Digital Ticket System based on Telegram for Managing Market Merchant Fee Payment

I Putu Arya Dharmaadi[1], Dewa Made Sri Arsa[2], I Gusti Made Arya Sasmita[3]
[1,2,3] Program Studi Teknologi Informasi, Fakultas Teknik, Universitas Udayana
E-mail: [1]aryadharmaadi@unud.ac.id , [2]dewamsa@unud.ac.id, [3]aryasasmita@unud.ac.id

Abstract

Traditional markets generally have a unique payment scheme for their merchants. Every year they are charged a stall rental fee, every month they pay electricity fees, and they are charged daily fees, such as cleaning fees, water fees, etc. The collector of payments generally carries a stack of tickets which will be given when the merchant pays his debts. The use of conventional tickets as proof of payment has several weaknesses, such as the difficulty of monitoring and managing payment data, both from the market director and the merchant side. In addition, tickets are often thrown away to cause garbage. Therefore, a digital ticket system is needed as proof of payment transactions. Using this system, the officers who receive money from merchants must enter transaction data into the system to send digital tickets to the registered market trader's telegram account. The merchants can view their complete payment history through the digital ticket. In the end, the market director can easily monitor the payment data of market traders to minimize revenue leakage.

Keywords: ticket, digital, telegram, payment, traditional market

1. INTRODUCTION

Traditional markets are places for buying and selling goods at low prices, where the market management is generally still very simple and conventional [1]. Although malls, supermarkets, and modern shops are growing fast in big cities, traditional markets still receive attention from local and central governments [2]. It is due to many MSMEs (Micro, Small, and Medium Enterprises) being interested in selling and people interested in shopping at lower prices than modern markets [3].

Traditional markets require service innovation and market management to compete with the modern markets [4]. Based on observations made to several traditional markets in Bali, one of the conventional market management models is the merchant fee payment collected by officers every day. The fees are in the form of cleaning fees, water fees, etc. The collector of payments generally carries a stack of tickets which will be given when the merchant pays his debts. The use of conventional tickets as proof of payment has several weaknesses, such as the difficulty of monitoring and managing payment data, both from the market manager and market trader sides. In addition, the physical tickets are often thrown away to cause garbage [5].

Therefore, a digital ticket system is needed as proof of payment transactions since it brings many benefits, such as explained in [5][6][7]. With this digital ticket system, dues collecting officers who receive money from traders must enter transaction data into the system to send digital tickets to the Telegram account of registered merchants. The merchants can view their complete payment history through the digital ticket. In the end, the market manager can easily monitor the payment data of the merchants to minimize revenue leakage.

2. RESEARCH METHOD

The methodology or stages of this research are divided into four steps: market

observation, system design, system implementation, and system testing**.**

2.1 Market Observation

The initial data collection was conducted by reviewing and directly interviewing several traditional market merchants and market managers in Denpasar City and Gianyar Regency. This review aims to observe the real conditions of the existing management and service models in traditional markets. In contrast, the interview explores market traders' daily, monthly, and annual fee payment schemes. Based on this observation, it has been known that the market officers come with a stack of physical tickets every day and give it to the sellers who have paid the daily fees. Using this kind of ticket as transaction proof can be bad because the physical tickets may be lost or thrown away, causing garbage [8]. Moreover, the market management is always late to monitor the money that has been collected on one day since the officers only report the payment manually by directly coming to the office and handing over the money and the transaction report. Therefore, it needs system information to generate a digital ticket for the sellers and record all payments.

We also observed their readiness to utilize information technology in their daily activities. All merchants had and used handphones for communication; however, only half fully used smartphones. The rest either still used old-model phones or shared the smartphones with their families. Even though the majority of the merchants did not know the Telegram application, they would download it as long as the market administrators instruct and teach them. In addition, the market managers were enthusiastic to use Telegram since this application is totally free when integrated into the proposed system and has better features than other popular chat applications [9].

2.2 System design

Based on the situation above, this research designs a market management information system equipped with a merchant fee payment system integrated with the *Telegram* application. Unlike *Whatsapp*, which creates a backup in users' Google Drive, the Telegram service stores its data in the secure cloud system making the users more conveniently retrieve data [10]. Considering that majority of the sellers do not have any banking account or electronic wallets, this system only received the payment by cash carried out by the officers. This system is web-based so that it can be opened on any device [11]. The system workflow is in line with the current payment flow to minimize the impacts of the system complexity. So, the general description of the system and the workflow of the system built is as follows.
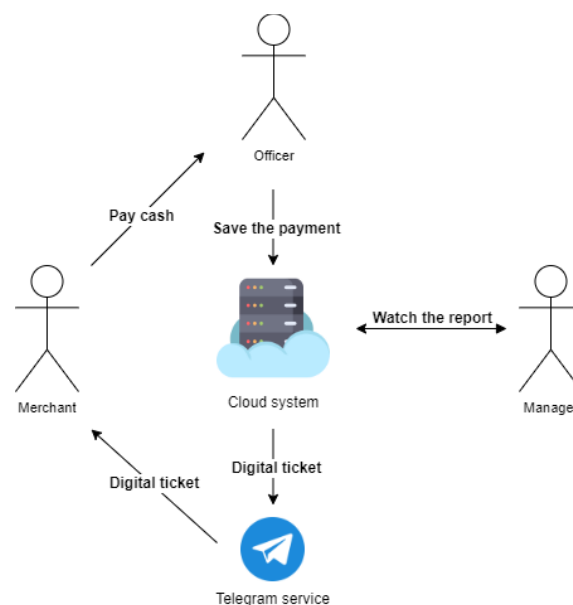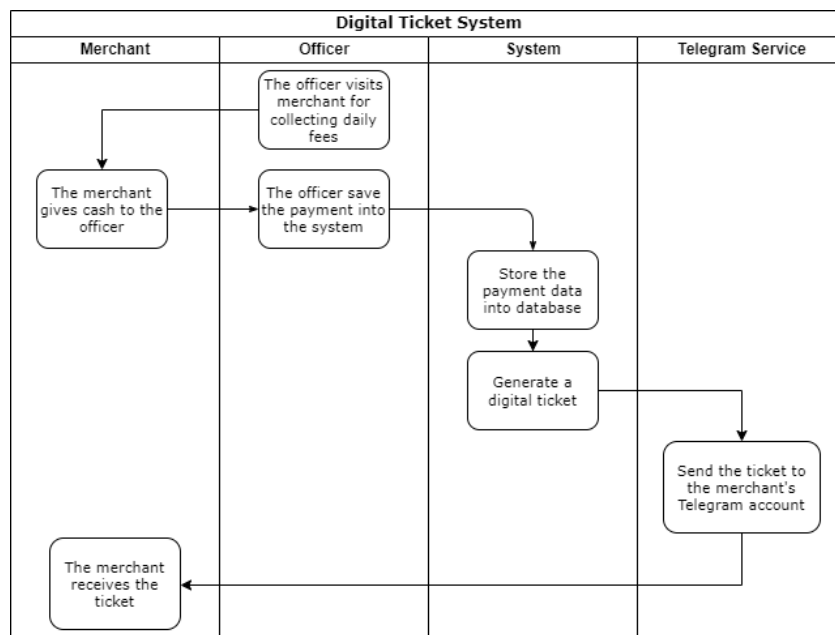

Figure 1. System overview

Figure 2. System workflow

We use the observation results in designing the system workflow. We want the developed system flow is not much different with the conventional workflow so that we are heavily inspired from the existing payment flow. In current situation, the officer comes to merchants to collect daily payments. Then, the merchants give cash and are noted by him. The designed system will play a role in the payment registration process and replace the paper ticket. Therefore, the system works as follow. The market officer logs into the system and receives the money cash payments from the seller. In the system, the officer enters the name or number of the stall paying the fees, then presses the "Pay Contribution" button. Upon success, the system automatically sends a digital ticket as proof of payment to the merchant's Telegram account. After successfully collecting all fees, the officer hands the collected cash to the manager. In the system, the officer selects the 'Money Handover' menu and enters the amount of money; then, it is approved by the manager through the system. After this process is successful, the market cash record will increase.
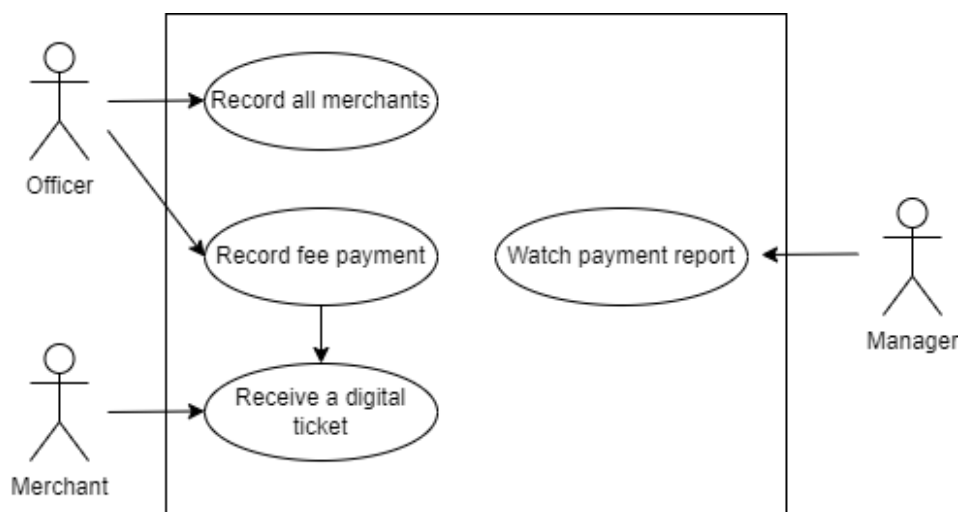

Figure 3. System use case

Based on the observation results, we knew that there are three actors on the conventional system. So, we use this information to design the system that is like the real situation. The designed system has three main actors: officer, merchant or seller, and manager. The collector officers can manage merchant data and record payment of merchant dues, while the merchant will receive a digital ticket from the Telegram server. Finally, managers can view financial reports.

2.3 System implementation

The system design results will be implemented in a PHP programming language with Laravel framework [12] and MySQL database. We use cloud server with 1vCore CPU and 1 GB RAM, including Ubuntu OS 18.04 x64, Nginx, Apache 2.4, MySQL, and Php-gd extensions. In addition, we also use an Android smartphone, namely Huawei P30 Pro with Kirin 980 chipset CPU and 6 GB RAM.

After the device is ready, the Brackets application version 1.7.0 is prepared to write program codes in the PHP language. The program codes that have been written will be sent to the cloud server device via the FileZilla application version 3.34.0.

2.4 System testing

After the system implementation process is successful, the next step will be the trial process. The following is a test scenario that will be carried out.

Table 1. System trial scheme

No	Real Scenario	System Scenario	Expected Result
1	The officer records all the traders in a market	The officer login --> select Add Merchant --> fill in the data completely --> Save	Merchant data has been successfully saved in the system
2	Merchants pay cash dues to officers	The officer login --> find the merchant's name --> select the Contribution you want paid --> click Pay	The payment data is successfully saved, and the merchant receives digital ticket via Telegram
3	Managers view financial report	Manager login --> select menu view report --> select reporting period	Financial reports appear on the manager screen

3. RESULT AND DISCUSSION

We demonstrate the application's main functions based on the system design and workflow.

1. Log in

When the traditional market officers want to collect the daily fee of the merchants, they need to log in to the SiPasar application. Before logging in, they have to create an account and be approved by their manager.
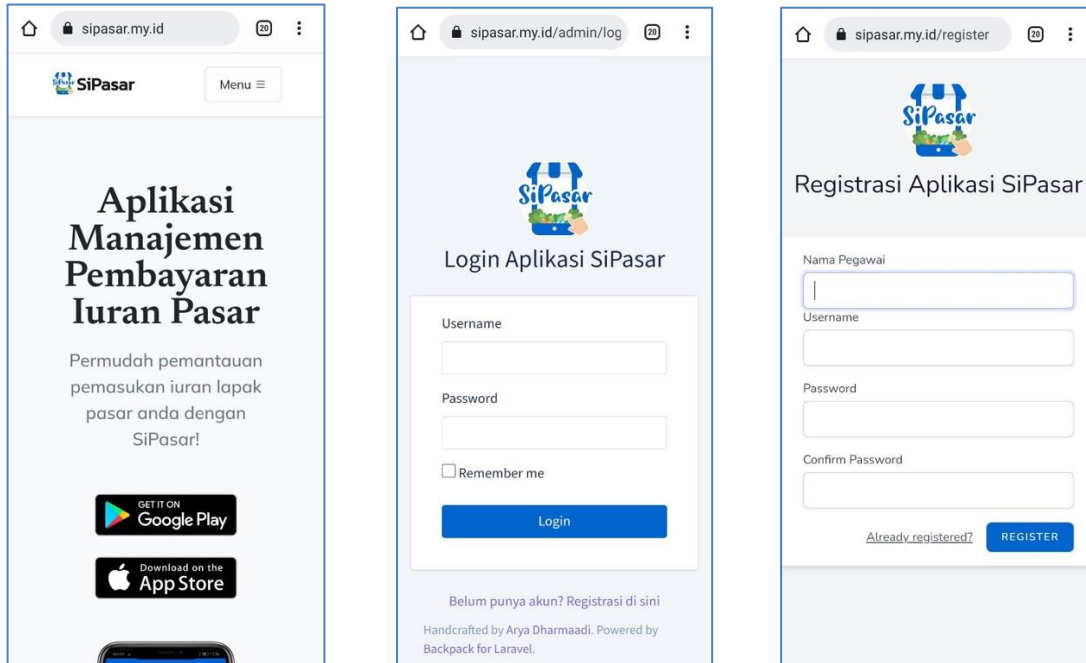
Figure 4. Home page, login page, and registration page

2. Add Merchant

Before choosing the merchant that will pay the fee, the officer needs to record all merchants on their traditional market into the system by opening the merchant menu. This step also saves the Telegram account of each merchant. After that, to activate the Telegram service, each merchant must send the "Daftar" keyword to the "Sipasar" Telegram bot, as shown in figure 7.
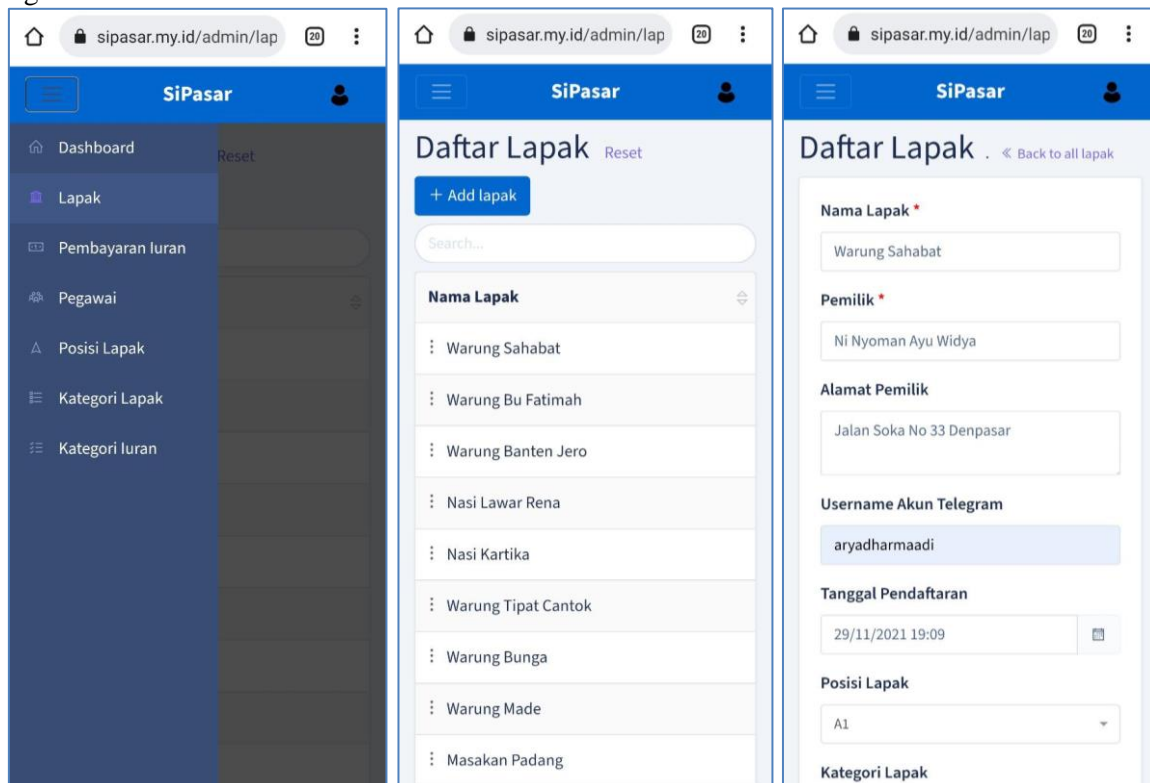

Figure 5. Home page, login page, and registration page

3. Pay Daily Fee

The officer selects the merchant's name, clicks the pay button, chooses the fee type, and click the save button.
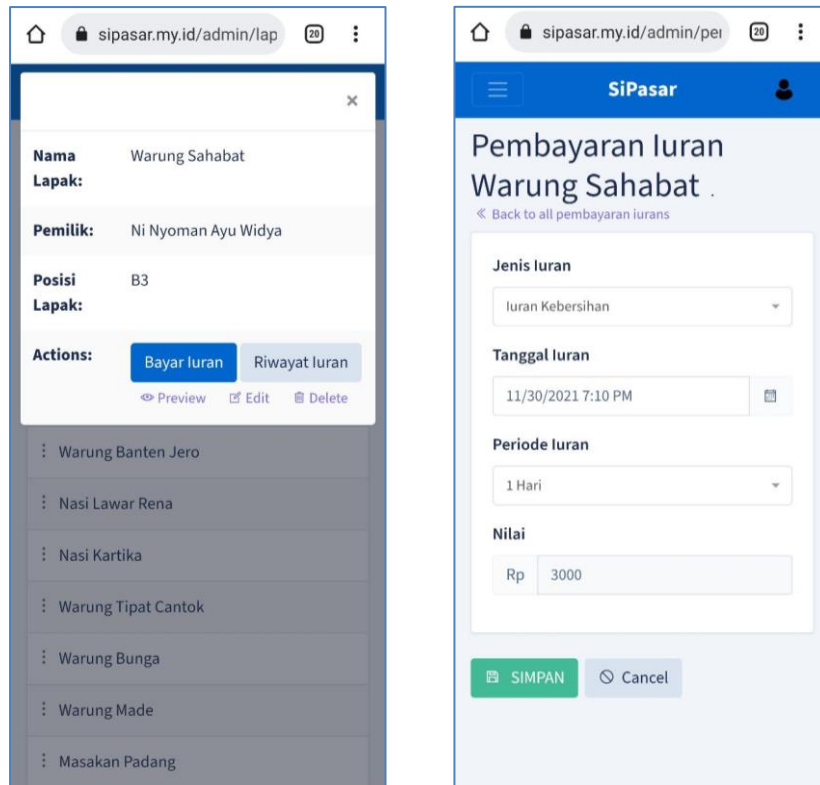

Figure 6. Fee payment page

4. Get Digital Ticket

After the officer saves the payment, the system automatically sends a digital ticket to prove that the merchant has completed the daily fee payment.

Figure 7. Digital ticket sent through Telegram service

5. View Financial Report

   To see the financial report, mainly the income overview, the manager has to log in with his credentials and open the 'Dashboard' menu.
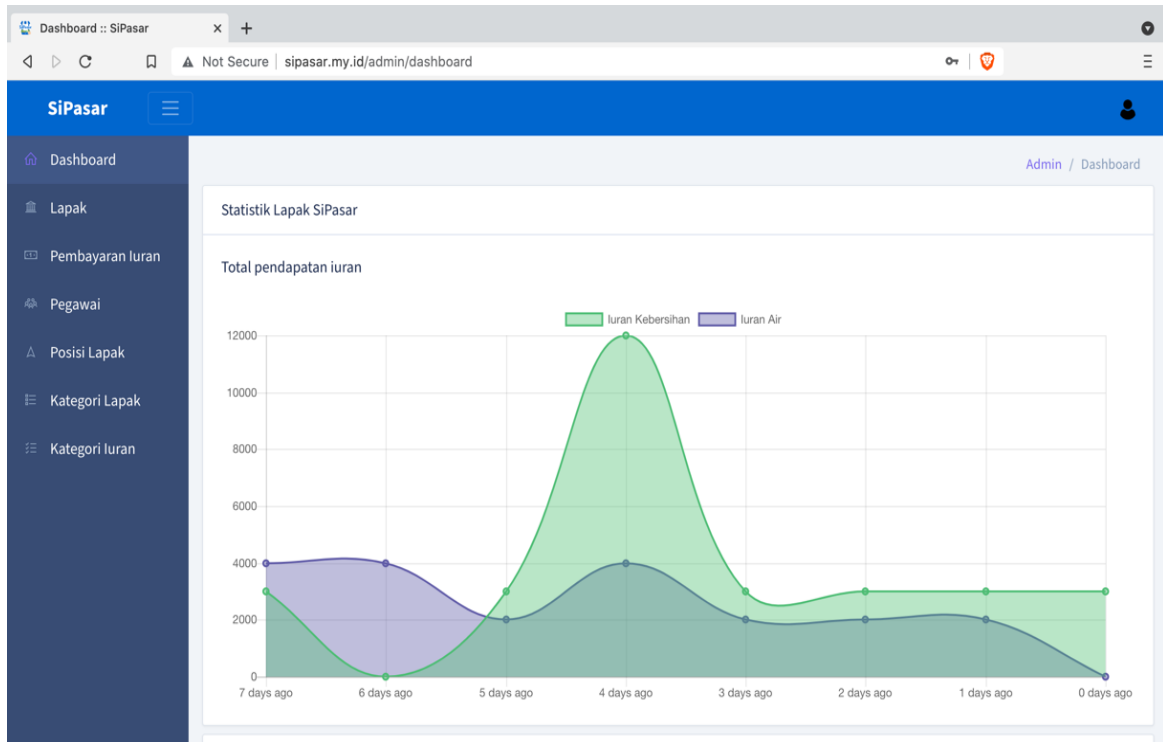

Figure 8. Financial dashboard

   Next, the system will be tested by doing black-box testing to know whether it works properly [13]. Given the test scenario shown in table 1 above, the results are as follow.

Table 2. Function testing results

No	Real Scenario	Result
1	The officer records all the traders in a market	Run properly
2	Merchants pay cash dues to officers	Run properly
3	Managers view financial report	Run properly

   The feature test results show that the SiPasar application has successfully implemented all the main functionalities because the system has been following the prepared draft scenario. In addition, the integration process with the Telegram server works well so that there are no problems in the process of sending data from the SiPasar cloud server to the Telegram server. The resulting digital ticket is in the form of an image with a unique background, so that it will be difficult for those who want to manipulate the contents of the digital ticket.

4. CONCLUSION AND FURTHER STUDY

   This research has successfully built a digital ticket system based on the Laravel framework integrated with Telegram services. The black-box testing showed that all system functions had worked well.

For future research, it can be integrated with other communication channels such as Whatsapp or Line services. Moreover, others can design digital watermarking or information hiding modules to secure the digital ticket system to detect if the ticket has been changed manually.

ACKNOWLEDGEMENT

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