

Implementation of point of sales at Kopi Lentera using agile methods and scrum framework

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ABSTRACT

Implement Point Of Sales (POS) at Kopi Lentera using Agile and Scrum Framework methods to improve transaction efficiency and accuracy and customer service quality. The purpose of this research is to improve efficiency in the transaction process, reduce errors, and improve customer relations by offering more responsive services through the design of a web-based POS system. The Agile method and Scrum Framework are utilized for managing the development process to ensure speed and adaptability to change. The data collection process is carried out by observation, interview, and literature study. Then the implementation of the device will be tested with the System Usability Scale (SUS) conducted on 10 respondents through a questionnaire. The study concludes that applying the agile-scrum method can result in the development of a POS system that meets the needs with a shorter development time. The implementation results show an increase in the efficiency of recording and transactions, as well as improving the quality of customer service.

Keywords: Point of Sales, Agile Methods, Scrum Framework, Customer Service, Lentera Coffee.

1. INTRODUCTION

In the current era of globalization and the development of information technology, the role of Point of Sales (POS) systems has become crucial in facilitating and improving the efficiency of business transaction processes (Febrianto, 2022; Sidhunata et al., 2023; Wulandari et al., 2021), including in the coffee industry. For example, Kopi Lentera as a coffee service provider committed to quality and customer experience, faced the challenge of improving the effectiveness of their transaction management system. Lentera Coffee faces various challenges in its business operations, from tracking product stock to manual and time-consuming transactions. It requires a system capable of processing transactions quickly and accurately and providing real-time information to support business decisions. With the proper design of a web-based POS system, Lentera Coffee is expected to enhance efficiency in the transaction process, reduce errors, and improve customer relationships by offering more responsive services.

To develop the point of sales system, we will use the agile-scrum method in the software development life cycle with a processing time of 3 months. When applying the agile methods, there are several stages. The first step is to identify the system requirements, such as the features needed by the owner of Kopi Lentera. The second step is to analyze the system to determine the business process and user needs. The design stage involves database design, system design using Unified Modeling Language (UML), UI/UX design, and prototype testing. Next comes the development stage, involving the coding process to implement the system design and UI/UX that has been created. After the development stage, the application will proceed to the testing stage to ensure that the features and functions align with user needs. After going through this process, the development team will carry out deployment so that the application can be used, and the development team will carry out periodic maintenance to ensure that the performance of the developed system is optimal and safe from system gaps or bugs.

The agile-scrum implementation is expected to deliver the appropriate POS application to enhance business process optimization at Kopi Lentera. With this method, the development process runs iteratively and can quickly adapt if changes are needed. It focuses on users to address the problems they experience.

Previous research conducted by Dharmalau et al., (2023), stated that the use of a point of sales application system using the Flutter Framework method, test results show good results and can increase efficiency. In the study Marisa and Yuarita (2017), the use of Point of Sales (POS) applications using the system development life cycle method is useful for increasing sales efficiency. Other studies stated that the use of Point of Sale (POS) applications using the Technology Acceptance Model (TAM) method in MSMEs can increase service efficiency because it is faster than manual methods (Sipayung & Fiarni, 2020). According to Fajar and Hayati (2021), using the Point of Sale (POS) with EOQ method in purchasing goods more efficiently than manual / conventional methods. In other study, Using Point of Sale (POS) using Object Oriented Programming (OOP) language can make sales activities more effective and efficient (Siddik & Samsir, 2020). In the study Sumarto (2023), the RAD method in Point of Sale (POS) applications can accelerate the Point of Sale (POS) application development process and increase flexibility in accommodating the growing needs of MSME users.

The new thing in this study lies in its focus on using a web-based Point of Sale (POS) system using the Agile and Scrum Framework methods. The use of this method is different from other studies that have been conducted. Its use is utilized to manage the development process to ensure speed and adaptability to change. By conducting this research, it will be useful to increase efficiency in the transaction process, reduce errors, and improve customer relations by offering more responsive services at Kopi Lentera.

2. METHOD

This research is a type of qualitative research with descriptive analysis techniques. Data collection techniques through observation, interviews, and literature studies. The subject of the research is Kopi

Lentera. The techniques used are agile methods and scrum framework.

Scrum is an implementation of the agile framework that focuses on delivering the best results in a short time (Khalil & Kotaiah, 2017). It is a team-oriented approach, defining roles, and setting iterations within short timeframes called sprints, where the system is developed in stages (Al-Saqqa et al., 2020). Sprint cycles typically last 1-4 weeks (Hema et al., 2020). In Scrum, there are three main roles: the product owner, the Scrum master, and the development team (Kumar & Dwivedi, 2020).

The point of sale development for Lentera Coffee was created using the Agile method and Scrum framework. Figure 1 below illustrates the development process of this POS system.

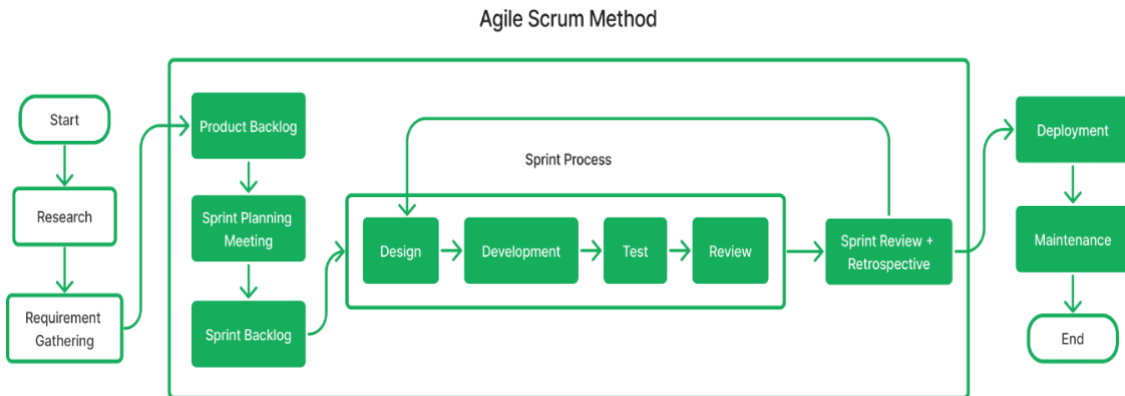


Figure 1 Flowchart of agile scrum method implementation

2.1 Product Backlog

This backlog pertains to the outcomes of interviews and observations carried out at Kopi Lentera. The requirements for this feature have been identified and will be overseen by the owner of Kopi Lentera. Table 1 will display the product backlog for this POS system."tera. Table 1 will display the product backlog for this POS system.

Table 1 Product backlog of Kopi Lentera POS system

No	Backlog Feature	Description
1	Authentication	Users log in to access the system, and they can reset their passwords if necessary.
2	Category menu	Users can manage product category data to be sold, this category is used to classify products at Kopi Lentera.
3	Product menu	Users can manage product data that will be sold.
4	Order menu	Users can record orders from customers.
5	Order history menu	Users can view the order history of several transactions that have been done before.
6	Dashboard	Users can view sales data in dashboard form to better understand reports and make efficient decisions.

2.2 Sprint Planning

The system was developed for 3 months, from April 3 to June 21, 2024. During this time, 6 sprint cycles were completed, with each sprint lasting 2 weeks. The development team consisted of various

roles including Product Owner, Scrum Master, Project Manager, UI/UX Researcher & Designer, Front-End Developer, Back-End Developer, and Quality Assurance.

2.3 Sprint Backlog

From the product backlog that has been created, the team will decompose the product backlog into smaller tasks, and then prioritize each task. Table 3 displays the sprint backlog of this POS system.

Table 2 Sprint backlog system POS Kopi Lentera

No.	Goals	Estimation(Day)	Priority Scale
1	The system can authenticate users who will access the POS system.	14	1
2	The system can manage product category data.	14	2
3	The system can manage product data, and the system can retrieve category data from the database.	14	3
4	The system can record bookings, display invoices, and save booking data.	28	4
5	The system can present reports in the form of dashboards	14	6

2.4 Sprint

The development team will work on tasks assigned through the sprint backlog in a process called a sprint. This process includes planning, designing, testing, and reviewing. At the end of each sprint, there will be a review by the business owner to test whether the product meets the needs and provide feedback. The team will then consider the feedback to be executed in the next sprint.

3. RESULTS AND DISCUSSION

3.1 RESULT

3.1.1 System Analysis

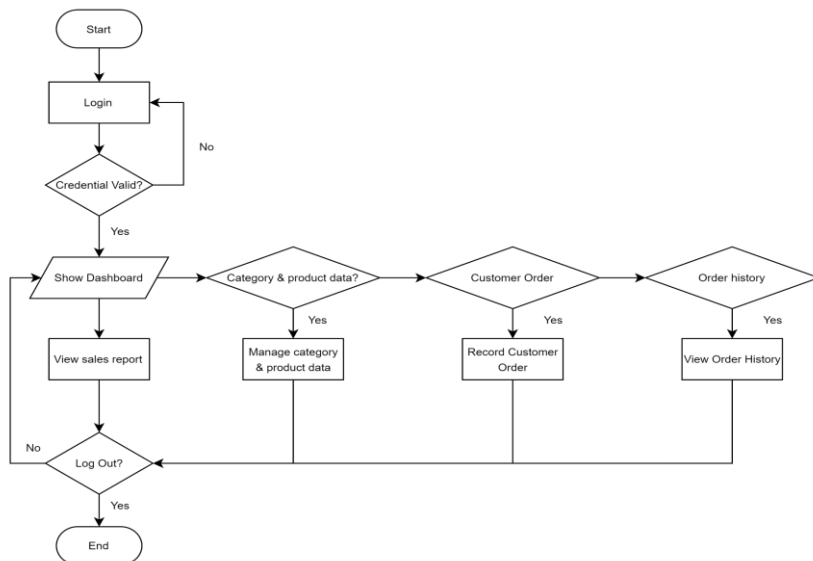


Figure 2 Flowchart of the entire Kopi Lentera POS system

The image above (Figure 2) displays the full POS system at Kopi Lentera. When a user initiates the system, the login menu appears immediately, prompting the entry of a username and password to access the system. This system consists of only one entity and role, which is the super admin, as Lentera Coffee is currently managed solely by its owner. Within the system, users can engage in various business operations, including managing data (product categories and products), processing sales by recording customer orders, reviewing order history, and accessing sales reports to track the progress of Lentera Coffee. Ultimately, these functions aid business owners in making informed decisions.

3.1.2 System Design

The design of the POS system will be created using Unified Modeling Language (UML) and database design. This design will then be implemented into UI/UX design and coding during the development phase.

a. Use Case Diagram

The following Use Case will show the design of actor interactions that can be done in this POS system.

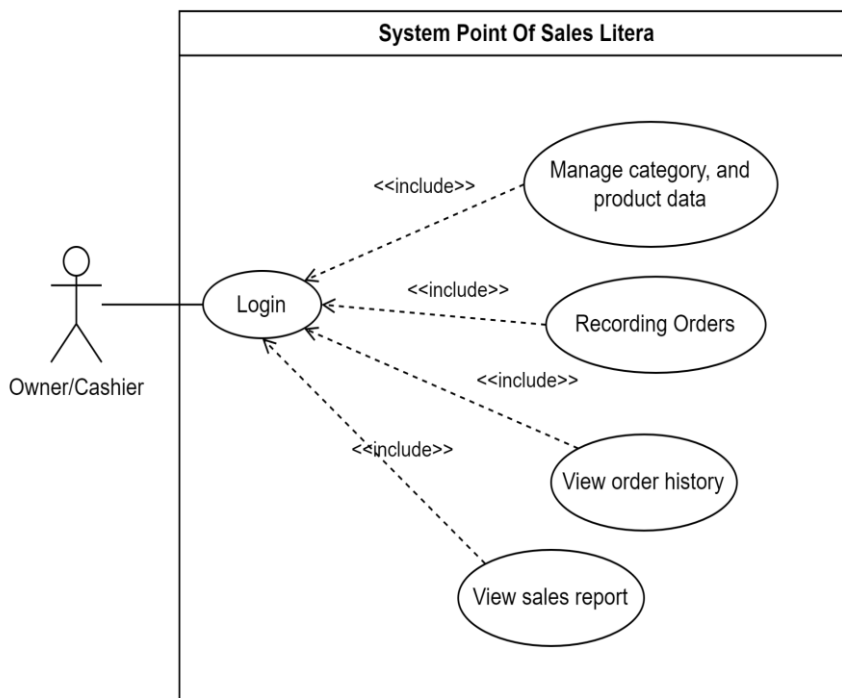


Figure 3 Use case system POS Kopi Lentera

b. Activity Diagram

Activity diagrams can be used to describe the behavior of the use case of the Kopi Lentera POS System. The diagram below provides a clear depiction of the login process, the order recording process, the process of managing product category data and product data, the process of viewing order history, and sales reports (Auditira et al., 2023).

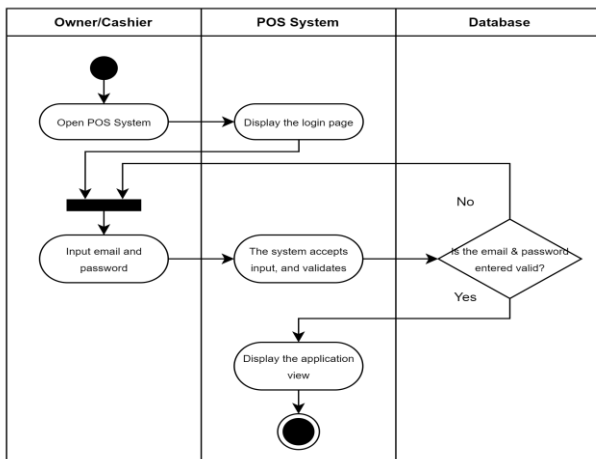


Figure 4 Activity diagram of the login of the Kopi Lentera POS system

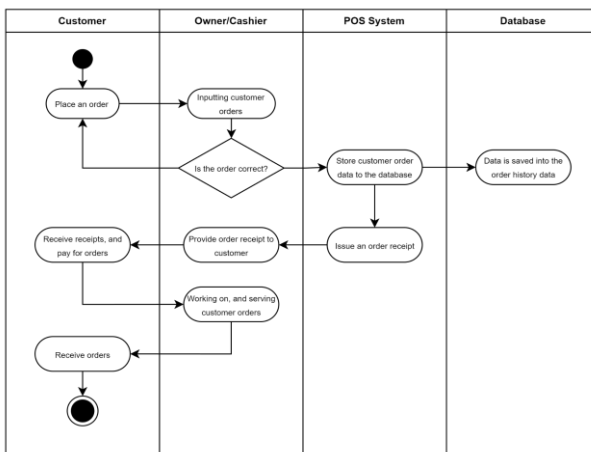


Figure 5 Activity diagram of the ordering process of the Kopi Lentera POS System

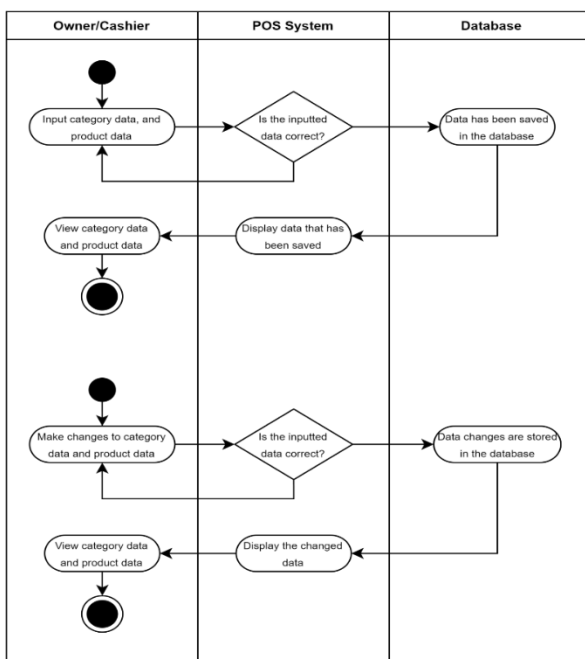


Figure 6 Activity diagram of category data input, and product of Kopi Lentera POS System

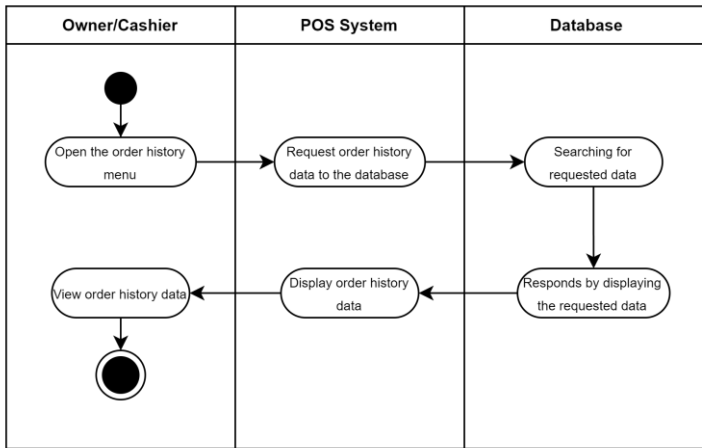


Figure 7 Activity diagram of viewing order history of Kopi Lentera POS System

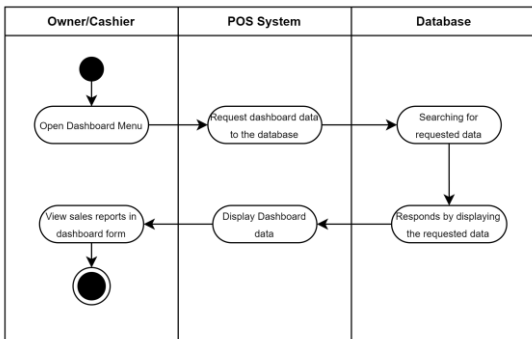


Figure 8 Activity diagram of viewing sales report of Kopi Lentera POS System

c. Schema Database

The database schema contains data in the form of tables that will be used in the POS system. This schema will define the relationship design between the tables. Below is Figure 9, which represents the database schema designed for this POS system.

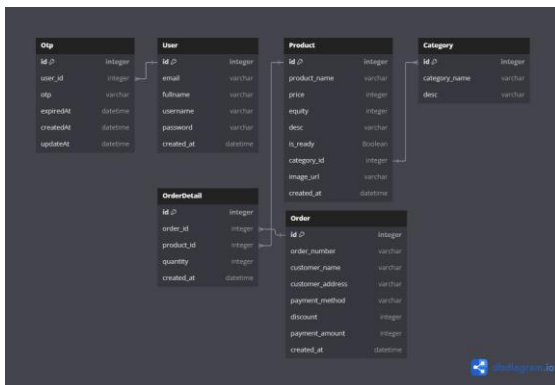


Figure 9 Database schema of Lentera Coffee POS system

3.1.3 Implementation

After designing the system with UML, creating the database, and developing the UI/UX, the Lentera Coffee Point of Sales system is now being implemented.

a. Authentication menu (login & forgot password)

Figure 10 displays the login menu interface. Here, the user (cashier/business owner) needs to input an email and password to access the system.

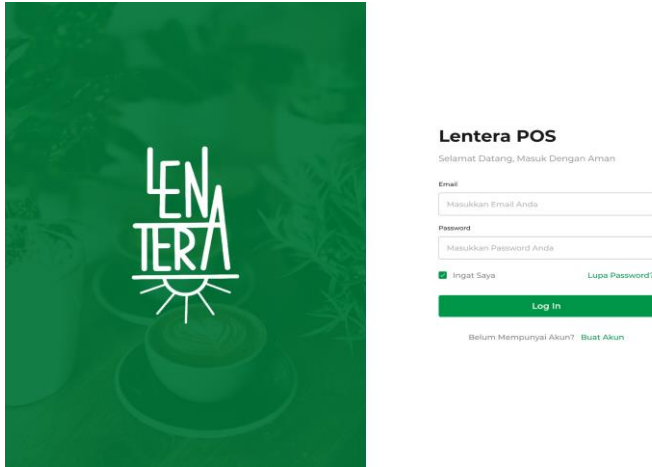


Figure 10 Login menu interface

Figure 11-13 depicts the "forgot password" menu, which can be utilized to reset a user's password. Initially, the user will need to input their registered email address. Following this, the system will dispatch an OTP code to the provided email address, granting access to reset the password. Finally, the user can proceed to reset the password.

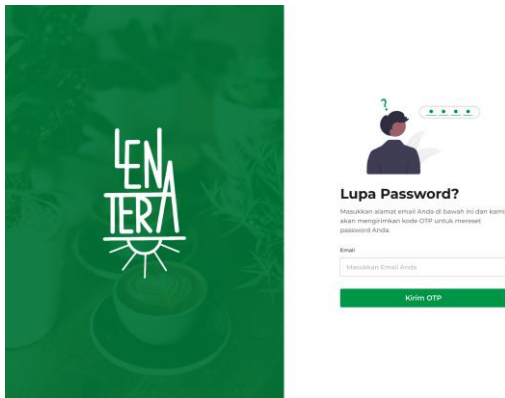


Figure 11 Forgot password menu interface (Step: Enter Email)

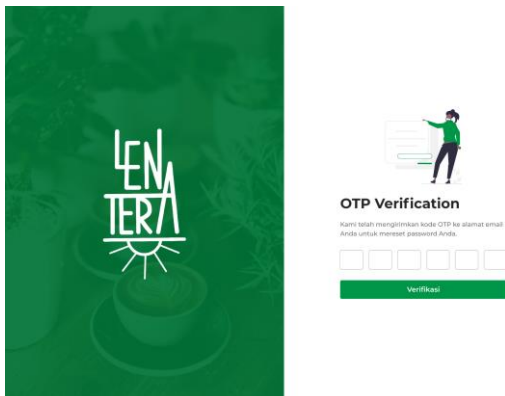


Figure 12 Forgot password menu interface (Step: OTP verification)

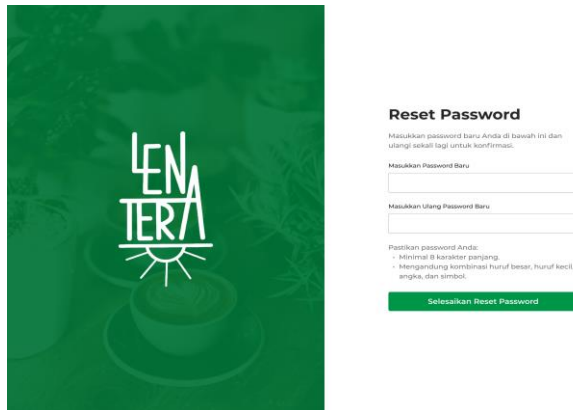


Figure 13 Password reset menu interface

b. Dashboard menu

Users can access sales data reports through a dashboard for decision-making.

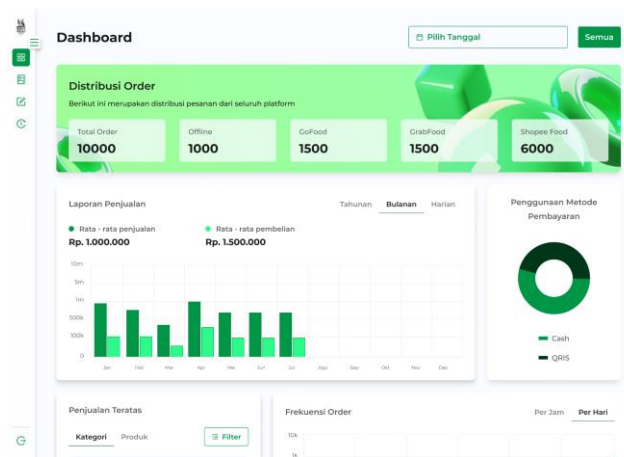


Figure 14 Dashboard menu interface

c. Products data menu

On this menu, users can manage product categories and decide which products to sell. Refer to Figures 15 and 16 for the user interface of this menu menu.

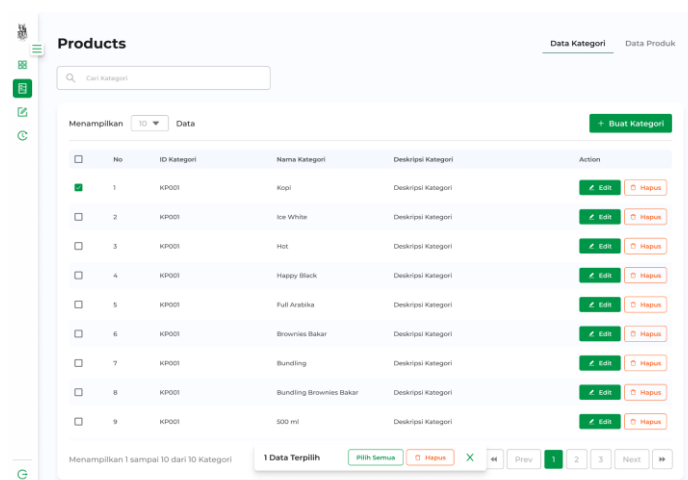


Figure 15 Product data menu interface (category section)

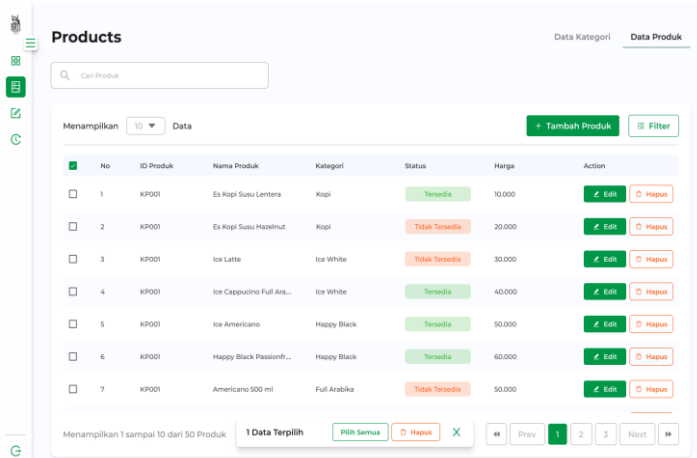


Figure 16 Product data menu interface (product section)

d. Order menu

This menu is used by the user to record orders from customers. It involves inputting customer data as well as the products ordered. Once the order is completed, the system will issue a receipt that will be given to the customer by the cashier or business owner. Figures 17 and 18 will display the layout of this menu menu.

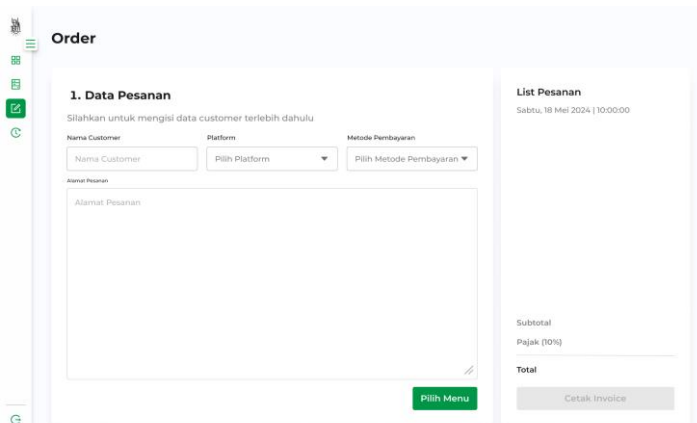


Figure 17 Order menu interface (Step: customer data input)

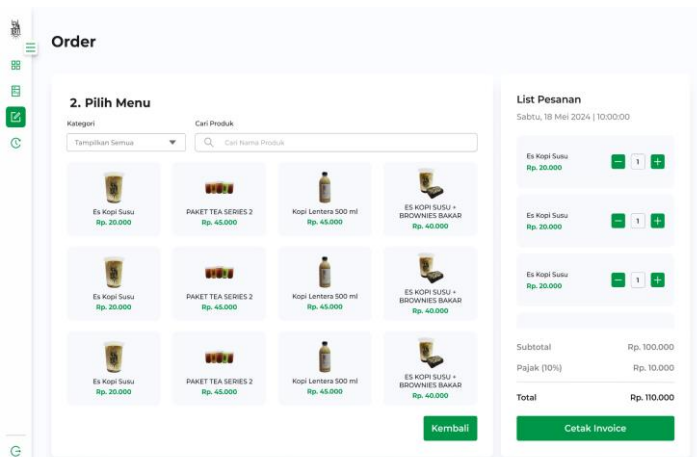


Figure 18 Order menu interface (Step: customer order input)

e. Order History menu

On this page, users can view the history of orders that have been made. This allows users to check

all transactions and orders that have occurred in the system. Please refer to Figure 19 for the appearance of this menu page.

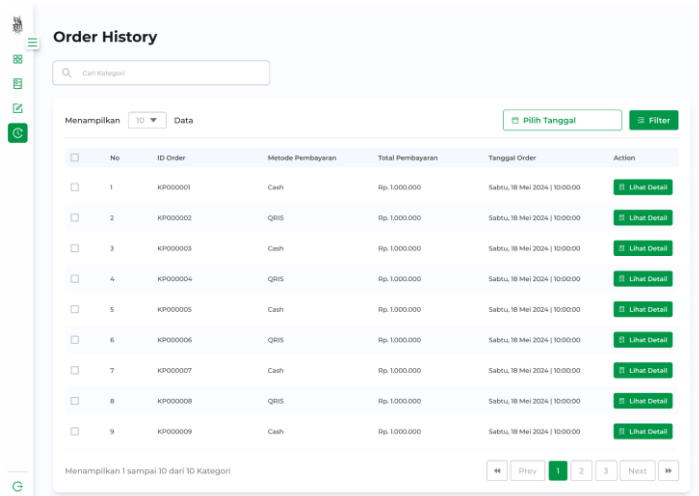


Figure 19 Order history menu interface

3.1.4 Testing

This test will use the Usability Testing method to evaluate usability which is part of the user experience between humans and computers by conducting direct testing to users to measure the ease, efficiency, and user satisfaction of the system that has been created (Auditira et al., 2023).

a. Enhanced System Usability Scale

This test will use the Enhanced System Usability Scale, which includes an additional 9 questions in addition to the original 10 questions. This brings the total to 19 questions that assess 8 usability criteria based on ISO 9241-11 (Efficiency, Effectiveness, Satisfaction) and ISO 9126 (Understandability, Learnability, Operability, Attractiveness, Usability compliance) (Thamilarasan et al., 2023).

When using the Enhanced System Usability Scale (ESUS) method, some changes have been made to address its shortcomings. These changes include eliminating redundant questions and rephrasing statements to focus on positive aspects. Despite these changes, the ESUS score calculation method is still used. The goal of these changes is to compare and enhance the ESUS method introduced previously (Thamilarasan et al., 2023). Table 3 presents the improved ESUS questionnaire questions, which will be used to assess the postal system.

Table 3 Modified Enhanced System Usability Scale

No.	Questions
1	I can complete tasks quickly and easily using this POS app.
2	This POS app helps me get my work done effectively.
3	This POS app helps me save time in making transactions.
4	I am satisfied with the performance of this POS app.
5	I am satisfied with the design and appearance of this POS app.
6	I feel confident using this POS app for my business transactions.
7	I feel that this POS app helps me in running my business.

No.	Questions
8	This POS app helps me complete transactions accurately.
9	I can easily understand the functions and features available in this POS app.
10	I can find the information I need easily in this POS app.
11	The instructions and messages that appear on this POS app are easy to understand.
12	I can easily learn how to use this POS app.
13	It didn't take me much time to learn how to use this POS app.
14	I find it easy to adapt to new features in this POS app.
15	This POS app is easy to operate and use.

Testing with the System Usability Scale (SUS) will be conducted with 10 respondents, both male and female, aged between 20 and 38 years, through online meetings. Tables 4 will show the results of the questionnaire using the System Usability Scale in general, the Enhanced System Usability Scale, and the modified Enhanced System Usability Scale.

Table 4 Questionnaire Results with Modified Enhanced System Usability Scale

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Score
1	5	5	5	4	2	4	4	4	4	4	5	4	4	3	5	82,5
2	4	5	5	5	3	5	4	4	4	4	4	3	4	2	5	80
3	4	4	2	4	3	3	4	3	5	3	4	4	4	2	5	87,5
4	4	5	5	4	4	4	5	5	4	4	5	4	4	2	5	87,5
5	4	4	4	5	5	4	4	4	5	4	4	3	5	4	5	87,5
6	4	4	3	5	4	4	5	5	4	5	5	5	4	2	3	72,5
7	5	5	5	5	5	5	5	4	5	5	5	5	5	2	5	90
8	4	5	3	4	5	4	5	4	4	4	4	4	5	1	5	90
9	4	5	4	5	5	4	4	4	5	4	5	5	4	2	5	85
10	5	5	5	5	5	5	5	3	5	5	5	4	5	4	5	90
SUS Score																85,25

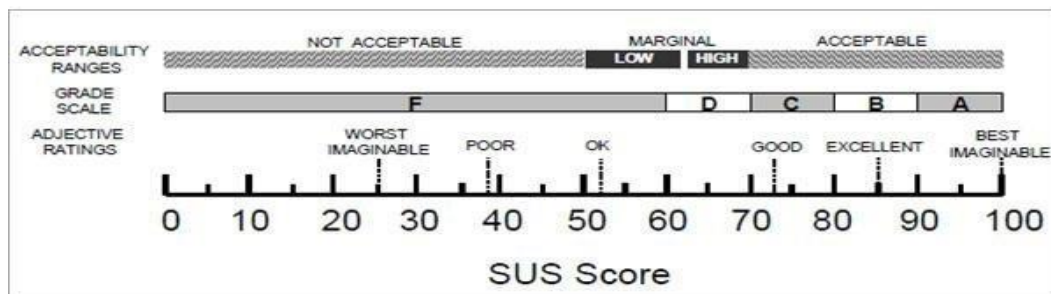


Figure 20 System Usability Scale Score

Based on the testing conducted using the three methods mentioned, the SUS method yielded a score of 69.5 (OK), the ESUS method yielded a score of 65 (OK), and the modified ESUS method yielded a score of 85.25 (GOOD). This indicates that the POS system developed for Kopi Lentera is acceptable. Based on this, the results of this study are in accordance with the research objectives which state that the application of the agile-scrum method can result in the development of a POS system that meets needs with a shorter development time. The results of the implementation have

been in accordance with the system usability scale questionnaire which shows an increase in the efficiency of recording and transactions, as well as an increase in the quality of customer service.

3.2 DISCUSSION

The results of the study indicate that the application of the agile-scrum method can result in the development of a POS system that meets the needs with a shorter development time. The results of the implementation show an increase in the efficiency of recording and transactions, as well as an increase in the quality of customer service. This is in accordance with the objectives of the study which aim to increase efficiency in the transaction process, reduce errors, and improve customer relations by offering more responsive services through the design of a web-based POS system. This is in line with research conducted by Church et al., (2017), Cao et al., (2020), Muharamani et al., (2023), Santgani and Angellia (2020), Pratiwi et al., (2016), and Heikkila et al., (2017) which states that POS system development can shorten sales service time.

The implications of this study are that there is an increase in efficiency in the transaction process, reducing errors, and improving customer relations by offering more responsive services so that the time spent is also only a short time. The limitations of this study are that it was only conducted at Kopi Lentera. In the future, it is hoped that the development of this system can be used for all MSMEs and other business institutions.

4. CONCLUSION

Based on the research results showing that the implementation of the agile-scrum method can result in the development of a POS system that is in accordance with needs with a shorter development time. The implementation results show an increase in the efficiency of recording and transactions, as well as an increase in the quality of customer service.

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