

PROTOTYPE OF NON CASH TRANSACTION SYSTEMS IN THE TRADITIONAL MARKET BASED ON E-WALLET AND QR-CODE

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ABSTRACT

E-Wallet-based non-cash transactions are now a trend in how to conduct transactions among the people of Indonesia. Traditional markets are places that have great potential for implementing this. This research aims to expose the use of technology in providing solutions to ways of transactions that are still done conventionally in traditional markets. The case study in this research was conducted at Cihapit Market in Bandung. The problem that arises is the frequent occurrence of the transaction process that takes a very long time either due to the calculation of shopping that is still manual or because of the time to prepare the right money and change. The research method used is the prototype method starting from the problem identification stage until drawing conclusions and suggestions. The data used are data obtained from the results of interviews with traders, observation, and literature studies. The solution for alternative payments used is by utilizing an E-Wallet and QR-Code which allows the payment process to be carried out easily and quickly through merchant smartphone devices and buyers. The author makes use of the Go-Pay E-Wallet as a payment tool through the Midtrans Payment Gateway. The results of this research indicate that the system built is able to accelerate and simplify the transaction process. Scanning and generating qr-code can be done accurately and quickly, which is around 2.531 milliseconds for scanning. The results of interviews with traders and buyers showed the data as follows, around 88.57% and 94% the level of agreement on the use of E-Wallet as an alternative payment, 85.71% and 84% the level of agreement with the statement that using E-Wallet was able to reduce the slow transactions process, also 74.28 and 82% level of agreement that this system is able to speed up the transaction process.

Keywords : QR-Code, E-Wallet, Payment Gateway, Traditional Markets, Non-Cash Transactions, Cihapit Market Bandung

1. INTRODUCTION

Traditional markets are one of the centers of public attention. In traditional markets this transaction buying process always happens every day. Cihapit Market Bandung is a traditional market located on Jl. Cihapit No. 32 Cihapit, Bandung City. This Cihapit market is a traditional market that is very orderly and neat compared to other markets. The number of traders in this market is 176 units and 25 street vendors. With details of 132 stalls and 44 tables.

Electronic money in Indonesia is now beginning to get the attention and trust of its users. Bank Indonesia recorded the number of electronic transactions in January 2019 reaching Rp5.8 trillion and the amount of electronic money reaching Rp137 million [1]. As of February 22, 2019, 36 electronic money providers had obtained a license from Bank Indonesia [2]. The electronic money was issued by T-Cash, Gopay, OVO, JakOne, etc. How is currently changing the way cash to non-cash transactions become a trend in Indonesia.

Seeing e-wallet is a payment instrument that is currently very widely used by people in the city of Bandung, Bandung Cihapit Market has good potential for the use of these payment instruments.

This is also supported by the fact obtained from direct interviews conducted with 17 traders, obtained data such as those in Table 1 below.

Table 1. Trader Interview Results

No	Question	Yes	No	Information
1	Are you an android user?	15	2	
2	Are you familiar with non-cash payment instruments (debit, credit, ovo, go-pay, dll)?	15	2	The majority are familiar with e-wallet payment instruments.
3	Are you a	9	8	Easy, fast, hassle

non-cash payment user (debit, credit, ovo, go-pay, dll)?		is the reason most often expressed by its users.
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E-wallet is a type of electronic money that can be accessed via a smartphone. An e-wallet allows transactions to be carried out more quickly and securely without the need for change. Thus, traders can focus more on serving buyers and transaction activities are completed faster. In previous research with the integration of the mobile payment system with NFC it was proven that transactions between two android smartphones can be completed quickly ie 141.50 ms and transactions with NFC assistance require 270.87 ms [3]. In other studies of mobile payment revealed that since smartphones become an inseparable part of the lives of all humans, the use of mobile payments will continue to increase going forward [4].

In this study QR Code was chosen as a medium for data interaction between two android smartphones on the grounds that all smartphones have cameras. This allows all smartphones to interact with the data needed for transaction activities. In previous studies have implemented the QR Code as a document licensing tool that contains some important information and allows access to that information quickly and safely [5]. In other studies also revealed that the QR Code has a number of advantages such as speed of access, storing more information, and the existence of pattern recognition that allows the orientation of the QR Code to be scanned in all positions [6].

With the integration of e-wallet and QR Code, it is hoped that all smartphones owned by visitors can be used as an alternative payment tool that can make transactions more practical, fast and secure. Therefore, this research focuses on prototyping / prototyping the application of non-cash transaction systems in traditional markets based on e-wallet and qr-code as a solution for speed and ease of transactions.

2. Research Contents

2.1 Theoretical Basis

2.1.1 Electronic Money

Electronic money is a means of payment in electronic form where the value of the money is stored in certain electronic media. The user must first deposit the money to the publisher and save it in electronic media before using it for transactional purposes [7].

Electronic money is divided into two types namely e-money and e-wallet [8]. E-money is a type

of electronic money in the form of cards (chip-based). Examples of e-money products include Flazz BCA, BRI Brizzi, JakCard Bank DKI, etc. Meanwhile, e-wallet is an electronic money in the form of application (server-based). Examples of e-wallet products include T-Cash, Go-Pay, OVO, etc.

2.1.2 QR-Code

QR-Code is an abbreviation of Quick Response Code which is a trademark of a type of 2-dimensional barcode. This 2-D code can store a lot of information. Often used as part of advertising, marketing, and social networking, this system can be used by mobile phones that have QR code reader applications with internet access [6].

2.1.3 Payment Gateway

Payment gateway is one way to process electronic transactions. Payment gateway provides tools to process payments between customers, businesses and banks. Payment Gateway used in the system is Midtrans. This Payment Gateway allows the system to make payments using Go-Pay from Go-Jek. The flow of the transaction process that occurs in midtrans can be seen in Figure 1 [9]:

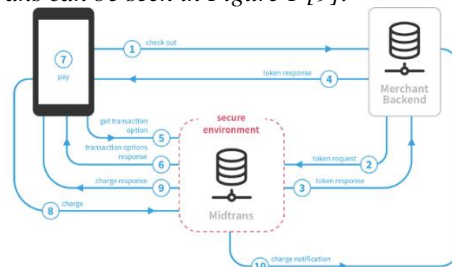


Figure 1. Midtrans Process Flowchart

2.1.4 Database

The database can be interpreted as defined as a collection of data that is integrated and arranged so that the data can be manipulated, retrieved, and searched quickly [10].

2.1.5 Blackbox Testing

Black Box Testing is software testing in terms of functional specifications without testing the design and program code [11]. This method is intended to ensure all functionality runs well and in accordance with what has been planned.

2.1.6 Skala Likert

Likert scale is an analytical method to conduct beta testing to respond to respondents' responses to the system that has been built [12]. Likert scale usually presents a statement accompanied by a choice. Choices on the Likert scale are frequency (always, often, rarely, never) or agreement (strongly agree, agree, neutral, disagree, strongly disagree).

Choices of answers with this scale are ranked in stages (ordinal). Likert scale analysis method is also relatively easy to do and more accurate when compared to the multiple choice method [13].

2.1.7 Go-Pay

Go-Pay is an e-wallet issued by the company Go-Jek. At present Go-Pay has been integrated with major banks in Indonesia for your convenience to top up your balance into Go-Pay.

2.2 Research methodology

Research methodology is a process used to solve a logical problem, which requires data to support the implementation of a study. The research methodology used is descriptive analysis method. The flow of research methods can be seen in Figure 1 below.

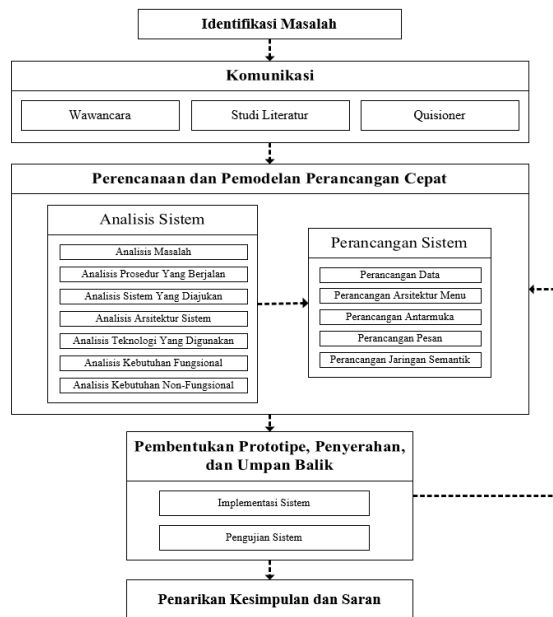


Figure 2. Flow of research methodology

2.3 Results And Discussion

2.3.1 Problem Analysis

Based on the background of the problems raised above, the problems examined in the study include:

1. Transaction activities at Cihapit Market are still conducted conventionally and in cash without any other alternative.
2. There is a need for mechanisms to share information between traders and buyers when using technology quickly and instantly as a reference to refer to the same transaction.
3. There is no system in Cihapit Market in Bandung for non-cash transactions using smartphones by integrating it with qr-code technology.

2.3.2 Proposed System

The proposed system consists of frontend and backend systems. Backend is made as a website based application while frontend is made as an android based application. The frontend system consists of two types of systems, namely systems for traders and buyers, while the backend system is intended for market managers. As an interaction tool for the two types of frontend systems for traders and buyers in sharing detailed shopping information on this system, QR Code technology is used. And the payment instrument used in this application is the Go-Pay e-wallet from Go-Jek based on Payment Gateway.

2.3.3 Analisis Arsitektur Sistem Transaksi

The application involved in the transaction system architecture is the frontend application of traders and buyers. This architecture describes a series of processes as follows:

- a. The trader initializes the details of the shopping the buyer will buy.
- b. The merchant application generates a transaction id that has been obtained from the data that has just been stored into the database into a QR-Code ..
- c. The buyer scans the QR-Code on the merchant's device screen using the buyer application.
- d. The buyer revisits shopping details on the application.
- e. The buyer makes a payment from the buyer's application.
- f. The system changes the transaction status concerned to "Paid".

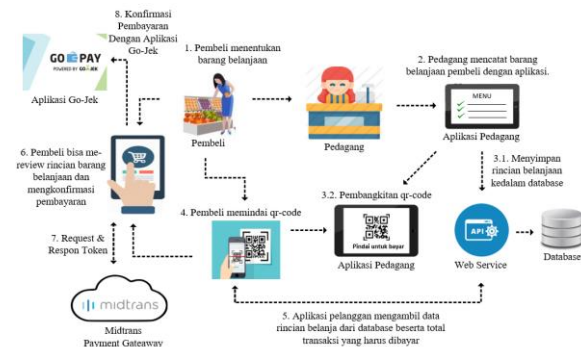


Figure 3. Transaction System Architecture

2.3.4 Functional Requirements Analysis

Functional requirements analysis describes the process of activities that will be applied in a system and explains the requirements needed by the system for the system to run well.

2.3.4.1 Use Case Diagram

Use Case Diagrams describe an interaction between one or more actors with the system to be created. Roughly, use cases are used to find out what functions are in a system and who has the right to use

these functions. Analysis of Use Case Diagrams on the system to be built can be seen in Figure 3.

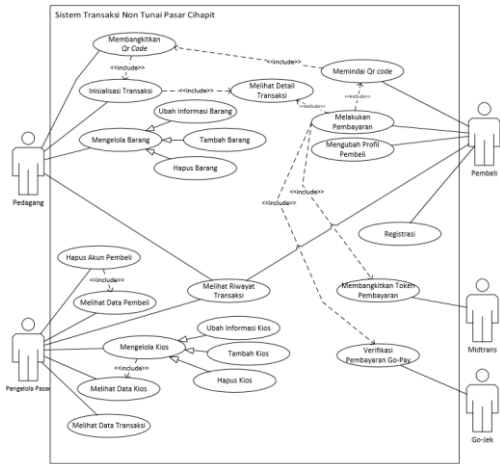


Figure 4. Use Case Diagram

2.3.4.2 Class Diagram

Class Diagram illustrates the structure and relationships between objects that exist on the system. This structure includes the attributes and methods that exist in each class that can be seen in Figure 4.



Figure 5. Class Diagram

2.3.5 Analysis of Non-Functional Needs

Non-functional requirements analysis is an analysis of system requirements including hardware and software requirements.

2.3.5.1 Web Hosting Implementation

Analysis of web hosting requirements includes the minimum specification requirements that must be met for website hosting. The minimum web hosting needs that must be met so that the system to be proposed can run well can be seen in Table 2 below.

Table 2. Web Hosting Implementation

No	Component	Minimum Requirements
1	Storage	50 MB
2	Subdomain	2
3	Database	1

2.3.5.2 Software Implementation

Software requirements analysis contains the minimum software requirements that must be met by the user. The minimum software requirements that must be met so that the system to be proposed can run well can be seen in the following Table 3.

Table 3. Software Implementation

No	Website	Android
1	Windows 7, Windows 8, Windows 8.1, Windows 10 or newer	Android OS 5.0 "Lollipop" or newer

2.3.5.3 Hardware Implementation

Hardware requirements analysis contains the minimum hardware requirements that must be met by the user. The minimum hardware requirements that must be met in the system to be proposed can run well can be seen in Table 4 below.

Table 4. Hardware Implementation

No	Android
1	Processor Dual Core
2	RAM 1GB
3	Storage space 20MB
4	Screen 6 inch

2.3.6 Transaction Id Analysis

Transaction id is a data that will be a reference for merchant and buyer applications to refer to the same transaction data.

The following is an illustration of how a transaction id is generated. If the current date is April 12, 2019 and the number of transactions that have been done on that date is 12 times. Then the new transaction sequence is 13. So the resulting transaction id is "20190412013". In this way it can be guaranteed that the existing transaction id will always be unique when every time the transaction id is raised.

2.3.7 QR-Code Analysis

The use of QR-Code is done using the ZXing library. The use of ZXing library in this system is intended so that the construction of the generation and scanning system of qr code can be done quickly without having to analyze from the beginning about the qr code.

The qr code in this system is used as a mechanism for sending transaction IDs from the merchant application to the buyer's application. So that traders and buyers can access the same transaction data in the database according to the

transaction id that has been raised. General description of how QR Code works in the system can be seen in Figure 5 below.

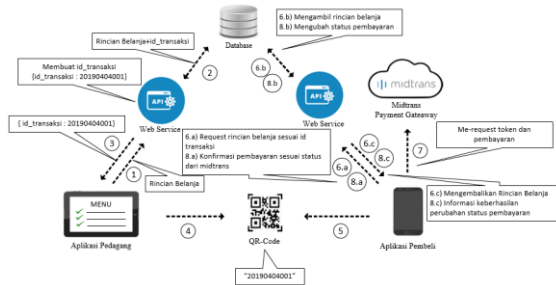


Figure 6. QR-Code Analysis

2.3.8 Payment Gateway and Go-Pay Analysis

Payment Gateway used in this system is Midtrans Payment Gateway. Midtrans is used as an intermediary so the system can make payments using Go-Pay. As a clearer picture. You can see an architectural description of how Midtrans Payment Gateway and Go-Pay work in Figure 6 below.

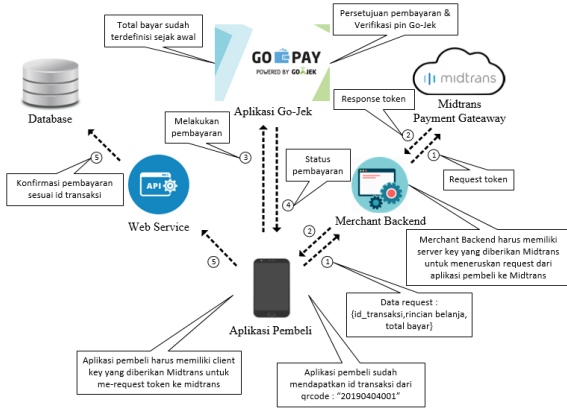


Figure 7. Payment Analysis

2.3.9 Data Design

Entity Relationship Diagram (ERD) is a form of database modeling that is often used in the development of information systems. ERD for the system built can be seen in Figure 7 below..

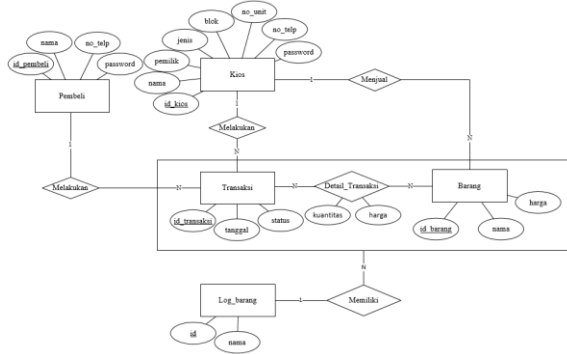


Figure 8. Entity Relationship Diagram

Based on the ERD that has been formed, then a relation scheme is formed. The relation scheme formed based on ERD above can be seen in the following Figure 8.

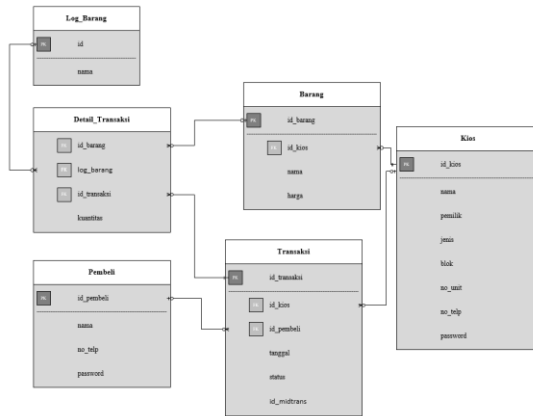


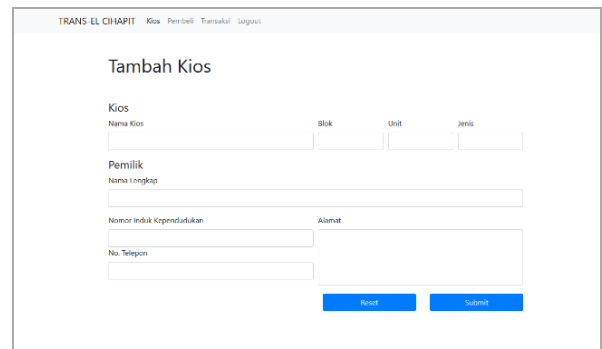
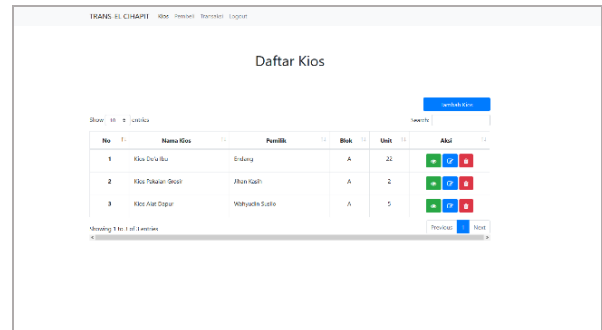
Figure 9. Relationship Scheme

Relation scheme is a relationship between tables that are used in a database that will be used in the system being built.

2.3.10 Interfaces Implementation

The interface implementation in the system built is divided into three different parts, namely :

- a. Backend Market Manager



TRANS-EL CIHAPIT Kios Pembeli Transaksi Logout

Daftar Pembeli

No. Telp	Nama Pembeli	No. Telp	Alat
1	Hiroshi Sasmita	08227629200	0
2	Jajang	08123056789	0
3	Juna Suppan	0897654321	0
4	Dafian Rizu	08271629302	0

Showing 1 to 4 of 4 entries

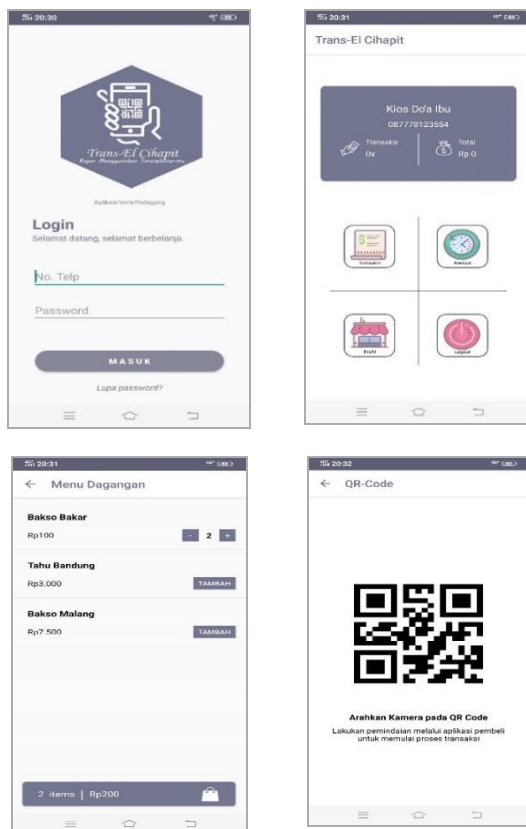
TRANS-EL CIHAPIT Kios Pembeli Transaksi Logout

Daftar Transaksi

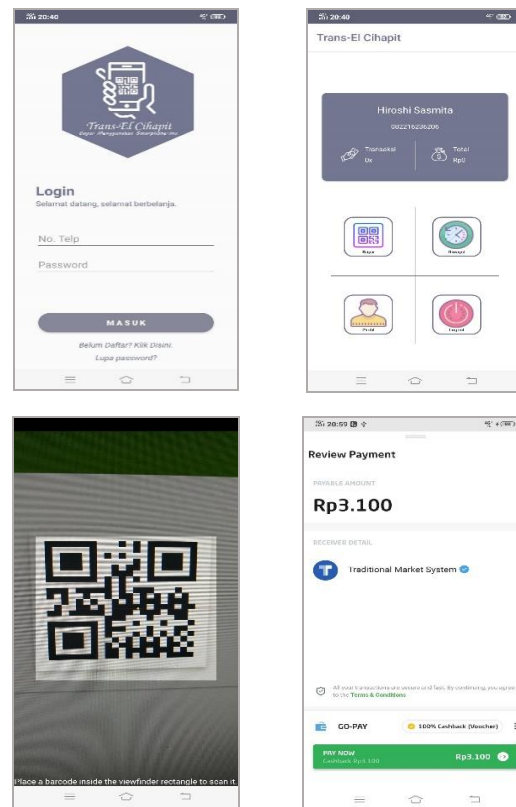
No. Telp	Terpilih	Bergang Kios	Bergang Pembeli	Bergang Transaksi	Total Transaksi
1	15-05-2016	1	1	3	Rp 15.000,00
2	22-05-2016	1	1	2	Rp 22.000,00
3	29-05-2016	1	1	1	Rp 11.000,00
4	21-05-2016	1	1	3	Rp 15.000,00
5	22-05-2016	1	1	6	Rp 28.000,00
6	27-05-2016	1	1	5	Rp 19.000,00
7	18-05-2016	1	1	3	Rp 13.000,00
8	19-05-2016	1	1	2	Rp 8.000,00
9	09-05-2016	1	1	3	Rp 14.000,00

Showing 1 to 9 of 9 entries

b. Frontend Trader



c. Frontend Buyer



2.3.11 Alpha Testing

At the alpha testing stage, testing that will be carried out on the system that is built is blackbox testing. At this stage, the prototype of the system being built will be tested with reference to the functional design and system analysis in the previous chapter. The test carried out aims to find out whether the system built is in accordance with the desired results or not. Tests carried out in this stage include functional testing.

Based on the results of testing using the black box method that has been done, the functionality contained in the application that has been made in the frontend application both for traders and buyers as well as the backend application for market managers can be accepted. That way, the application can already be said to be fit for use by market managers, traders, and buyers of the Bandung Cihapit market.

2.3.12 Beta Testing

Beta testing is an objective test conducted directly by users who will later use the system software that is built including traders and buyers. Beta testing is done to determine the quality of the system that has been built, whether it meets

expectations or not. The beta testing method used for this system is a Likert scale.

Questions asked to traders and buyers and buyers can be seen in the following Table 5.

Table 5. Likert Scale Questions

No.	Question
1.	Alternative e-wallet payments (Go-Pay) in this system provide a choice of ways of transacting which is currently a payment trend in the community.
2.	Such a system would be able to help reduce traders' dependence on troublesome small bills and slow down the transaction process.
3.	The fast transaction process will increase the comfort for shoppers when shopping.
4.	With this system, buyers can check and correct shopping details via their own smartphone quickly through scanning the QR Code.
5.	Transactions using this system can be done quickly.
6.	Transactions using this system can be done quickly.

The following results from the Likert scale can be seen in Figure 9.

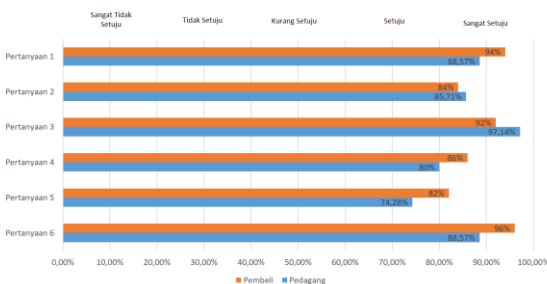


Figure 10. Likert Scale Result

3. Closing

3.1 Conclusion

Based on the description that has been discussed in the previous chapters and the process of building and testing the system, some conclusions can be obtained as follows.

1. Transaction activities can already have other payment alternatives as an option for buyers, namely by implementing digital cash-based e-wallet payment instruments that can simplify and make the transaction process safer and more convenient.
2. Transaction activities can be done quickly and instantly by implementing the qr code and payment features digitally via a smartphone.
3. The use of alternative e-wallet payments and sharing features of fast transaction details

between merchants and buyers can add convenience and speed in transactions.

3.2 Suggestion

The system developed certainly has some shortcomings, so improvements are needed in the future, so that suggestions are needed to build the system. The suggestions for future system development to be better are as follows.

1. Add more e-wallet alternatives, such as OVO, DANA, etc. By collaborating with various payment gateways.
2. Speed up the process of determining the details of a transaction, by using image recognition to determine the items to be purchased by the buyer.
3. Add sales and financial report features both daily, weekly and monthly.
4. Add a feature to handle the process of financial distribution to traders from the existing account at the payment gateway concerned.

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