and java libraries are all open source.
2. Easy To Learn : Kotlin Programming Language is easy to learn, It is influenced by Java, Scala, Groovy, C#, JavaScript and Gosu. Learning Kotlin is easy if you are familiar with one of these programming languages. Very easy to learn if you know Java.
3. Safe : Kotlin guarantees that every syntax we write in the compilation process can prevent possible errors from occurring, for example it can prevent NullPointerExceptions when we write code using the Java language.
4. Conscious and Expressive: The compilation process and complexity when coding using Java will be reduced when using Kotlin.
5. Interoperable With Java and Android : Kotlin can read old code or libraries that we use when coding in Java and vice versa.

2.6 Multiplatform Kotlin

Multiplatform Kotlin is a key feature of Kotlin. Kotlin can be compiled to JVM bytecode (like Java), JavaScript or to native LLVM code. In this way, we can use it for Android, iOS, Web, Desktop and Backend development in Java frameworks like Spring [10].

Figure 4 Multiplatform Kotlin (Source: Moskala, 2019)

3. RESEARCH METHOD

The research methodology used in this research uses an approach in the form of data collection where the details are as follows:

3.1 System Requirements Analysis

Analysis of system requirements is carried out by conducting interviews and observing the business and operational processes of the user, namely PT. Scuto Indonesia. The results of this system requirements analysis are documented in a document, namely BRD (Business Requirement Document). Where the contents of this BRD are system requirements.

3.2 System planning

The system is designed according to the guidelines from the BRD that have been produced. The results of the system design are documented in a document, namely the FSD (Functional Specification Design). Where the contents of this FSD are a draft of the system process flow and the system interface display.

3.3 System Development

System development uses the SDLC Waterfall methodology. Where the details of the waterfall stages are poured into the system development schedule, namely the GanttChart.

4. RESULT AND DISCUSSION

4.1 System Requirements Analysis

The system requirements analysis that has been outlined in the BRD document is divided into two major sections, namely:

A. Functional Requirements

1. Centralized authentication and authorization for all users and all interrelated applications.
2. Android Mobile App for Resellers
    a. Customer Offer Module
    b. Commission Claim Module
3. Web Outlets
    a. Bid Approval Module
    b. Commission Claim Payment Module
    c. Invoices module
4. Notification Email Generator
5. Web Administration

B. Architectural Needs

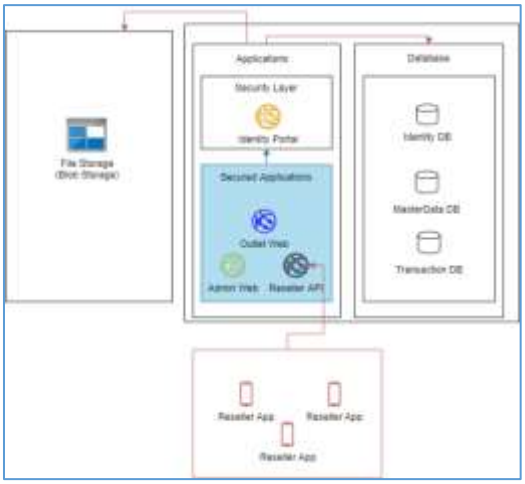


Figure 5 System Architecture

4.2 System Design

The system design from the FSD document is divided into two parts, namely:

1. Process definition process flow from offer to claim

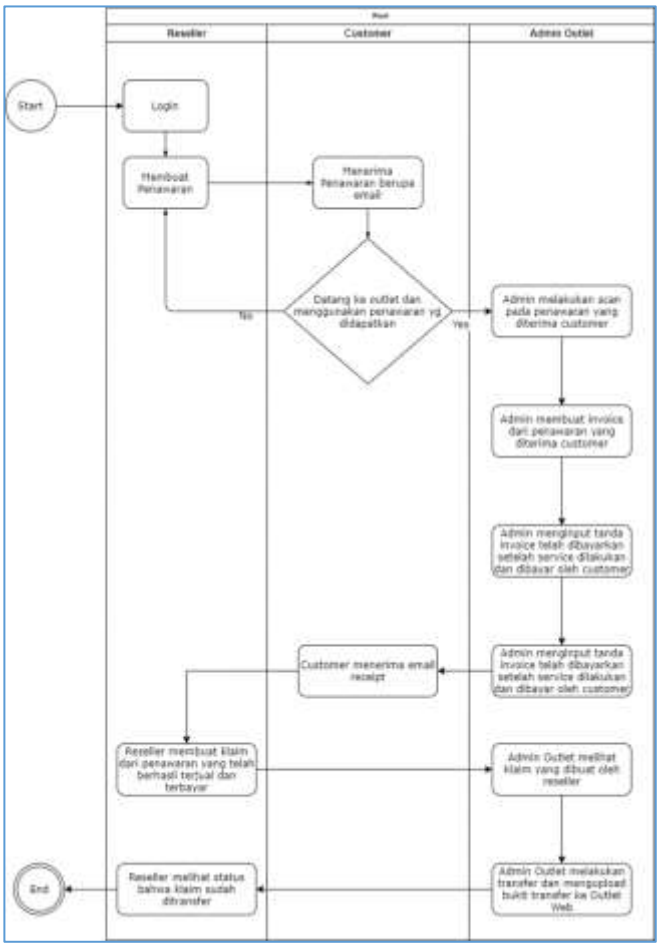
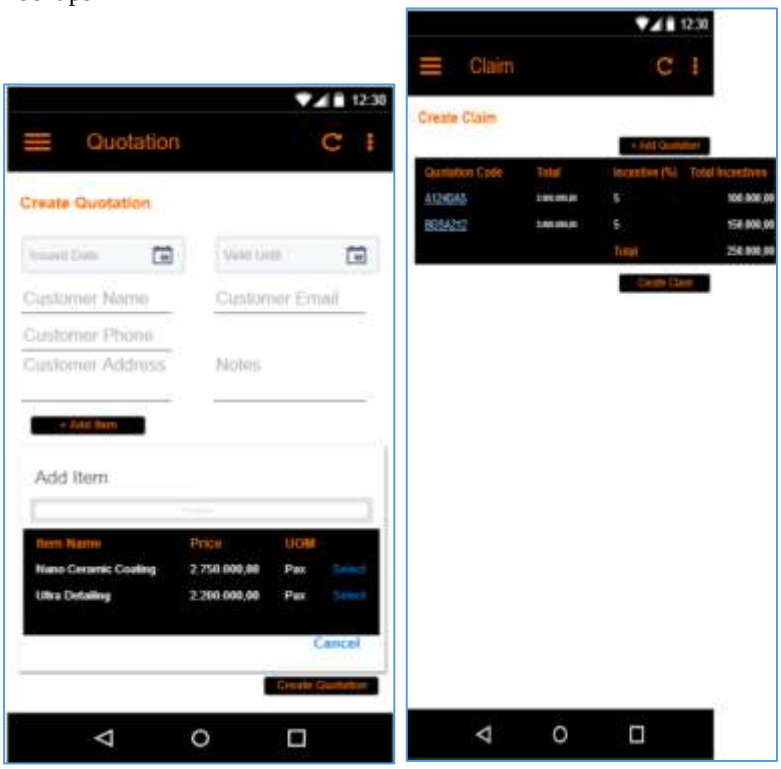


Figure 6 System Flow Process

2. Some of the developed system interface designs are as follows:
   a. Mobile version mockups

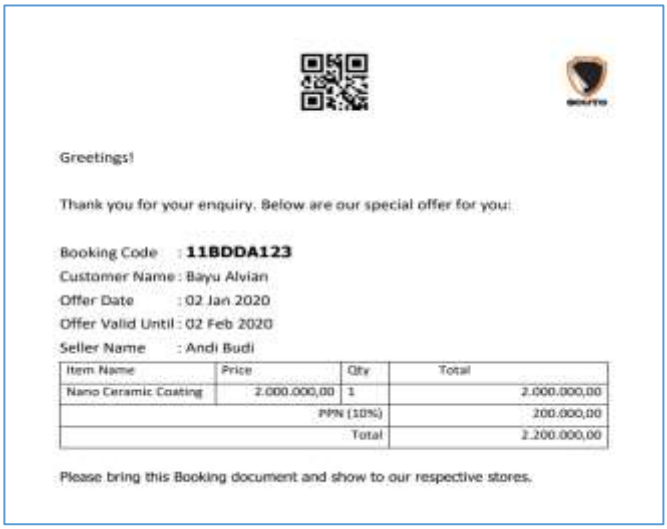


a) h)

Figure 7. a) Offering Module for the Mobile Version, b)Claim Module for Mobile Version

b. Mockup versi web

Figure 8 Invoice Module for Web Version



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		PPN (10%)	200.000,00
		Total	2.200.000,00

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Figure 9. Offer Email Notifications

4.3 System Development

System development is carried out using the SDLC Waterfall methodology. Details of all stages of system development can be seen in the following GanttChart table:

Task Name	PIC	Tahun 2019								
		Feb	Mar	Apr	Mei	Jun	Jul	Agu	Sep	Okt
1. Requirement Analysis										
1.a Pengumpulan Data	PM, BA, User									
1.b Analisa Data	PM, BA									
1.c Finalisasi BRD	PM, BA, User									
2. Design										
2.a Perancangan Proses Sistem	PM, BA, SA									
2.b Perancangan UI/UIX Mobile	PM, BA, SA									
2.c Perancangan UI/UIX Web	PM, BA, SA									
3. Implementation										
3.a Programming Mobile Apps	SA, Programmer									
3.b Programming Web Apps	SA, Programmer									
4. Testing										
4.a SIT (System Internal Test)	SA, Programmer, Tester									
4.b UAT (User Acceptance Test)	BA, Programmer, User									
5. Deployment										
5.a Implementasi Sistem ke Server	SA, Infra									
5.b Piloting dan Training Sistem	PM, BA, User									
6. Maintenance	PM, SA, Programmer									

Figure 10. System Development GanttChart

Information :

1. Task Name is the stages and details of the activity
2. PIC is a party involved in detailed activities, which are divided into:
   a. PM is the Project Manager who manages the overall project
   b. BA is a Business Analyst who analyzes the system from a business and operational point of view of the user
   c. SA is a System Analyst who analyzes technically both systems and programming
   d. Programmers are the team who program the system
   e. Tester is a team that tests the system
   f. Infra is the team responsible for system integration and installation
   g. Users are system users in this project, namely Scuto

As seen from the GanttChart, that system development Took 9 months. Due to the use of the SDLC Waterfall methodology, the completed stages cannot be repeated. Therefore, the development of this system requires readiness for work both from software resources, hardware, and also the team involved.

5. CONCLUSION

5.1 Conclusion

Based on the research that has been done and has been described in this study, several conclusions can be drawn as follows
following:

1. Reseller operations at Scuto, which are still manual in nature, result in difficulties and long waiting times in processing offers to potential customers and claiming bonuses from sales that have been made. This can be overcome by developing an information system where data can be processed. in real-time.
2. Kotlin technology, which has multi-platform features, is useful in cost-effective system development, especially in establishing team resource requirements, namely programmers. Because the output of Kotlin programming can be run in both mobile (android and iOS) and web environments.

5.2 Suggestions

Apart from these conclusions, this research still requires further testing. The test that needs to be carried out is the implementation of an information system development based on Kotlin technology using the SDLC methodology other than waterfall. So, later we can see which methodology is faster and suitable for Kotlin technology. The next suggestion is that this research can hopefully become a foundation for research with similar case studies in order to enrich the analysis of the implementation of Kotlin technology in information system development.

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