Design and Development of A Web-Based Point Of Sale (POS) Information System for Ngadi Rejo Store

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Abstract— The The advancement of information technology has had a significant impact on the business world, providing added value as well as new challenges. This study involves Toko Ngadi Rejo, which has seen an increase in the variety of Jamu products. However, manual stock recording has caused data discrepancies and reduced employee productivity. Therefore, the author proposes the design of a web-based stock and sales management application using the Laravel framework with database integration.

The research method includes needs analysis through observation and interviews, system design using flowcharts and ERD (Entity Relationship Diagram), and the implementation of a web-based application. The developed system includes stock management, sales recording, and real-time reporting

The research results show that this system improves the efficiency and accuracy of stock recording. User testing using the user experience questionnaire (UMUX) indicates positive responses from users. The implementation of this system is expected to reduce recording errors, increase productivity, and facilitate stock and sales management.

Thus, this web-based stock and sales management application is expected to be an effective solution for Toko Ngadi Rejo, supporting the future growth of their business.

Keywords— information technology, Laravel, framework, database, Stock Record

I. INTRODUCTION

The rapid advancement of information technology has both positive and negative impacts. The implementation of information technology can provide added value in the development of the business world, especially due to increasing needs and competition among companies. Companies are currently competing in adopting information technology to improve business efficiency, provide the best service to customers, create a positive corporate image, and excel in business competition. The development of information systems and computers serves as a reference in designing software, such as Point Of Sales (POS) Systems (Lutfi Irawan et al., 2023).

In recent years, Toko Ngadi Rejo has experienced an increase in the variety of Jamu products sold. However, due to the inventory management system still relying on manual recording through books, discrepancies often occur between the recorded quantity in the system and the reality in the field. This discrepancy negatively impacts the productivity of Toko Ngadi Rejo's employees and also makes it difficult for the store owner to track the best-selling items and determine which items need to be restocked.

Based on the challenges faced by Toko Ngadi Rejo, an integrated inventory and transaction management system using a database is needed, planned to be developed on a laptop device. To support this need, the development of a web-based inventory and sales management application is proposed. In connection with this, the author proposes the title "Designing a Web-based Sales

System (Point Of Sale) for Toko Ngadi Rejo" as the focus of development.

II. METHOD

In this study, the testing method used to evaluate the program quantitatively is the UMUX (Usability Metrics for User Experience) method. This testing is conducted by composing testing scenarios that include usage procedures and interviews with users for qualitative evaluation. The results of the testing scenarios are presented in the following table. Each UMUX item has a value range from 0 to 4, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

2.1 Literature Review

According to (Lutfi Irawan et al., 2023), the implementation of a Point of Sales (POS) application at Hoops Frozen Food store was successful. This application provides detailed information about inventory, daily and monthly transaction numbers, and presents reports useful for future business planning. The use of the POS application has been proven to increase business management efficiency and reduce the likelihood of errors.

According to (Lewis et al., 2022), small eateries in underserved urban areas often do not utilize electronic records, making it difficult to document the program's impact on sales. We evaluated the possibility of using a tablet point-of-sale (POST) application to monitor sales at corner stores in Baltimore City. Four diverse store owners were trained to use POST for eleven days, and the results showed positive economic and cultural acceptance. All store owners expressed readiness to continue using POST. This indicates that training small store owners to use point-of-sale applications for sales monitoring is feasible, and future trials will ensure adequate added value.

According to (Anyanwu & Anumaka, 2020), this study evaluates the impact of using Point of Sale (POS) on cashless policy in Nigeria's economy. Research questions were distributed to 500 respondents from various POS operational centers, with 450 responses categorized and analyzed using various econometric methods. The results show that POS has a positive and significant impact on the cashless policy in Nigeria. Therefore, it is recommended that POS be implemented in various regions to facilitate exchange transactions and reduce cash-based transactions in the economy.

The POS (Point of Sale) system offers various benefits for businesses, including SMEs like Café Diaraks. With its ability to automate transaction processes, improve data accuracy, monitor inventory in real-time, enhance customer experience, provide business data analysis, facilitate financial management, and increase transaction security, the POS system helps businesses improve operational efficiency, optimize business performance, and create an overall better customer experience (Mahotma et al., 2023).

2.2 Teknologi

2.2.1 Laravel

Laravel is a framework developed by Taylor Otwell in June 2011, which has many users to this day. In the Laravel framework, there are code functions provided in the library, which are then installed into Laravel. (Endra et al., 2021)

2.2.2 POS

Point of sales (POS) is an application aimed at recording transaction processes from ordering to payment, processing data, and assisting operational activities, thus accelerating transaction services (Dwi Shaputra & Hidayat, n.d.).

2.3 Analisis & Design

2.3.1 Analisis

Based on the problem analysis, a system is needed to manage sales transactions and inventory calculations at

Toko Ngadi Rejo, which will be developed using the Laravel framework with data storage in a database and output in the form of a web application. This system includes features such as Master Data for adding, modifying, and deleting product data; Vendor Data for managing supplier data; Sales Transactions for recording sold items; Purchase Transactions for recording purchased items; Reports summarizing sales and purchase information including total sales; and a Dashboard displaying best-selling items, items needing restocking, total products, total vendors, and daily income.

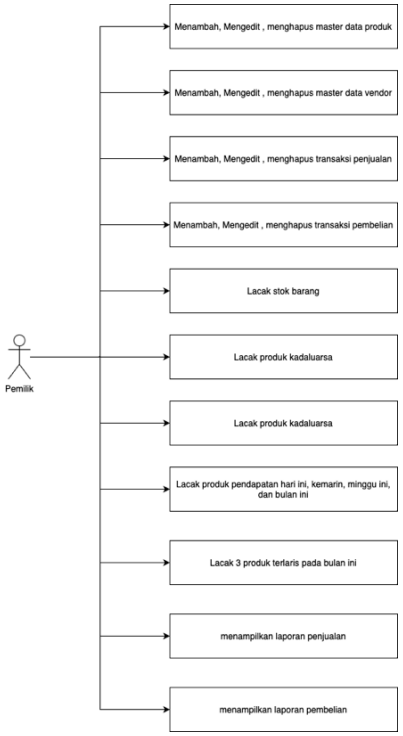


Figure 2.1 Usecase Diagram

2.3.2 Design

In this subsection, we will discuss the design of the Toko Ngadi Rejo website to be developed. This subsection includes discussions on architecture, workflow discussions of several business processes, object modeling, and the creation of the interface or mockup.

2.3.2.1 Architecture

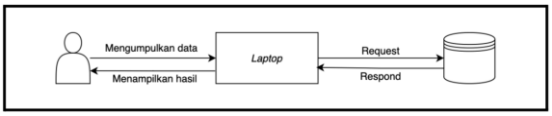


Figure 2. 2 Architecture

2.3.2.2 WorkFlow

This section will discuss the workflow of the business processes to be implemented in the design and development process, which will be explained using activity diagrams.

2.3.2.2.1 Master Data Product

Figure 3.4 below is an activity diagram for the master data process, where the user can add, modify, and delete product data..

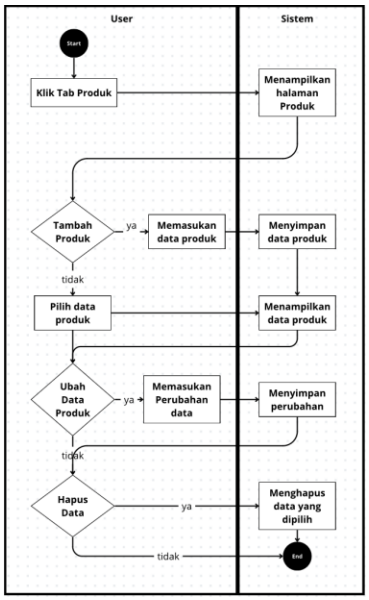


Figure 2. 3 Activity Diagram Master Data Barang

2.3.2.2.2 Master Data Vendor

Figure 2.5 below shows the activity diagram for the master data process of product vendors, where the user can add, modify, and delete vendor data.

ISSN 2442-7888 (online) DOI 10.24167/sisforma.v12i1.11922

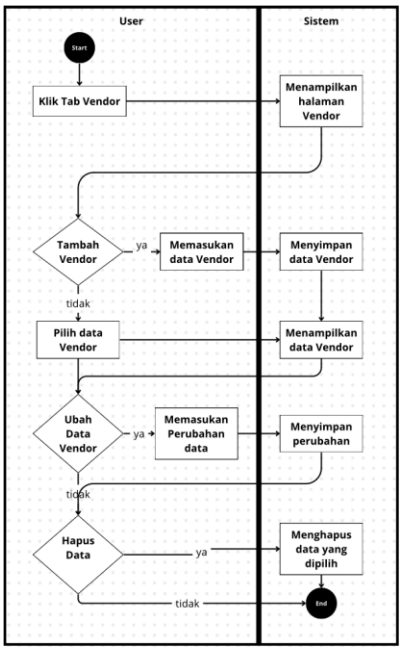


Figure 2. 4 Activity Diagram Master Data Vendor

2.3.2.2.3 Sales Transactions

Figure 2.5 below is an activity diagram for the sales transaction process, where the user can add and modify sales transaction data.

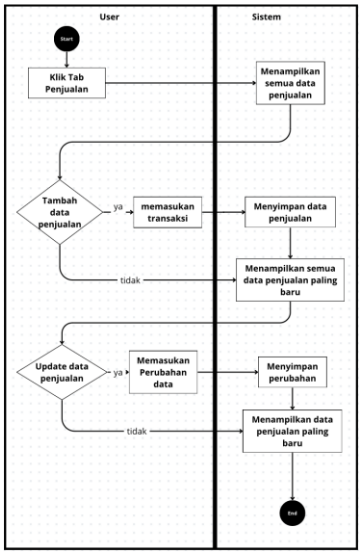


Figure 2.5 Activity Diagram Transaksi Penjualan (sales transactions)

2.3.2.2.4 Purchase

Figure 2.6 below is an activity diagram for the purchase transaction process, where the user can add and delete purchase transaction data. The user can also update the status of items once they have arrived at the warehouse.

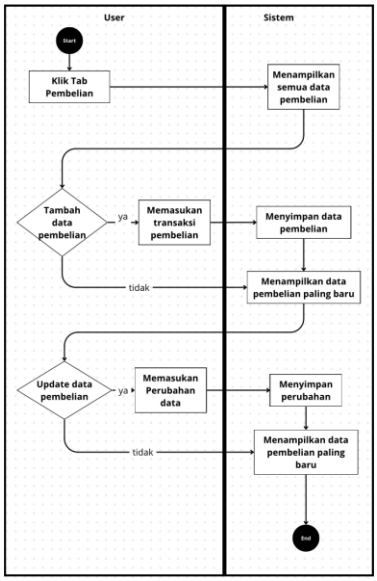


Figure 2. 6 Activity Diagram transaksi pembelian (Purchase)

2.3.2.2.5 Track stock items

Figure 2.7 below is an activity diagram for viewing items with stock levels less than 20%.

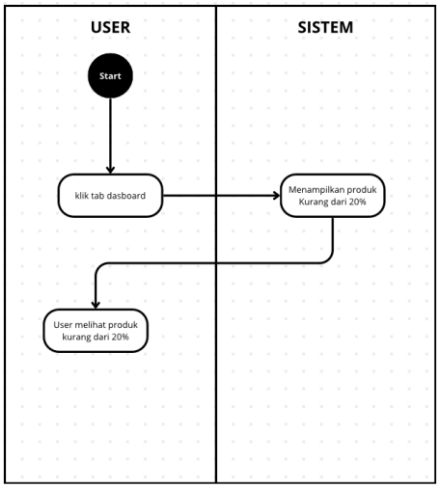


Figure 2. 7 Activity Diagram Lacak stok barang (Track stock items)

2.3.2.2.6 Best-Selling Products List

Figure 2.8 below is an activity diagram for viewing the best-selling items

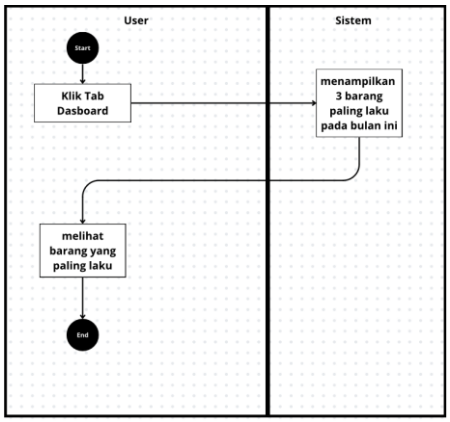


Figure 2.8 Activity Diagram barang paling laku (3 top selling Product)

2.3.2.2.7 Income

Figure 2.9 below is an activity diagram for viewing the total income for today, yesterday, this week, and this month..

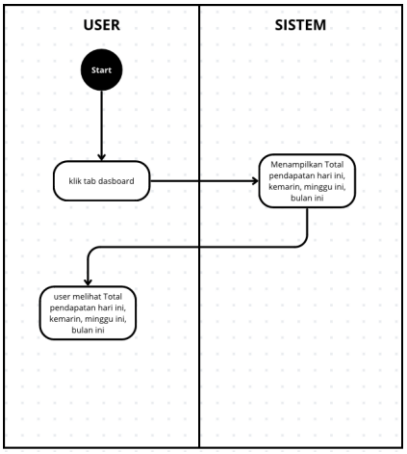


Figure 2.9 Activity Diagram pendapatan(Income)

2.3.2.2.8 Expired Products

Figure 2.10 below is an activity diagram for viewing expired products..

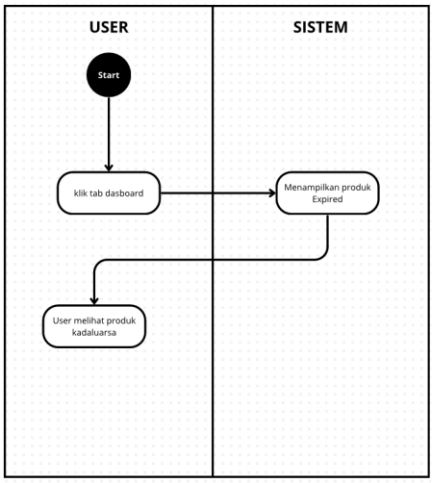


Figure 2. 10 Product expired

2.3.2.2.9 Sales Report

Figure 2.11 below is an activity diagram where the owner can view sales transaction reports such as which items were sold, on what dates they were sold, and the total sales.

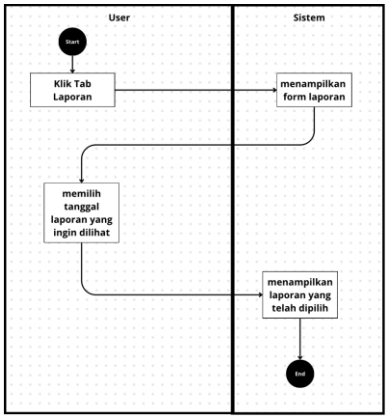


Figure 2. 11 Activity Diagram Laporan penjualan selling report

2.3.2.2.10 Purchase Report

Figure 3.12 below is an activity diagram where the owner can view purchase transaction reports such as which items were purchased, on what dates they were purchased, and the total purchases

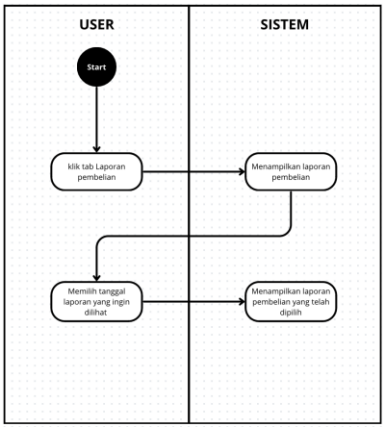


Figure 2. 12 Activity Diagram Laporan Pembelian(purchase report)

2.3.2.3 Modeling Object

Creating a class diagram serves as the foundational step in the software development lifecycle, particularly for intricate systems such as the one at Toko Ngadi Rejo. By meticulously illustrating the system's architecture, encompassing classes, attributes, methods, and their intricate interrelations, developers not only cultivate a deeper comprehension of the system's inner workings but also fortify the implementation phase, minimizing errors and maximizing efficiency. This visual representation acts as a guiding beacon for the development team, illuminating the path throughout the implementation journey, ensuring alignment with the envisioned design and functionality. Moreover, beyond its technical utility, the class diagram fosters a shared understanding among team members and stakeholders, nurturing a collaborative environment conducive to constructive dialogue and unified consensus on the system's overarching architecture and feature set. Thus, the class diagram transcends its static portrayal, evolving into a dynamic instrument that catalyzes effective communication, informed decision-making, and ultimately, the realization of a robust and seamlessly functioning software solution.

Figure 2. 13 Diagram Class

III. RESULTS AND DISCUSSION

A. RESULT

3.1 Login

Figure 3.1 This is the view of the login process, featuring input fields for email and password, as well as a login button.

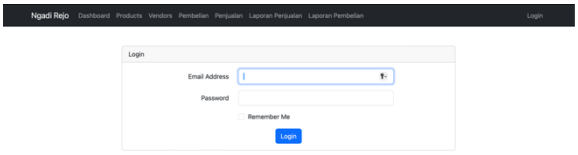


Figure 3.1 Login

3.2 Dashboard

Figure 3.2 This is the Dashboard displaying the top 3 best-selling items this month, items needing restocking with remaining stock < 20%, expired items, and today's income, yesterday's income, and income for this week, providing a quick overview of Toko Ngadi Rejo's performance.

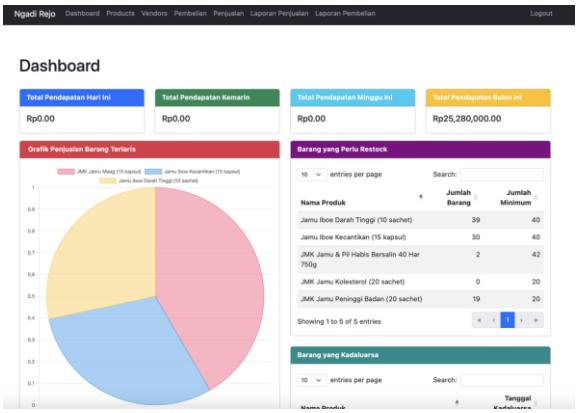


Figure 3.2 Dashboard

3.3 Master Product

Figure 3.3 Displaying product data includes the process of adding, modifying, and deleting product data.

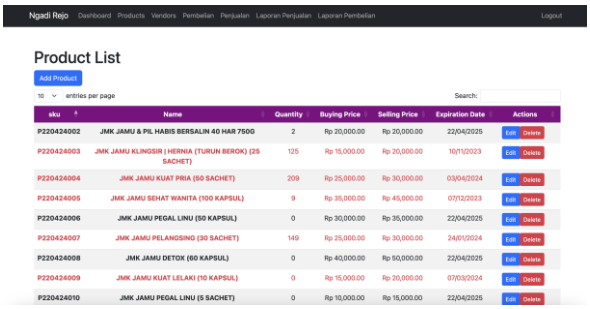


Figure 3.3 Produk Index

Figure 3.4 Displaying the addition process of adding products.

Figure 3.4 Produk Insert

Figure 3.5 Displaying the edit process, which is useful for the owner in modifying and updating product data.

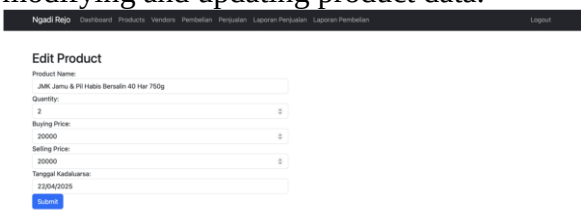


Figure 3.5 Produk edit

3.4 Master Vendor

Figure 3.6 This is the display of the list of product vendors, including the processes of adding, modifying, and deleting product vendor data.

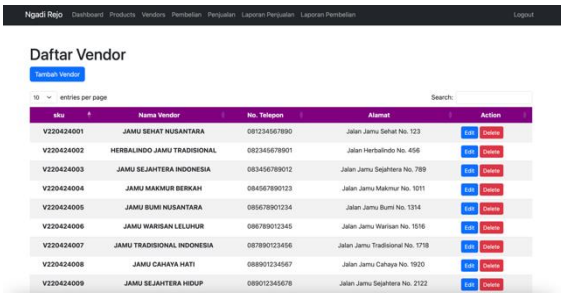


Figure 3.6 Vendor Index

Figure 3.7 This is the display for adding product vendors, where the owner can add vendor information for future product purchases or additions.

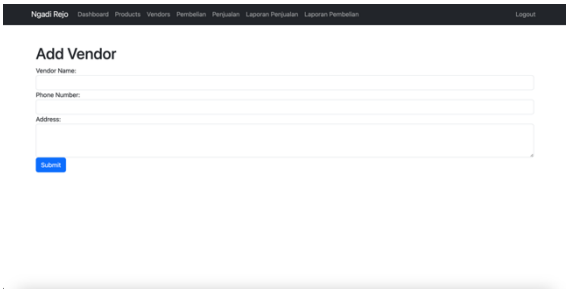


Figure 3.7 Vendor Insert

Figure 3.8 Displaying the process of editing vendors, which is useful for the owner in modifying and updating vendor data.

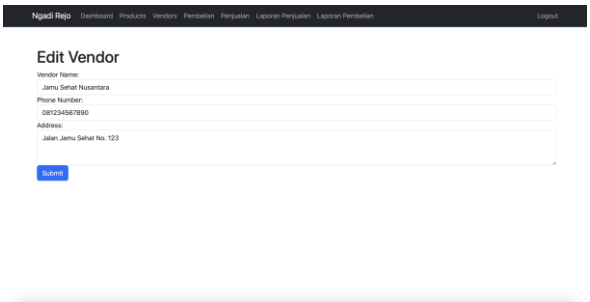


Figure 3.8 Vendor Edit

3.5 Purchase

Figure 3.9 This is the purchase view, which is the transaction process that includes recording sold items.

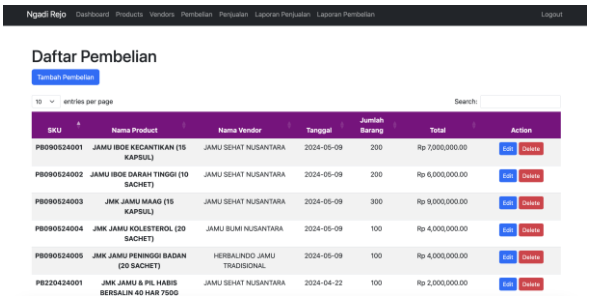


Figure 3.9 Pembelian Index

Figure 3.10 This is the view for adding Purchase Transactions, where the owner can add purchase transactions for products from vendors that will be purchased.

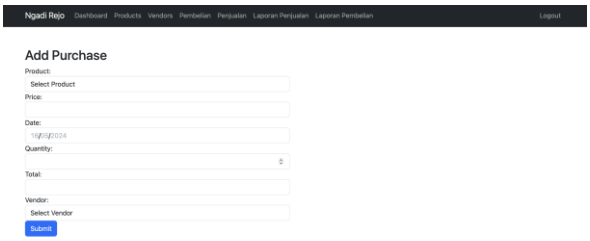


Figure 3.10 Pembelian Insert

Figure 3.11 This is the view for editing purchases. The owner can modify/update purchase transactions.

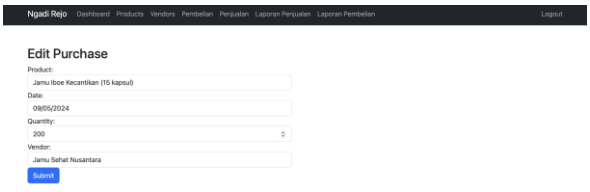


Figure 3.11 Pembelian Edit

3.6 Sales

Figure 3.12 This is the sales mockup, which is the transaction process that includes recording sold items.

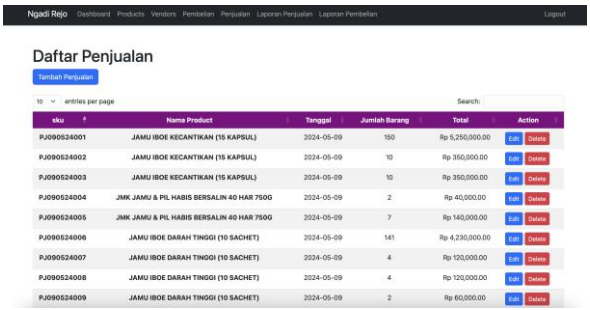


Figure 3.12 Penjualan Index

Figure 3.13 This is the view for inserting sales. The owner can add sales transactions for items.

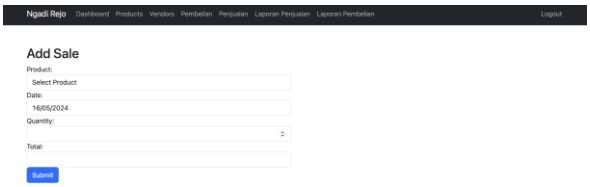


Figure 3.13 Penjualan Insert()

Figure 3.14 This is the view for editing sales. The owner can modify sales transactions if there are any errors during data insertion.

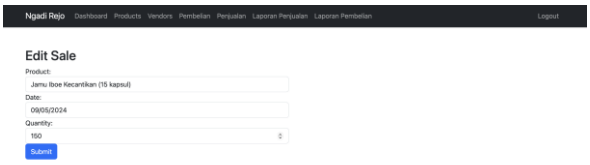
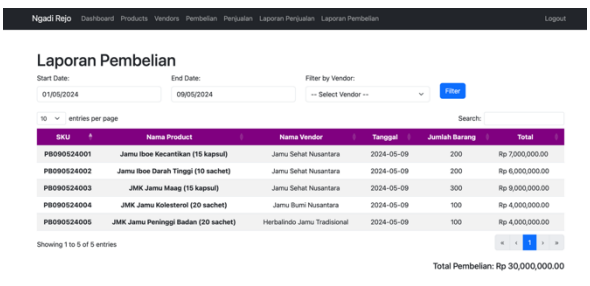


Figure 3.14 Penjualan Edit

3.7 Purchase Report

Figure 3.15 This is the purchase report view, which is the transaction process that includes recording purchased items. It has



ISSN 2442-7888 (online) DOI 10.24167/sisforma.v12i1.11922

several features such as filtering by date and vendor.

Figure 3.15 Laporan Pembelian (purchase report)

3.8 Sales Report

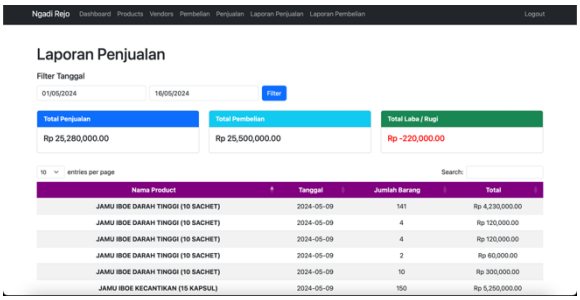


Figure 3.16 Laporan Penjualan(selling report)

Figure 3.16 the sales report view, which is the transaction process that includes recording sold items. It has several features such as filtering by date and profit-loss calculation.

3.9 Test Results

NO	PERTANYAAN	SKALA				
		1	2	3	4	5
UMUX01	Kemampuan web ini memenuhi kebutuhan saya					✓
UMUX02	Menggunakan situs web ini merupakan pengalaman yang membuat frustrasi	✓				
UMUX03	Situs web ini mudah digunakan					✓
UMUX04	Saya harus menghabiskan banyak waktu untuk memperbaiki berbagai hal dengan web ini		✓			

Figure 3.17 Tabel Result Testing

Based on the test results in Table 3.18, the calculation from the formula is as follows: the value of odd questions is given a value of (value - 1) while the value of even questions is given a value of (5 - value). All the obtained total values will be divided by 16, where 16 is the highest total from all tests from Q1 to Q4, then multiplied by 100 to obtain the calculation result. The calculation obtained using this formula with the values obtained from the previous question submission is as follows.

$$\text{UMUX} = \frac{1}{16} \text{ x } [(Q_1 - 1) + (5 - Q_2) + (Q_3 - 1) + (5 - Q_4)] \text{ x } 100$$
$$= \frac{1}{16} \text{ x } [(5 - 1) + (5 - 1) + (5 - 1) + (5 - 2)] \text{ x } 100$$
$$= 93.75$$

Figure 3.18 Calculation

Based on the calculation above, the UMUX value obtained is 93.75. With this, the system that has been created is able to meet the needs of users in running their business and also provide efficiency. This is also supported by the usability results where users can easily use the designed system. Users also understand the usefulness of the available buttons because the design used is not misleading.

IV. CONCLUSION

During the development of the program using the PHP Laravel framework on the MacBook Pro M2 2023, the researcher prepared the device before the testing process. The browser used was Google Chrome. During the testing process, users faced some challenges in adapting to the use of the device because the owner had never done recording in the form of a website before. However, overall, the testing process went smoothly.

The design of the point of sales system in the form of a website successfully managed transactions and inventory, answering the problem formulation written in chapter 1 about designing and building a system capable of recording transactions and inventory at Toko Ngadi Rejo, as evidenced by the test results conducted with users. The UMUX result obtained a score of 93.75. To answer the research objective regarding recording transactions, inventory availability.

In the test results table, there are 2 positive questions in UMUX items: UMUX01 where users gave a score of 5, meaning that the website's capabilities met user needs, and UMUX03 where users gave a score of 5, meaning that the tested website was easy to use by users. In addition to

positive questions, there are also negative questions in UMUX items: UMUX02 where users gave a score of 2, meaning that using the tested website did not cause frustration, and UMUX04 where users gave a score of 2, meaning that using the tested website did not waste users' time..

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