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# Application Of System Information & Android Based Smart Display In Jewellery Stores

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**Abstract**— In general, medium-sized retail stores have started implementing information systems to optimize their business processes, even though the information system used is relatively simple. This is not the case with precious metal retail stores or often called jewelry stores. They are currently still using manual processes.

**Keywords**— jewelry stores, medium-sized, retail stores, information system, optimized

## I. INTRODUCTION

Nowadays, the use of information systems is common in retail stores. A combination of IT (Information Technology) and business activities to support business and management activities. Users can get many benefits. Especially in reporting, the data stored in the report creation system can be made quickly. Information systems are also useful for tracking the availability of an item or item details.

Unfortunately, not all retail store sectors apply this technology. This research focuses on the retail jewelry store sector, where the business process is still fairly traditional. To find out the price & details of jewelry desired by prospective buyers, shop staff must open the books in the staff room, thus leaving prospective buyers waiting for a long time. This waiting process can influence the decision to buy jewelry or not.

With this, the research focuses on developing an application to help the process of checking prices quickly using RFID and also displaying jewelry details quickly..

## II. LITERATURE REVIEW

### A. Definition of RFID

RFID (Radio Frequency Identification) is a radio wave-based information exchange technology. To store information, RFID has a label (tag). And the label reader is called a reader. Overall, RFID consists of 2 components, namely [1]: 1. Passive RFID system: passive components do not emit radio waves & do not require a power source. In the form of paper labels, stickers, or cards of a certain size, therefore the name of the label (tag) is given. Each label (tag) has a chip capable of storing information. 2. Active RFID system: Active components require electric power to operate the antenna which will shoot electromagnetic waves that will be received by the label (tag). Labels send back information in the form of device serial number on the chip through the reflection of electromagnetic waves [2]. Early development of RFID was used as a substitute for a key to open doors and was patented by Mario W. Cardullo on 23 - January - 1973. In early 2000 many companies implemented RFID in their supply chain systems. The application of this system is very helpful for companies to monitor containers to be stored and distributed. Now, RFID can be applied to many aspects of life, from electronic keys to e-money card-based payments [3].

### B. Android

Android is an open-source operating system based on Linux for smart devices developed by Google. Android provides an open platform for application developers to

release applications on a platform that has been provided. In general, Android is used for smartphones, tablet computers, and other smart devices [4].

### C. Websites

2 The website is a collection of web pages (web pages). Whereas a web page is what you see on the screen when you type a web address, click a link, or put a query in a search engine. Each web page can contain information, which can include text, color, graphics, animation, and sound [5].

### D. XAMPP

4 XAMPP is a web server with GNU (General Public License). The term XAMPP stands for X (x- operating system), Apache, MySQL, PHP, and Perl. The main function of XAMPP is used as a server that runs on a local computer (localhost) using the Apache module. Web server is used if we want to display/use a dynamic website [6].

### E. HTML5

HTML (Hypertext Markup Language) is a markup language used to display a website. HTML 5 is an advanced version of HTML 4.01 & XHTML. One of the advantages of HTML 5 is that there is no need for additional programs (plugins) to carry out dynamic interactions on a website, for example playing videos, running animations, etc. [7].

### F. CSS

To set an appearance on a website that uses HTML, CSS (Cascading Style Sheet) is required. CSS can be written in HTML tags, or add id & class properties to HTML tags. CSS is useful for separating content, layout, and design [8].

### G. PHP

PHP: Hypertext Preprocessor is a scripting language (scripting language). PHP can be used for free under the PHP License. PHP is widely used in dynamic modern website development. The advantages of PHP are in ease and good compatibility. PHP can run on

various - various, OS (Operating System), web server and supports several databases. PHP can be another choice from other programming languages such as Ruby, ASP.NET, Scala, and others [9].

### H. MySQL

MySQL is an RDBMS (Relational Database Management System) program with an open-source GPLv2 license which has multithreaded capabilities that can handle multiple requests on a large and large scale. MySQL operation is based on SQL queries. The data in the MySQL database is stored in tables consisting of related data sets, columns, and rows [10].

### I. SQLite

SQLite is an RDBMS (Relational Database Management System) program that is relatively small in size and has a small library of code compared to MySQL. SQLite is serverless which means it does not require a separate server system to run it [11].

### J. Python

Python is a scripting language designed by Guido Van Rossum in 1991. The ease of using python is an option for working on small projects or learning programming languages for beginners. Until now Python was developed by PSF (Python Software Foundation) [12].

## III. RESEARCH METHODOLOGY

The method used to create applications and information systems used the waterfall method. The process starts with the Analysis, design, code generation, testing, and support stages [13].

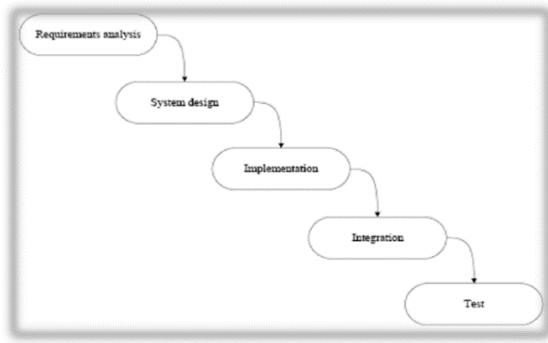


Figure 1. Waterfall Method

as data tables in the database. ERD Diagram can be seen in Figure 3.

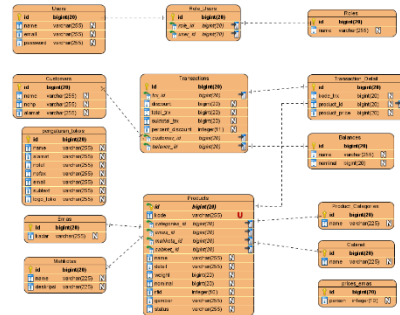


Figure 3. ERD Diagram

IV. RESULT AND DISCUSSION

The first step in making Android Information Systems & Applications begins with designing a use case diagram. This is done to have an overview of the difficulties and scope of what is in the information system & application later. Use case diagrams can be seen in Figure 2.

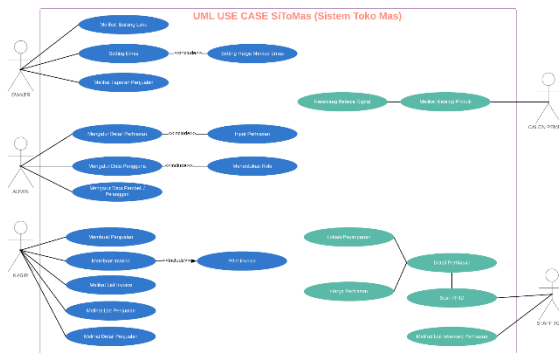


Figure 2. Use Case Diagram

The stage after designing the use case diagram & ERD (Entity Relationship Diagram) is continued with the making of a business process swim lane diagram. With the business process swim lane, it can provide a simple description of the workflow of information systems & android applications [14]. Swim lane diagram can be seen in Figure 4.

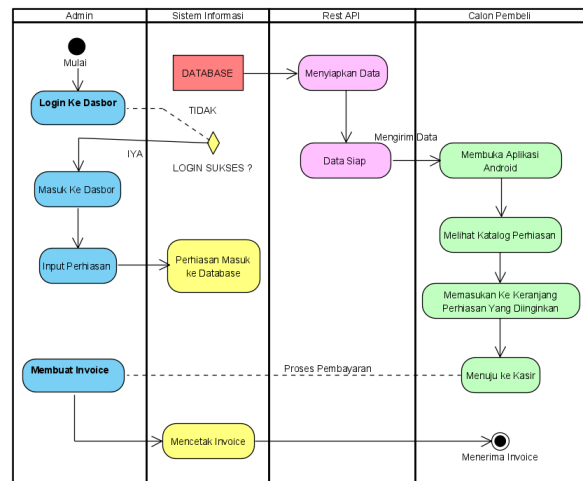


Figure 4. BP Swim Lane Diagram

In the use case diagram above, we can see that there are 4 roles for stores and 1 role for potential buyers. Each role has different features and has different permissions. This is done so that there is a clear and structured division of authority. The blue color describes the activities carried out in the Information System, while the green color the activities carried out on the android application.

ERD (Entity Relationship Diagram) is an advanced stage in the design process. ERD has the aim of describing the relationship between data entities. Entities are represented

Figure 5 shown below, is the login page. User can access their dashboard from this page. After user enter the correct credential, it automatically redirects to the appropriate page for the user role. If user enter the wrong credential for login in it will redirect back to login page.

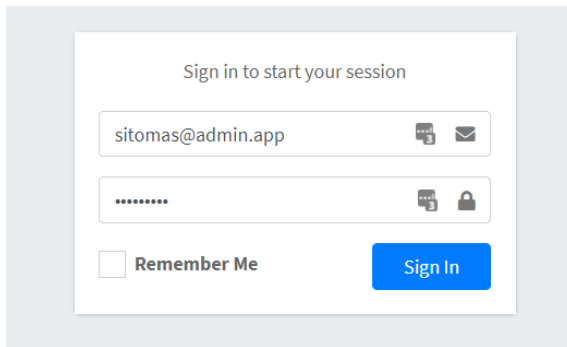


Figure 5. Login Page

Dashboard page is the main menu for user, from there user can view a glimpse what happen in the entire system, from gold price to sales list. Dashboard can be seen on figure 6 bellow.

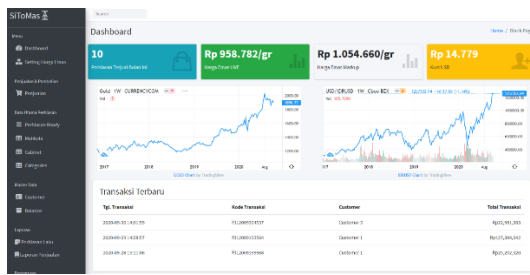


Figure 6. Dashboard Page

With correct roles user can access the gold price setting page. This page contain configuration for mark up gold price. The price used to determine the jewelry price.

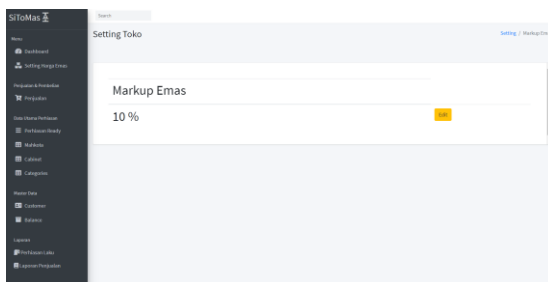


Figure 7. Dashboard Page

The Sales page has 2 pages, a sales list page & an invoice creation page. When the user first goes to the sales page. The first thing to display is the sales list page, it contains the list of sales has been made. The invoice creation page can be accessed by the user that has a cashier role.

User can view or print the invoice by clicking on the view icon. Next to the view icon is hide invoice, only user with appropriate role that can hide some invoice.

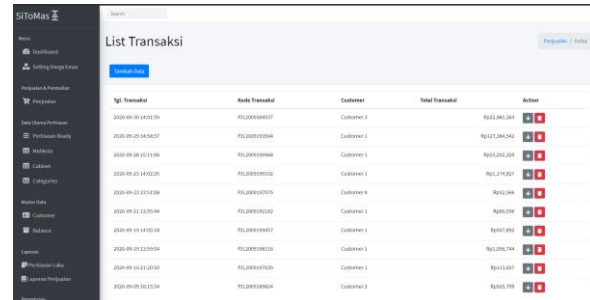


Figure 8. Sales List Page

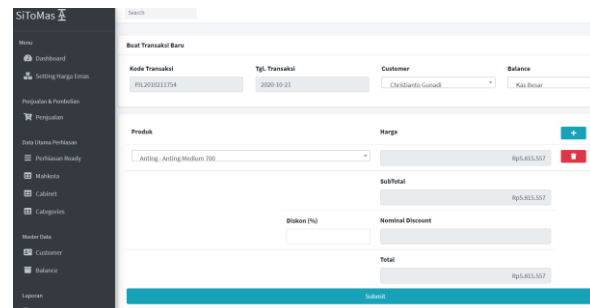


Figure 9. Invoice Creation Page

Figure 10 shown below, is the output of the invoice creation page. The invoice contain information such as : customer details, product name, price, discount, and total that need to pay.



Figure 10. Invoice Creation Page

User can view the jewelry available at the shop via the jewelry page. This page will list

the jewelry and their details. To add data/jewelry input, you can press the "add data" button. The jewelry page has sub-menus such as crown, cabinet, categories. The snippet of the jewelry page code along with the submenu can be seen in the figure 11 shown below.

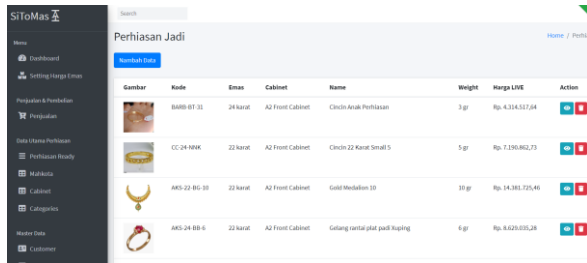


Figure 11. Jewelry Page

The android application created using the react-native programming language. The main role of this application is to retrieve data that has been prepared by the Information System and present it into an application.

The home page is the first display when the user opens the application. There are 2 main components on the home page. The first component is to display the gold price that has been set by the shop. The second component is a grid-view view of the 4 newest products with a 2 x 2 format. The home page can be seen in Figure 12 shown bellow.

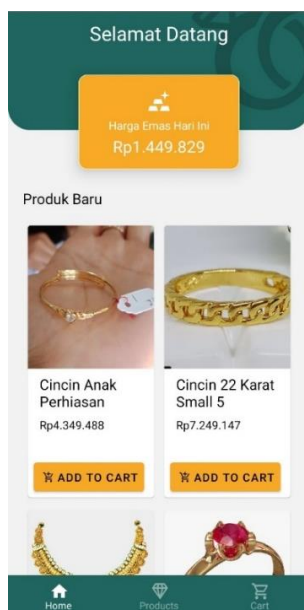


Figure 12. Android Home Screen

The product page displays all available jewelry, in a grid-view format. To see the details of the jewelry, users can simply touch the picture of the jewelry they want to see.

After the user presses the desired jewelry image, a jewelry detail page pop-up will appear. This page brings out the details of the jewelry such as a clearer image, the name of the jewelry, and the weight of the jewelry.



Figure 13. Product Page

After the user finds the matching jewelry, the user can press the "add to cart" button to enter the jewelry into the digital shopping cart. This page provides a list of items that have entered the digital shopping cart. The shopping cart page can be seen in Figure 14 shown below.

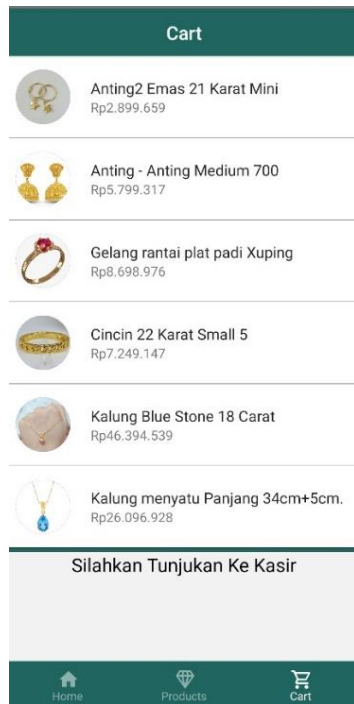


Figure 14. Cart Page

**RESPONDEN RESULT**

The next step after the android application is ready, researcher distribute questionnaire to 39 respondents. Most respondents have the age group 18-30 years with the largest percentage of 65.6%.

Then followed by the 30-45 age group with a percentage of 18.8%. Respondents with an age group of more than 45 are the lowest with a percentage of 15.6%. Figure 15 below illustrates a diagram of the respondent's age group.

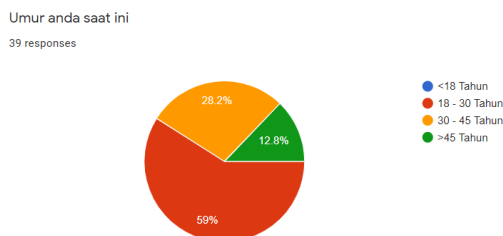


Figure 15. Respondent's Age

Most respondents have male gender with a percentage of 62.5% and females as much as 37.5%. Figure 16 below illustrates the gender diagram of the respondents.

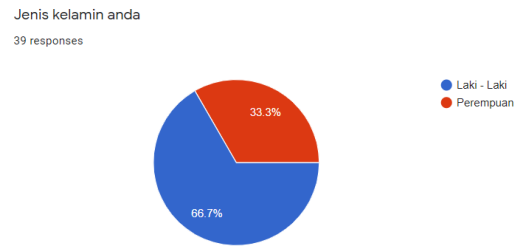


Figure 16. Respondent's Gender

The variable model in this study can be seen in Figure 17 below. The variables PE, EE, and FC are independent variables, while the BI variable is the dependent variable.

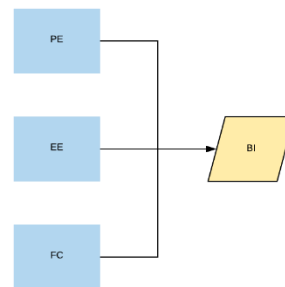


Figure 17. Model Variable

The process of testing the validity of variables is carried out to eliminate variables that do not have strong certainty between variables. As shown below, the variables EE2, FC1, FC2, and PE2 have values below 0.700. Therefore, these variables are removed from the model.

Outer Loadings

Matrix	BI	EE	FC	PE
BI1	0.763			
BI2	0.790			
BI3	0.916			
EE1		0.780		
EE2		0.576		
EE3		0.788		
FC1			0.659	
FC2			0.294	
FC3			0.887	
FC4			0.840	
PE1				0.752
PE2				0.636
PE3				0.907

Figure 18. Outer Loadings

A correlation test is done to find out the correlation between variables. The results of the correlation test using the Pearson Correlation method can be seen in Table 4.2. Strong correlations are indicated by two stars

(\*\*) and weak correlations are indicated in by one star (\*).

	TPE	TEE	TFC	TBI
TPE	1	.339*	.556**	.312
TEE	.339*	1	.373*	.297
TFC	.556**	.373*	1	.651**
TBI	.312	.297	.651**	1

**Table 1. Correlation Table**

The results show that the PE variable has a strong correlation to the FC variable and a weak correlation to the EE variable. Variable EE has a weak correlation with PE and FC variables. The FC variable has a strong correlation with the PE and BI variables. And the BI variable has a strong correlation to the FC variable.

### INTERVIEW RESULT

Interviews were conducted on 2 sources. The first resource person is a middle-scale jewelry shop with a staff of 15 people, the subject being interviewed is the store manager. And a small second jewelry shop with a staff of 2 people. the interviewed subject is the co-owner.

The response from the first source to the question. Respondents did not experience difficulties in program operation because they were familiar with touch screens. The features I found most useful was the live pricing and sales reports. Respondents responded that there are features that are lacking in the program, it would be better if the program also includes a staffing section such as the distribution of sales commissions. In the future, the first resource person is interested in using the program if all the features have been met.

The second respondent's response to the question. The second respondent did not have difficulty navigating the program, after reversing to portrait mode. The feature that is considered the most useful is the gold price setting, besides being able to see the gold chart and the movement of the US Dollar on one screen and being able to make decisions

from the chart. The second respondent did not feel that the program lacked any features. And in the near future, they don't need a program because they think still can use the manual method to judge the gold price or making reports.

### IV. CONCLUSION

The conclusions from the results of research on information systems and applications based on jewelry store android are:

1. Information systems and android applications are designed using the waterfall method. By using the waterfall method, the development of information systems and android applications has a clear flow. Starting from making use cases, continuing with database design using ERD (Entity Relationship Diagram), and finally making a swim lane flowchart business process.
2. The information system was developed using the Laravel 7 PHP framework with the addition of Python to retrieve live gold price data.
3. The android application is developed using react-native to retrieve API data provided by the information system.
4. The results of the interview show that a medium-sized jewelry shop is interested in using an information system if staffing features such as sales commission sharing are in the system. Meanwhile, small-scale jewelry stores feel that they do not need an information system because everything can still be handled manually.
5. The results of the questionnaire show that the topaz application is easy and intuitive to operate so that in the future it has the intention of using topas application in the future. This is indicated by the high correlation between the FC variable and the BI variable.



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