

Implementation Of Qr-Code Based Point Of Sales Application For Retail Store

Simeon Benson¹, FX Hendra Prasetya², Bernardinus Harnadi³

¹²³Department of Information System, Soegijapranata Catholic University

¹²³Jl. Pawiyatan Luhur Sel.IV No.1, Bendan Duwur, Kota Semarang, Jawa Tengah 50234

¹sbensona77@gmail.com

²hendra@unika.ac.id

³berdi@unika.ac.id

Abstract— Point of Sales is an application used to record transactions. This application can be used to help business owners including retail stores, self-service stores, and even supermarkets so that every transaction can be supervised and tracked. This kind of application gives convenience and easiness to avoid as many as possible from transaction fraud that may happen in running the business. This kind of application has features that may fulfill the direct and in-direct needs in business transactions. POS Applications can now be installed and operated in any kind of common electronic device in society including but not limited to laptops, smartphones, and personal computers. Because of the developments of technologies, the use of cameras in every device has become common nowadays. In the context of technology, this new feature can be utilized to search and find data and even read the data in the system. To store data in the real world, the use of QR-Code has been becoming common but rarely been implemented in POS Application. Because of this kind of capability, the three of these technologies can be integrated to ease the human's works. Several problems in business need contributions like this. In order to prove that, this research had been conducted to a retail shop by implementing Point of Sales Application and doing interviews to collect data as proof of the hypothesis. In order to do that, the research will be started to ask several questions about the needs of the business and build the application using Rapid Application Development Methodology. Rapid Application Development Method will be using the data from the interview as the

requirements of system development. The Rapid Application Development Methodology was used because it has effectiveness and efficiency to build applications without wasting time and efforts in building useless features. After the application is done, then the testing will be conducted by listing all main features of the application and checking whether the application works as expected. When the testing is done, the implementation of application will be conducted directly to the business. Implementation will be meeting several issues and revisions, in this section, another interview will be conducted in order to gather information about anything that needs to be fixed or changed. After the last interview was conducted, several facts were found. It proves that what has been stated in previous research was correct. Research has found that fraud and human error that spoil the business has occurred.

Keywords— Technology, Transaction, *QR-Code*, *POS*, Camera.

I. INTRODUCTION

Point of Sales (POS) technology is a hardware or software system that records transactions in a business by helping it to record transactions occurring in the cashier[1]. By data that has been recorded from each transaction occurring in business, the owner of the business may be able to make decisions for their business in the future[2]. According to Cahyodi dan Arifin, Point of Sales helps businesses to reduce work of manual recording, checking and data validations in businesses transactions[3].

Several things need to be proved. Those things are whether Point of Sales Application does help the business owner to monitor the stock flow or not, second, whether the Point of Sales Application helps to increase the workers productivity by occupying the workers' gadget. So, this is why the application was developed.

In the making of this application, some technologies are being used. First technology is PHP, this technology is being used because the syntax of this programming language is pragmatic, fast and flexible[3]. To make it work better, another technology that uses PHP as a base is being used. That technology is a framework named Laravel[4]. The convenience that Laravel offers is the simpler framework of building applications. Laravel has a framework that applies MVC (Model View Controller) Model, so that the application development separates data processing, business logic and the application user interface. This allows the developers to build each component better[5, 11]. To store data, a database is being used. The database used is MySQL[6]. MySQL offers high-speed data processing and a broad community to support the developer for asking questions[7]. To help the development in terms of user interface, another framework is being used, the framework used is React JS. React JS is built by Facebook Developers to help other developers to build interactive user interfaces without refreshing pages[8].

To ease the user to read data from the real world, QR-Code is being used. QR-Code is actually a code that saves any text or link inside of it[9]. So that the QR-Code Reader may read it[10]. This reader converts the code to what the code actually saves to human-readable text or link.

To build the structure of the interface, HTML is being used. HTML is commonly used to build web pages because it offers easiness to build structure of web applications for developers to build user interfaces. HTML uses tags to declare the structure of web pages, the tags are using common human-language. Along with HTML, another technology is being used, the technology used is javascript.

Javascript gives behaviours to web pages so that may give sense of interactivity to the users that operate the web application[12].

After the setup for application development, the next thing that needs to be analyzed is the business model main problem. The main problem of business most of the time is fraud. Fraud can be avoided by making certain supervision and bureaucracy that implies the real-time tracking of any transactions[13]. This is one of the most important components of POS Application. To assist the transaction in fighting fraud, supervision above inventories and stocks should also be there. The recording and supervision of stock flows should be supervised by certain people in the system so that the flow of information about stocks and inventories may be tracked[14].

II. METHOD

The development of application was started by analyzing the needs of business and the previous research conclusion and later on trying to solve the problem using the data that has been collected. The details are as follows.

Primary and Secondary Data Source

Primary data is collected through direct interviews with business owners about the business problem and later after implementation of application, another interview will be conducted to get a conclusion about application impact in solving the problem.

Secondary data source is journal research on the internet. The source is validated by google books so that the data can be trusted.

Data Gathering Methodologies

There are 2 methods used in this research to gather data. First method is asking several questions about business problems and owners' problems in running business and after the application is implemented, another interview will be conducted to get a real conclusion about the impact of the application whether it solves the problem or not.

Second method is by reading through journals, research and official websites that

provide information about the application and solution that was used in the application to solve the problem of business. This method also includes the research about previous Point of Sales Application in answering problems in dynamics of business.

Application Development, Testing and Implementation Methodology

After the data and information needed to build the application collected, the development of the application started by using the method of Rapid Application Development. This method implements the early setup and early preparation of application development needs. This preparation helps developers to be clear to build the application faster because it cuts the need of developers to designing and developing possible useless features in the future.

Before the development started, the general flowchart about application development and research were designed to give mindset to developers to build the application. The flowchart as follows.

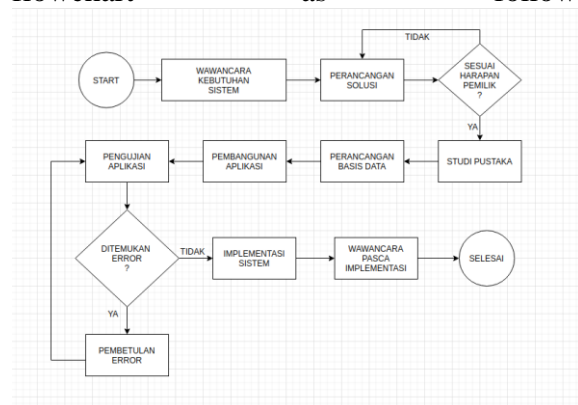


Figure 1 Flowchart of Research

The flowchart above includes the way of testing also, the complete development in Rapid Application Development Method also includes the testing and implementation.

Before the application starts to serve the business, it is necessary to be tested, so that in the future, any errors or problems caused by the application's bug may not startle the application in serving the business. Every problem and error found will be fixed soon after the cause of problem and error identified.

After the testing and fixing is done, the implementation to the real business starts. The implementation includes the training to the owner and staff that are included in the application jurisdiction..

III. RESULTS AND DISCUSSION Application Plot

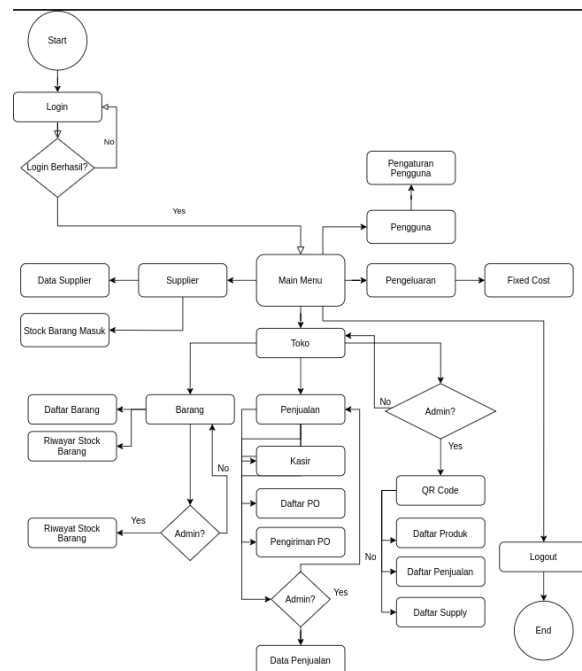


Figure 2 Flowchart of Application Plot

The figure 2 above shows the plot of application, that plot was made based on the result of interviews with the business owner. The application is made for solving the business problem, along with that, the application should also be intuitive for the users. This plot diagram is the reference for building the application.

The whole bureaucracy should be covered by the application functionality. Based on that reason, this plot was built and became the reference of the application to be built.

Application Development

The application was built using the Rapid Application Development method. This method uses the early preparation of application needs. After the plot of the application is done, the developer can predict the actual needs of the application development process.

Database Designing

The application's core functionality is to store data. Hence, the database is crucially important. The design of the database's structures and contents should be able to store the needed information gathered from the application.

The figures above are the visualization of the database's structure. The structure was created based on the needed data to be stored in the system. The structure of the database was influenced by the business problems and solutions. Thus, the database is the main idea of an application's data structure.

Application User Interface

The application has user interfaces to serve the user to operate and interact with the database and system. The user interface was built to give ease to the user for using the application.

The user interface will show the data and condition of the business in the system. The user interface loads every item needed by the user to serve the bureaucracy of the business.

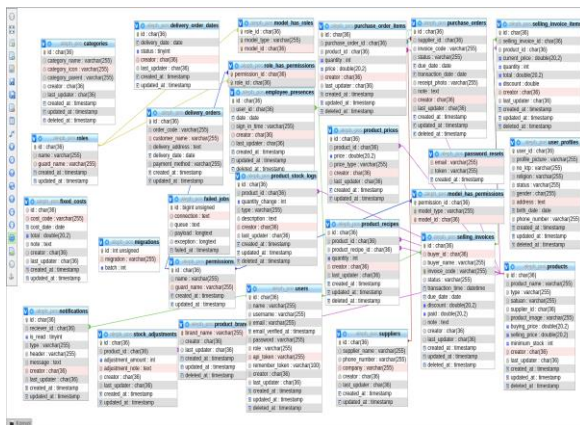


Figure 5 Visualization of The Database Structure Part 2

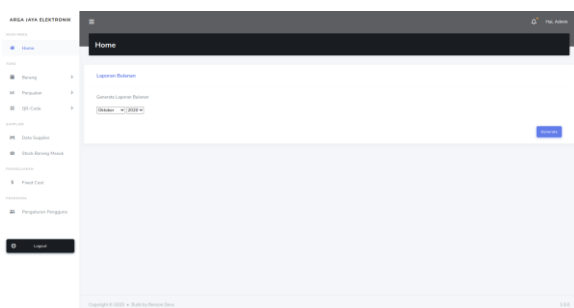


Figure 6 Home Interface of Application

The user interface uses the sidebar to list all the available features. The sidebar helps the user to move from one features to another. This is needed to help the user to do a certain amount of work.

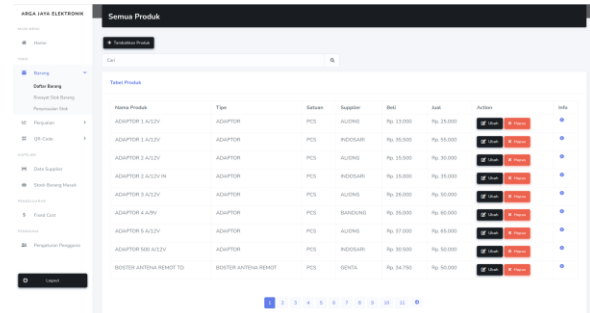


Figure 7 Product Management User Interface

Figure 8 shows the example of stock management on product in the system. This stock management system has supported the owner of the business to keep track of the stock that needs to be restocked. This page allows the administrator to manage the stock and check the availability of the product.

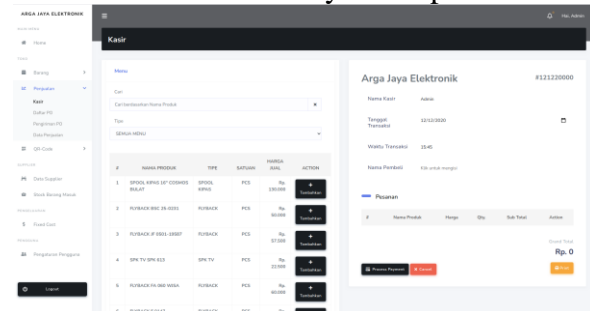


Figure 9 Cashier User Interface

Figure 9 shows the cashier working space. This page shows the cashier tools to serve the buyer. This page contains product information and the purchase order list. Thus from that the buyer can get the item with actual price with less likely to get fraud from unwanted bad intention of the cashier.

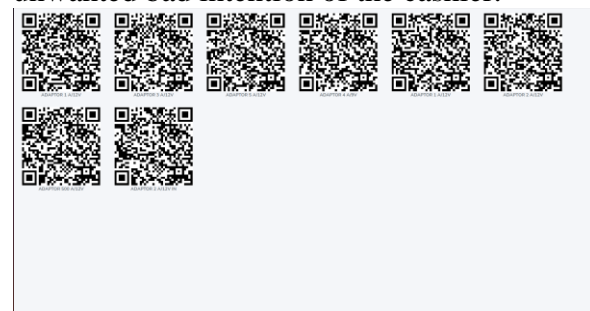


Figure 10 QR-Code Generated Page

In order to generate the QR-Code, the application allows the user, especially the admin to generate the QR-Code for each product based on the category of the product. Later on the generated QR-Code will be printed in paper to be stucked to any place to help the business subject to check the product data.

Deskripsi	Keterangan
Nama Produk:	ADAPTOR 1 A/12V
Tipe Produk:	ADAPTOR
Harga Produk:	Rp. 55.000
Stok Tersedia:	0
Gambar:	

Figure 11 Result of QR-Code Scanning

When the QR-Code is scanned, the device will show a link. If the link clicked, the page will be displayed, this page shows the data of a product.

Application Testing

When the application is done, the testing before real life implementation is needed. This will reduce the possibility of the system crashing unexpectedly. The testing will be using a list of features. Below are the lists.

FEATU RE	TESTING TYPE	RESULT
1 Login	Login Action	Works Correctly
	Adding Product to Form	Works Correctly
2 Order Form	Delete Product from Form	Works Correctly
	Submit Order	Whatsapp connection sometimes problematic
3 Product	Add New Product	Works Correctly
	Delete Product	Works Correctly
	Update Product	Product Image Preview Sometimes Problematic

FEATU RE	TESTING TYPE	RESULT
4 Cashier	Read Product Using QR-Code	Works Correctly
	Add Product to Cart	Works Correctly
	Delete Product from Cart	Works Correctly
	Submit Cart	Works Correctly
5 Product Supply	Print Out Receipt	Works Correctly
	Add Supplier	Works Correctly
	Edit Supplier Data	Works Correctly
	Delete Supplier	Works Correctly
	Create Supply Receipt	Works Correctly
	Delete Supply Receipt	Works Correctly
6 User	Upload Receipt Image	Works Correctly
	Add User	Works Correctly
	Delete User	Works Correctly
	Update User	Works Correctly

Figure 5 Lists of Features Testing Result

The list above shows the first time the application was tested. Found that the application had several features with bugs and problems. By this list, fixing can be done and the possibility of crashing while deployment is reduced. Later on, the application will meet it's deployment stage.

Post Deployment Interview Result

After a few days deployment, the owner of the business was interviewed about the significance of the solution using application. The interview was covering the reaction of the

workers, the usability of the system, and the problems found after the implementation.

The reaction of the workers was amusing. The workers felt that the system does help them to sort the products of the business. The system really helps the workers to simplify the work to count and manage stocks.

The owner of the business also agreed with this condition. The business owner was getting easier to supervise the stock of the warehouse.

The implementation of QR-Code really helps the buyer to check the stock and product details without asking the clerks to answer them, which cuts off the unnecessary bureaucracy to ask the owner to get information and details about the product they need.

Although the implementation of the stock management system made good success, the implementation of online order form was a failure. This is because the buyer tends to be confident when buying things directly from the clerk. Because in the system, buyers can't check the real condition of the product. They need their sense of touch and see to make sure the product is still fine and has good quality.

This condition was compounded with the ability of the buyers to operate the newest technology. Because the market of this retail store is mostly not technology natives. Even though some of the buyers do buy from an online platform, they tend to be satisfied by the service of the *whatsapp* admin.

Overall, the implementation of the application still solves the problem of the business. It may help the business to run with complete supervision of the owner.

IV. CONCLUSION

Based on the result of the research, several things could be concluded. Firstly is that the Point of Sales system does solve the problem of product stocking. This is because of the complete supervision in every transaction that includes the change of stock in the warehouse.

Secondly, the implementation of QR-Code does help the business to run even better. Because the implementation of this

feature does occupy the phone of the worker. This creates the ease for any business subject to get ease at reading data.

Thirdly is the implementation of several innovative solutions such as order form sometimes is not needed. This is because of the limitation of the business subject ability and the convenience of business subject in transaction.

Based on the facts above, we can conclude and answer the questions in the beginning of the research. First conclusion is whether the Point of Sales helps the owner to monitor the stock flow is proven to be true because the Point of Sales does record the transaction briefly. Second conclusion is that the QR-Code feature helps the workers to be more productive through the occupation of the cellular phone. This is because the convenience of the feature also gives occupation at the sametime to the workers..

REFERENCES

- [1] Leslie Turner, Andrea B. Weickgenannt, Mary Kay Copeland, Accounting Information Systems: Controls and Processes. Accessed On: October 10, 2020. [Online]. Available: <https://books.google.co.id/books?id=IDLDDwAAQBAJ&lpg=RA1-PA16&dq=definition%20of%20point%20of%20sales%20system&pg=RA1-PA16#v=onepage&q=definition%20of%20point%20of%20sales%20system&f=false>
- [2] Adrian Mackay, John Wilmshurst, Fundamentals and Practice of Marketing. Accessed On: October 11, 2020. [Online]. Available: <https://books.google.co.id/books?id=aYxBAvjV8kgC&lpg=PA213&dq=how%20point%20of%20sales%20works&pg=PA212#v=onepage&q=how%20point%20of%20sales%20works&f=false>
- [3] S. C. Cahyodi and R. W. Arifin, "Sistem Informasi Point Of Sales Berbasis Web Pada Colony Amaranta Bekasi," *Mei Rev. Mei*, vol. 1, no. 12, pp. 189–204, 2017.

- [4] The PHP Group, "PHP". Accessed On: December 8, 2020. [Online]. Available: <https://www.php.net/>
- [5] Ajit Kumar, Sencha MVC Architecture. Accessed On: December 12, 2020. [Online]. Available: <https://httpsbooks.google.co.id/books?id=WdVBvFUOpvAC&lpg=PT35&dq=mvc%20architecture&pg=PT35#v=onepage&q=mvc%20architecture&f=false>
- [6] Oracle Corporation, MySQL 2020. Accessed On: December 12, 2020. [Online]. Available: <https://www.mysql.com/>
- [7] Terry Collings, Kurt Wall, Red Hat Linux Networking and System Administration. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=PrepsktXgScC&lpg=PA353&dq=mysql%20popularity&pg=PA353#v=onepage&q=mysql%20popularity&f=false>
- [8] Facebook Inc, React JS 2020. Accessed On: December 12, 2020. [Online]. Available: <https://reactjs.org/>
- [9] Sharmitha M. C., Shuvadeep S., QR Code and Indian Library. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=V7KiCgAAQBAJ&lpg=PA121&dq=quick%20response%20code&pg=PA121#v=onepage&q=quick%20response%20code&f=false>
- [10] gruhn, vue-qr-code-reader. Accessed On: December 12, 2020. [Online]. Available: <https://github.com/gruhn/vue-qr-code-reader>
- [11] Taylor Otwell, Laravel Framework. Accessed On: December 12, 2020. [Online]. Available: <https://www.laravel.com/>
- [12] Shay Howe, Learn to Code HTML and CSS: Develop and Style Websites Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=PNFpAwAAQBAJ&printsec=frontcover&dq=Learn+to+Code+HTML+and+CSS:+Develop+and+Style+Websites&hl=en&sa=X&ved=2ahUKEwiGq9vij8jtAhVxIEsFHXvhAAAQ6AEwAHoECAAAQAg#v=onepage&q=Learn%20to%20Code%20HTML%20and%20CSS%3A%20Develop%20and%20Style%20Websites&f=false>
- [13] Pencegahan Fraud Di Lembaga Keuangan Mikro Syariah. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=i2jXDwAAQBAJ&lpg=PA66&dq=penyebab%20fraud&pg=PA70#v=onepage&q=penyebab%20fraud&f=false>
- [14] Antony Wild, Best Practice in Inventory Management. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=JlY7OBks4XEC&printsec=frontcover&dq=inventory+stock+management&hl=en&sa=X&ved=2ahUKEwjH6PT0yeHsAhUX9nMBHV0PDDYQ6AEwAHoECAEQAg#v=onepage&q=stock%20management&f=false>
- [15] Nigel McFarlane, Rapid Application Development with Mozilla. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=fuWgZyiR7fkC&printsec=frontcover&dq=rapid+application+development&hl=en&sa=X&ved=2ahUKEwjdhbivy-HsAhWf73MBHfznBbYQ6AEwAXoECAYQAg#v=onepage&q=rapid%20application%20development&f=false>
- [16] GetStisla, Stisla Admin Dashboard. Accessed On: December 12, 2020. [Online]. Available: <https://getstisla.com/>
- [17] Kevlin Henney, 97 Things Every Programmer Should Know: Collective Wisdom from the Experts. Accessed On: December 12, 2020. [Online]. Available: <https://books.google.co.id/books?id=sS7aPtrUuw4C&pg=PA60&dq=Dont+repeat+yourself+Programming&hl=en&sa=X&ved=2ahUKEwiF3Lmz2uHsAh>

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