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Web-Based Point of Sale Information System for Slaughterhouses with Laravel Framework (Case Study of RPH Nawawi Farm)

Sistem Maklumat Jualan Berasaskan Web bagi Rumah Sembelihan dengan Rangka Kerja Laravel (Kes Kajian Ladang RPH Nawawi)

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ABSTRACT

In a rapidly evolving era of technology, companies of all sizes face pressure to leverage advanced technology to stay competitive. This study examines the application of a web-based Point of Sale (POS) information system at the Nawawi Farm Slaughterhouse (RPH) to improve operational efficiency. Nawawi Farm, which previously used a manual recording system for consumer orders, faces challenges in meeting the demands of the modern market. This research aims to analyze the improvement of operational efficiency through the adoption of web-based POS systems and design solutions that meet the needs of RPH. The Waterfall method is used for system development. The results show that the implementation of a web-based POS system has accelerated the ordering process, improved inventory management, and produced more accurate and real-time reports. The implementation of this system also improves the customer experience with faster service. These findings confirm that web-based solutions designed specifically for the livestock industry can significantly improve quality control and operations in slaughterhouses, making them a relevant model for similar sectors.

Keywords: Information Systems; Point of Sale; Waterfalls; Slaughterhouses (RPH)

ABSTRAK

Dalam era teknologi yang terus berkembang, perusahaan dari berbagai skala menghadapi tekanan untuk memanfaatkan teknologi canggih agar tetap kompetitif. Penelitian ini mengkaji penerapan sistem informasi Point of Sale (POS) berbasis website di Rumah Potong Hewan (RPH) Nawawi Farm untuk meningkatkan efisiensi operasional. Nawawi Farm, yang sebelumnya menggunakan sistem pencatatan

manual untuk pesanan konsumen, menghadapi tantangan dalam memenuhi tuntutan pasar modern. Penelitian ini bertujuan untuk menganalisis peningkatan efisiensi operasional melalui adopsi sistem POS berbasis website dan merancang solusi yang sesuai dengan kebutuhan RPH. Metode Waterfall digunakan untuk pengembangan sistem. Hasil penelitian menunjukkan bahwa penerapan sistem POS berbasis website telah mempercepat proses pemesanan, meningkatkan pengelolaan inventaris, serta menghasilkan laporan yang lebih akurat dan real-time. Implementasi sistem ini juga meningkatkan pengalaman pelanggan dengan layanan yang lebih cepat. Temuan ini menegaskan bahwa solusi berbasis web yang dirancang khusus untuk industri peternakan dapat secara signifikan meningkatkan kontrol kualitas dan operasional di RPH, menjadikannya model yang relevan untuk sektor serupa

Kata kunci: Sistem Informasi; Point of Sale; Waterfall; Rumah Potong Hewan (RPH)

INTRODUCTION

In line with the rapid development of the technology sector, companies that are members of small, medium and large industries, which are one of the many actors and supporters of economic activities in the country, are increasingly encouraged to use advanced technology as a weapon to survive and win increasingly fierce and tough competition (Utomo et al., 2024). The role of information technology to improve the performance of a company must be owned by every organization or company, competition in the modern era of information technology has become a media tool or strategy to convey information in a more attractive and clear form (Ramadhanu & Priandika, 2021).

In the face of increasingly fierce competition in the slaughter animal management industry, Nawawi Farm realizes the importance of utilizing information technology as the key to winning the competition. With a focus on poultry management, Nawawi Farm records consumer orders manually through paper documents. The adoption of more sophisticated transaction systems is essential to improve efficiency and meet the demands of the modern market. The use of information technology is not only a necessity, but a strategy to ensure sustainability and better service quality for customers.

T The research begins by researching previous research that is relevant to the topic to be discussed. The following is a previous related study: Title: "Point of Sales Applications Using Laravel Framework", compiled by Tamus Bin Tahir, in 2019. In this study, the point of sales application is very helpful for Galaxy Cell store owners in managing store data and the use of the laravel framework is very helpful for programmers in building applications. This is of course due to the clean and functional laravel syntax and large and easy-to-use libraries that can accelerate module development (Bin Tahir et al., 2019).

Title: "Website-Based Point of Sale Application at Rigid Grocery Stores", compiled by Bayu Setyo Prayogi, in 2021. In this study, this website-based point of sales application can help grocery stores in transactions. So that data storage that was previously done manually can be computerized properly. That way, it will reduce the anonymity of important transaction data because it has been stored in the database, and by having this application, the store owner as an admin can check the transactions made by the cashier in detail because the admin can also access all transaction reports that have been made, thereby reducing fraud in every transaction (Prayogi et al., 2022).

In contrast to previous research that focused on Point of Sale applications for general retail stores, this study highlighted the specific needs of Slaughterhouses (RPHs). This research aims to overcome the problem of manual order recording by implementing a web-based Point of Sale information system. While previous research emphasized the use of the Laravel Framework for POS application development and transaction data digitization, this research makes a significant contribution to improving operational efficiency in the RPH sector. The hypothesis of this study is that the application of a web-based Point of Sale information system will improve operational efficiency and service quality at Nawawi Farm compared to the current manual method.

PROBLEM STATEMENT

Problems that arise due to operational efficiency in the context of Nawawi Farm which still uses a manual consumer order recording system can be formulated in several problem formulations, namely:

1. How can I improve operational efficiency at RPH Nawawi Farm?
2. What is the transaction process at Nawawi Farm through the implementation of a website-based Point of Sale?

LITERATURE REVIEWS

Information System

An information system is defined as a combination of interacting components, including hardware, software, data, procedures, and people, that together collect, process, store, and disseminate information to support decision-making and control within an organization

Point Of Sale

Point of Sale is defined as a system used in retail to process sales transactions. The POS is the point where sales occur, and this system serves as the place where customers pay for the goods or services they purchase. POS systems typically include hardware and software used to handle a variety of functions, including payment processing, transaction logging, and inventory management. Modern POS is often integrated with technologies such as barcode scanners, payment terminals, and inventory management systems to improve efficiency and accuracy in transactions and reporting. POS systems serve not only to complete transactions but also to collect data that can be analyzed to assist retail managers in strategic decision-making, such as stock management, sales analysis, and promotion planning. An effective POS system can help improve customer experience and operational efficiency in stores.

Laravel

Laravel is an open-source PHP-based web application framework designed to make web application development faster and more enjoyable with an expressive and elegant syntax. Laravel provides a variety of features that simplify the development process, including:

1. Routing: Laravel offers a simple and flexible routing system, allowing developers to easily define the app's URL and appropriate logic.
2. Eloquent ORM: Eloquent is Laravel's Object-Relational Mapper (ORM) that provides an easy method to interact with databases using a clean and expressive PHP syntax.
3. Artisan CLI: Laravel comes with a Command-Line Interface tool called Artisan that allows developers to execute routine tasks and automate various aspects of app development.
4. Blade Templates: Laravel uses Blade as its template engine, which allows developers to use PHP logic in HTML views in a clean and efficient way.
5. Middleware: Middleware in Laravel allows developers to insert additional logic into incoming HTTP requests before or after they are processed by an application.
6. Security: Laravel offers a wide range of security features, including protection against attacks such as SQL injection, cross-site request forgery (CSRF), and cross-site scripting (XSS).
7. Testing: Laravel supports end-to-end application testing with built-in tools for unit and functional testing.
8. Database Management: Laravel provides database migration and seeding that makes it easy to manage database schemas and initial applications.
9. Laravel Ecosystem: Laravel also has an extensive ecosystem including add-on packages, development tools, and services such as Laravel Forge and Laravel Envoyer.

Overall, Laravel is designed to make web application development easier by providing tools and features that reduce the need to write boilerplate code and increase developer productivity.

Flowchart

A flowchart is a graphical representation of the steps or flow of a process in the form of a diagram that uses standard symbols. Flowcharts are used to visually describe the logical flow of a process or algorithm.

Efficiency Analysis

Operational efficiency refers to how effective an information system is in supporting and improving the day-to-day operations of an organization. This includes the ability of information systems to automate processes, improve speed and accuracy, and reduce operational costs. Operational efficiency can help organizations achieve their business goals faster and more economically.

UML (Unified Modelling Language)

Unified Modelling Language (UML) is a "language" that has been adopted as an industry standard for defining, visualizing, designing, and documenting software systems as well as modelling various aspects of business and non-software systems. UML is not only limited to software, but it can also be applied to a wider range of systems. The techniques in UML have proven to be effective in modelling complex and large systems. UML allows the creation of models for different types of software applications, which can be run on a variety of hard platforms, operating systems, and networks, and written in a variety of programming languages.

Use Case Diagram

A use case is a series or description of groups that are interrelated and form an orderly system that is carried out or supervised by an actor. Use cases are used to shape the behaviour of an object in fashion and are realized by collaborators, generally use cases are depicted with ellipses with solid lines, usually containing names. The use case describes the system process.

Class Diagram

A class diagram is a type of diagram used in software modelling with notation from the Unified Modelling Language (UML). This diagram describes the static structure of a software system, showing the classes within the system, the attributes of each class, and the relationships between classes. Class diagrams are very useful for visualizing the internal structure of a software system before development begins or as a tool for understanding the structure of an existing system.

Activity Diagram

Activity diagrams model the workflow of a business process and the sequence of activities in a process. These charts are very similar to flowcharts in that they model the workflow from one activity to another or from an activity to a state. It can be helpful to create an activity diagram at the beginning of process modelling to help understand the entire process. Activity charts are also useful for illustrating parallel behaviours or illustrating interactions between multiple use cases.

Sequence Diagram

Sequence diagrams are a type of diagram found in UML modelling. This diagram is useful for illustrating how interactions between objects in the system occur sequentially. Through this diagram, the flow of messages or calls between objects can be illustrated by following the time sequence of the activity that occurred during the interaction. Sequence diagrams play a role in visualizing how objects communicate and interact to achieve the functional goals of the system. In this diagram, it is detailed how the interaction between related components generates information according to the activities that occur in the system.

Waterfall Method

The waterfall method is a systematic and sequential classical pattern in software manufacturing, the name of this model is actually a linear sequential model and is often referred to as the classic life cycle or waterfall method, also called waterfall because the phases passed have to wait for the completion of the previous phase and be executed sequentially.

Black Box Testing - Partition Equality

Black Box Testing -Equivalence Partitioning is a testing method based on data input in every form in the performance data information application system, where each input menu will be tested and also grouped according to its function, whether valid or invalid. Equality partition testing for software can be designed by examining the output and input data.

METHODOLOGY

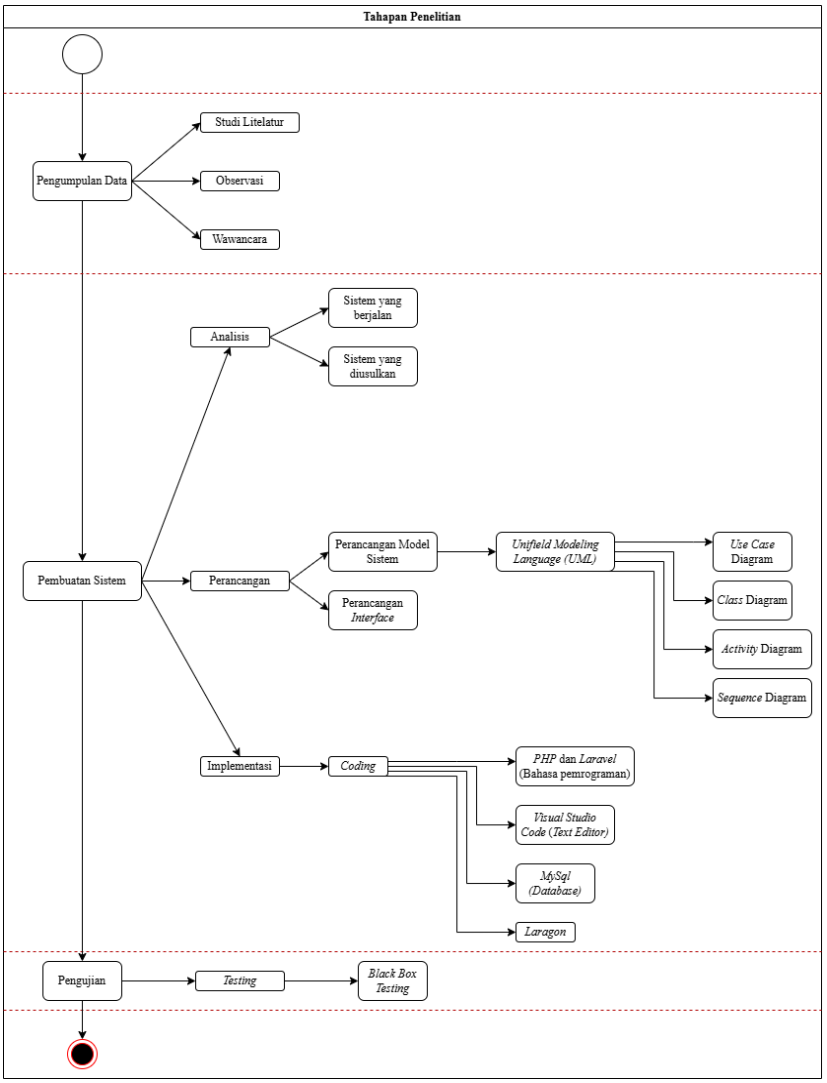
The data required for this study are as follows:
Data collection techniques

1. Direct observation of the transaction recording process in the field.
2. Through Interviews with Administrative Staff to understand business processes, system needs, and issues faced with current systems.

Research Stages

This stage of research forms a step in the research process, from planning to documentation, making it structured. An overview of the research stages can be seen in Figure 1.

Figure 1: Stages of research



Needs Analysis

At this stage, information is collected and processed into business processes and system requirements that include ongoing business processes and proposed business processes. The following is the explanation:

1. Ongoing business processes

The ongoing business processes at Nawawi Farm currently depend on manuals to manage various operational aspects.

2. Proposed business processes

The proposed business process aims to propose a system that will develop. This is done so that the system developed is in accordance with the request from the user himself.

Efficiency Analysis to Improve Operations

In an effort to improve operational efficiency at Nawawi Farm through the implementation of a web-based POS information system, the efficiency analysis method described in the book "Management Information Systems: Managing the Digital Firm" by Kenneth C. Laudon and Jane P. Laudon was used. Here is the application of the efficiency analysis method

Apps at Nawawi Farm

The performance measurement of the POS system is carried out by comparing the transaction processing time before and after the implementation of the system. The data collected from the use of the new system will be compared with historical data to evaluate performance and efficiency improvements.

System Design

At this stage, the process of designing a system model will be carried out which will be explained in the form of a UML diagram (use case diagram, activity diagram, sequence diagram, and class diagram).

Coding

After the system analysis and design stage is completed, the next stage is coding, at this stage the results of the analysis and system design are made into a program using a programming language.

Testing

The system coding stage has been completed, then the testing stage will be carried out, this stage aims to test the functionality of the system that has been created, whether the function is appropriate and runs smoothly and whether there are any system functions that are not running properly (error).

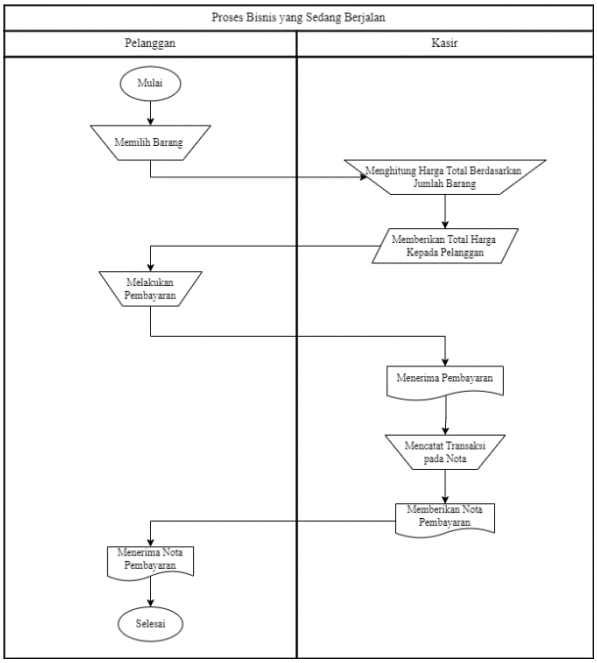
FINDINGS AND DISCUSSION

Stages of Analysis

Ongoing Business Process Analysis:

The business process that is currently running at Nawawi Farm is still carried out manually. The following is an overview of the ongoing business processes can be seen in Figure 2.

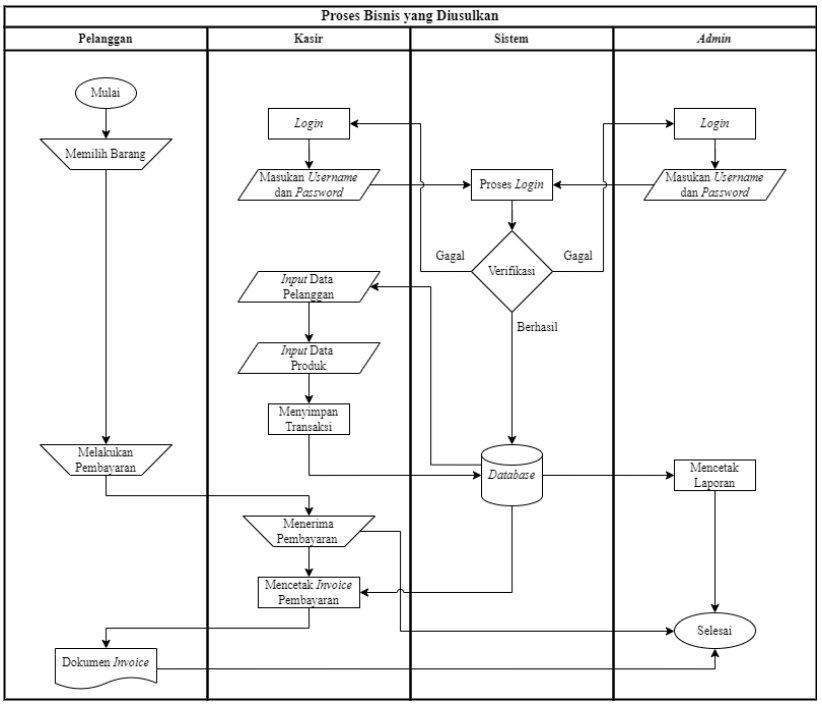
Figure 2: Ongoing Business Processes



Proposed Business Process Analysis

Old, ongoing business processes such as operational processes, management, and transaction reporting processes will be updated using the information system. The following is a picture of the proposed business process can be seen in Figure 3.

Figure 3: Proposed Business Process



Use Case Diagram

A Use Case Diagram is a description of the actors interacting to implement the system. Here is a diagram of the use case that can be seen in Figure 4.

Figure 4: Use Cases of RPH Nawawi Farm

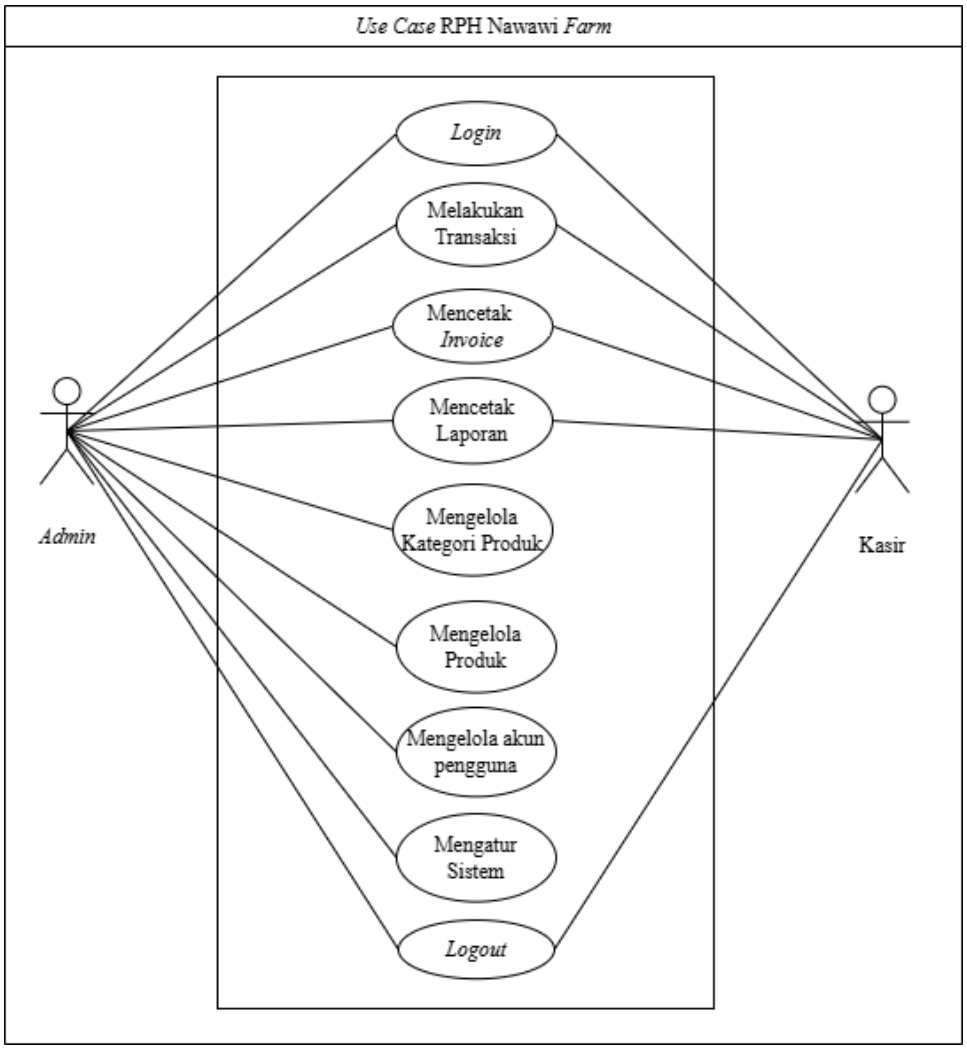
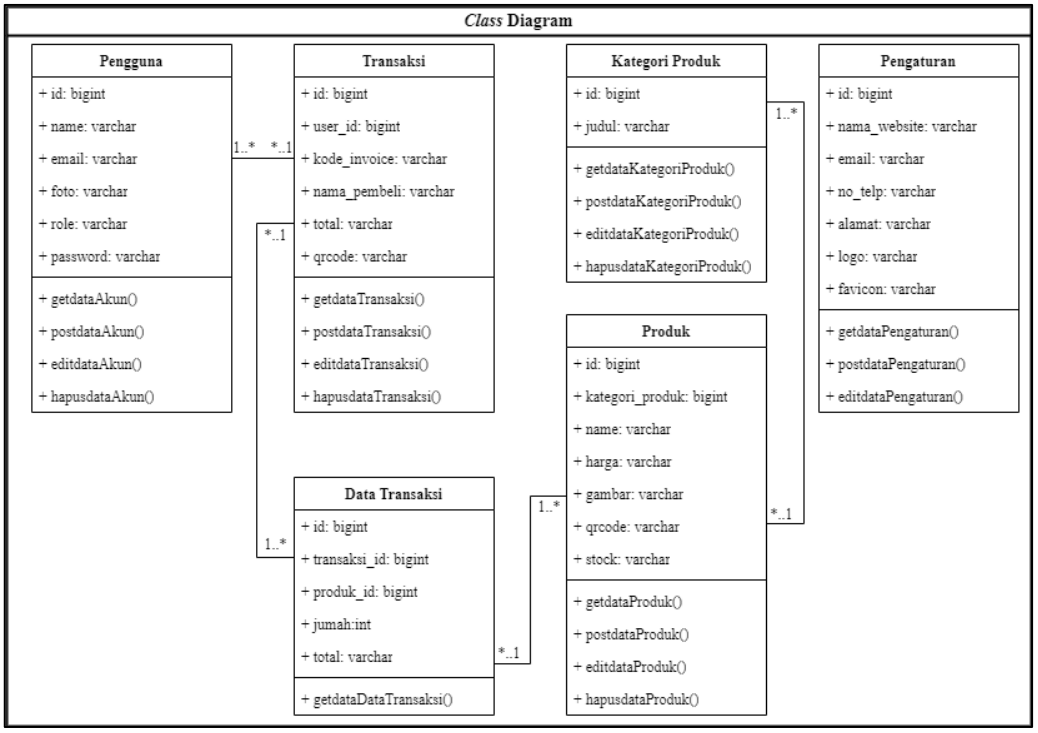


Diagram Class

A class diagram is a diagram that describes the structure of a system in terms of defining the classes to be created to build the system. Each class has its own attributes or methods. The following is an illustration of the class diagram that will be made can be seen in Figure 5.

Figure 5: Class Diagram



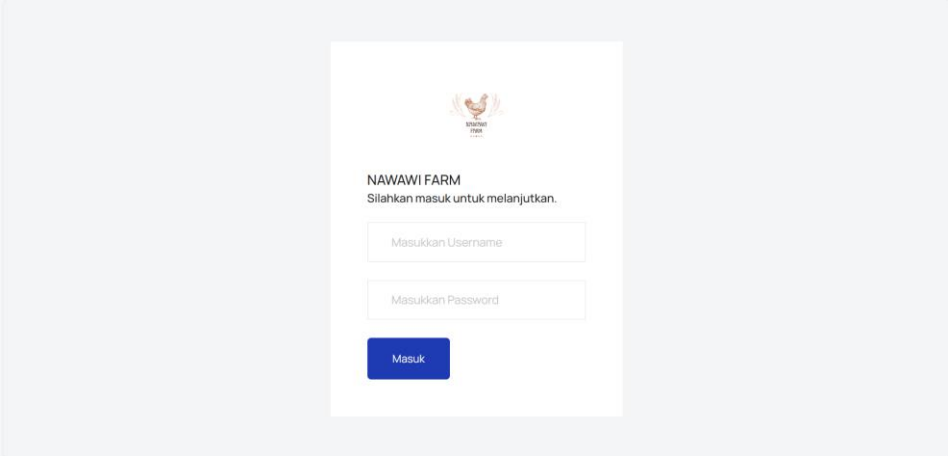
System Implementation

Application of Point of Sale Information System at RPH Nawawi Farm Based on WEB:

1. Login Page

On this page, a form will be displayed for the login process into the dashboard system, to access the dashboard system authentication is required in the form of a username and password, the dashboard page that opens will be different depending on the user's data role.

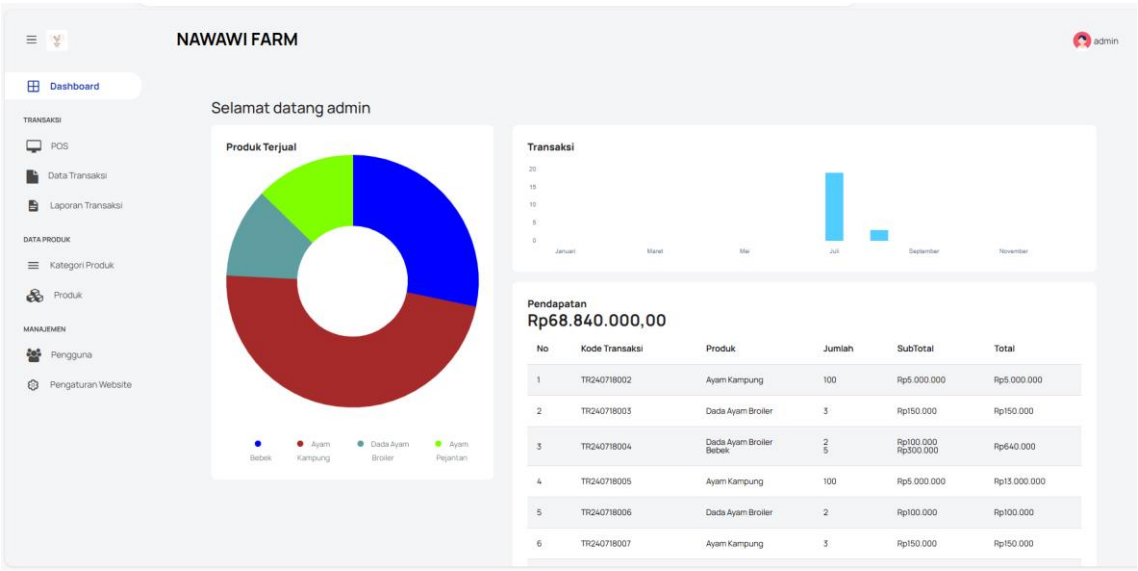
Figure 6: Login Interface



2. Dashboard Implementation

This page displays the main page of the Point of Sale information system at RPH Nawawi Farm. Here is an image of the Dashboard page which can be seen in Figure 7.

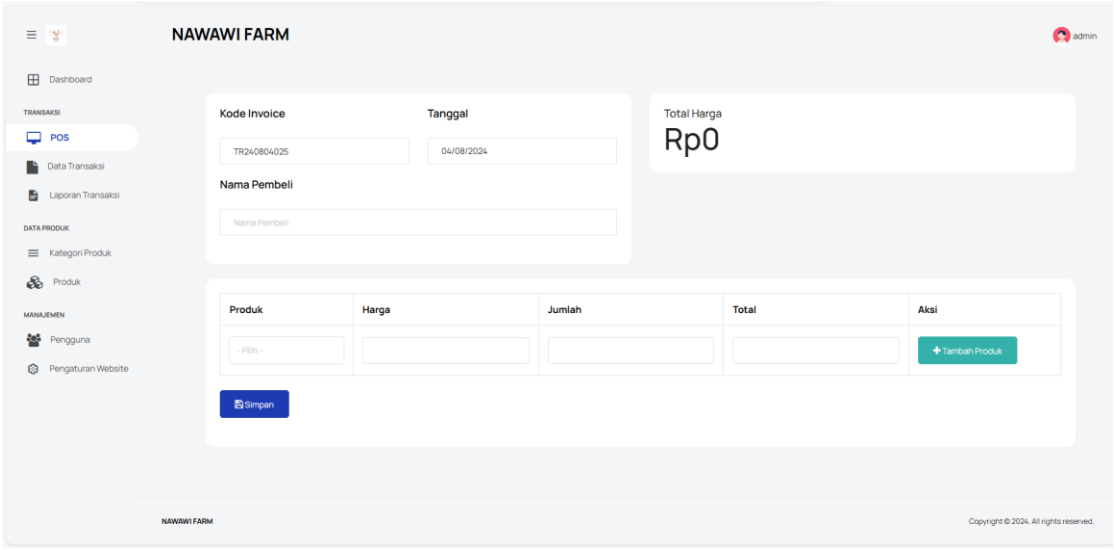
Figure 7: Dashboard Interface



3. Transaction Implementation

This page displays the transaction page which is one of the important parts of the Point of Sale (POS) information system at RPH Nawawi Farm. Here is the image of the Transactions page which can be seen in Figure 8.

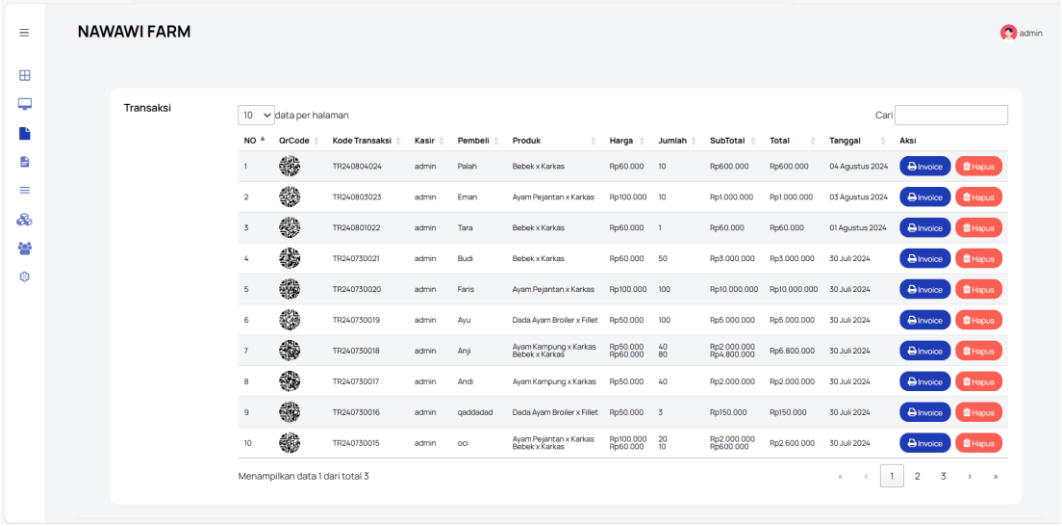
Figure 8: Transaction Interface



4. Transaction Data Implementation

This page displays the Transaction Data page which is an important part of the Point of Sale (POS) information system at RPH Nawawi Farm. The following is an image of the Transaction Data page which can be seen in Figure 9.

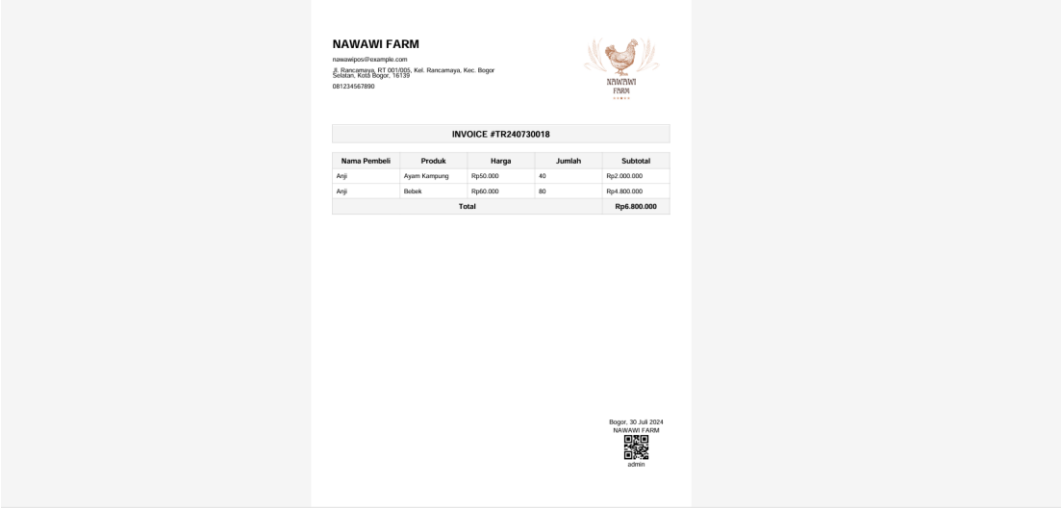
Figure 9*:* Transaction Data Interface



5. Invoice Printing Implementation

This page displays the Print Invoice page in the Point of Sale (POS) information system at RPH Nawawi Farm which is an important component to ensure that every transaction can be properly documented. Here is an image of the Print Invoice page that can be seen in Figure 10.

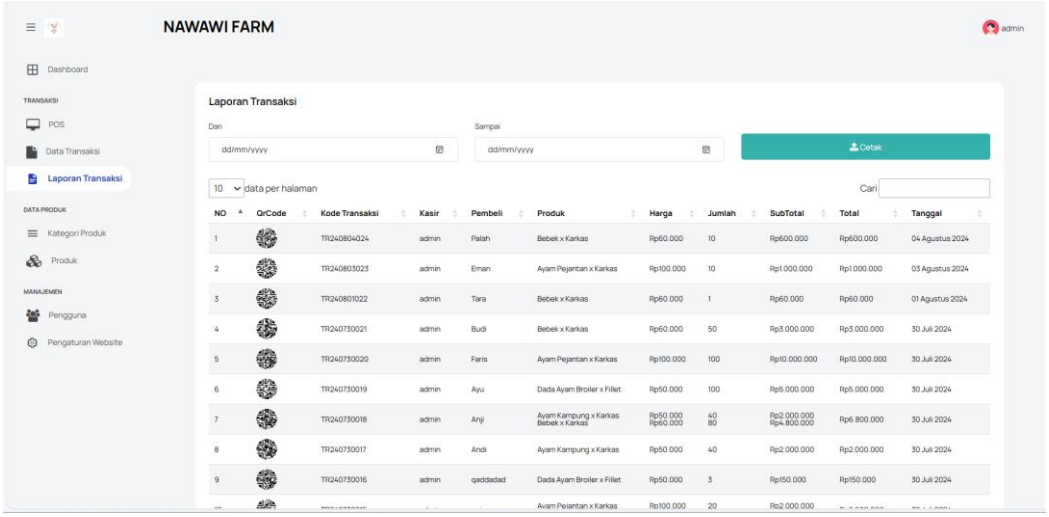
Figure 10: Invoice Print Interface



6. Transaction Report Implementation

This page displays Transaction Reports in the Point of Sale (POS) information system at RPH Nawawi Farm which aims to provide easy access to admins and cashiers to create and analyze reports related to transactions that occur. The following image from the Transaction Report page can be seen in Figure 11.

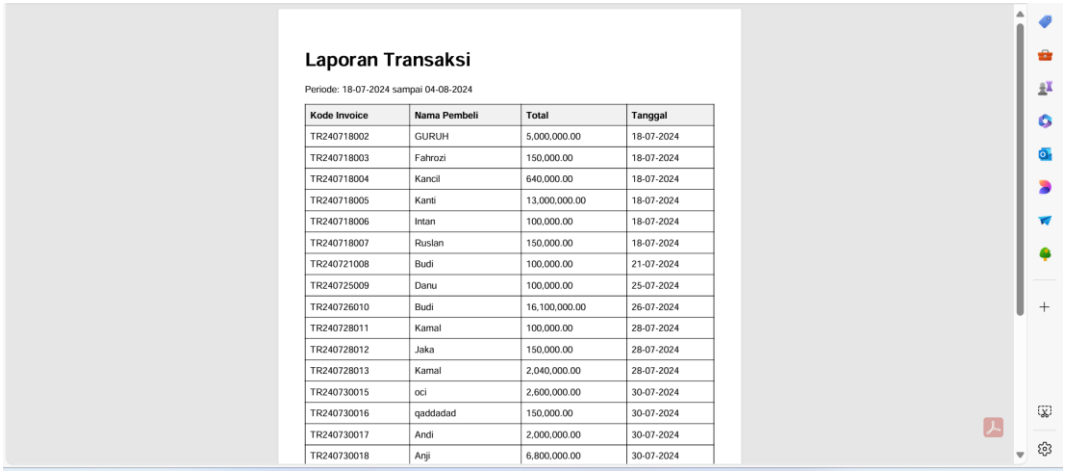
Figure 11: Transaction Report Interface



7. Implementation of Print Transaction Reports

This page displays the Print Transaction Report page in the Point of Sale (POS) information system at RPH Nawawi Farm which is designed to allow admins and cashiers to print transaction reports easily. The following is an image of the Print Transaction Report page which can be seen in Figure 12.

Figure 12: Print Transaction Report Interface



Laporan Transaksi

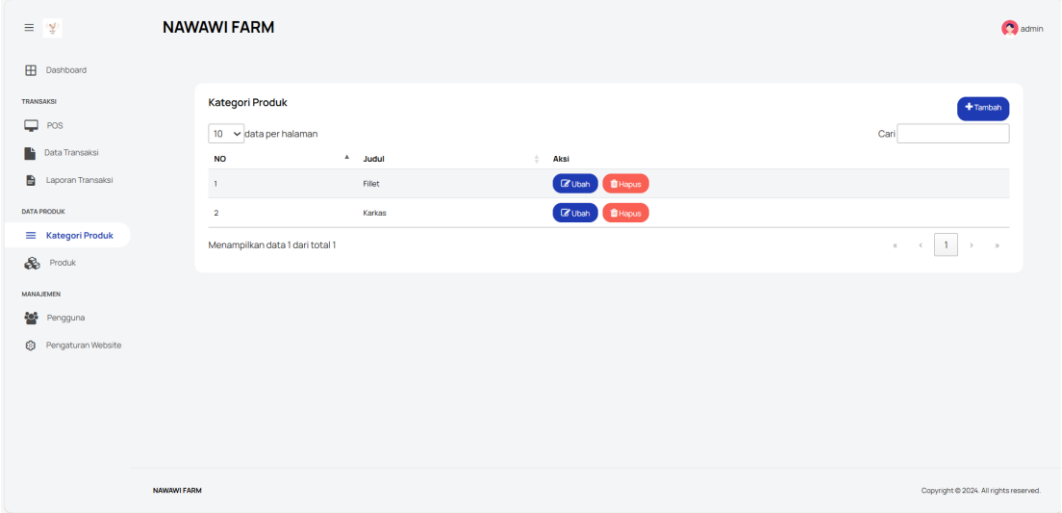
Periode: 18-07-2024 sampai 04-08-2024

Kode Invoice	Nama Pembeli	Total	Tanggal
TR240718002	GURUH	5,000,000.00	18-07-2024
TR240718003	Fahrozi	150,000.00	18-07-2024
TR240718004	Kancil	640,000.00	18-07-2024
TR240718005	Kanti	13,000,000.00	18-07-2024
TR240718006	Intan	100,000.00	18-07-2024
TR240718007	Ruslan	150,000.00	18-07-2024
TR240721008	Budi	100,000.00	21-07-2024
TR240725009	Danu	100,000.00	25-07-2024
TR240726010	Budi	16,100,000.00	26-07-2024
TR240728011	Kamal	100,000.00	28-07-2024
TR240728012	Jaka	150,000.00	28-07-2024
TR240728013	Kamal	2,040,000.00	28-07-2024
TR240730015	oci	2,600,000.00	30-07-2024
TR240730016	qaddadad	150,000.00	30-07-2024
TR240730017	Andi	2,000,000.00	30-07-2024
TR240730018	Anji	6,800,000.00	30-07-2024

8. Product Category Implementation

On this page, the Product Categories page in the Point of Sale (POS) information system at RPH Nawawi Farm aims to group products based on predetermined categories. The following is a picture of the Product Category which can be seen in Figure 13.

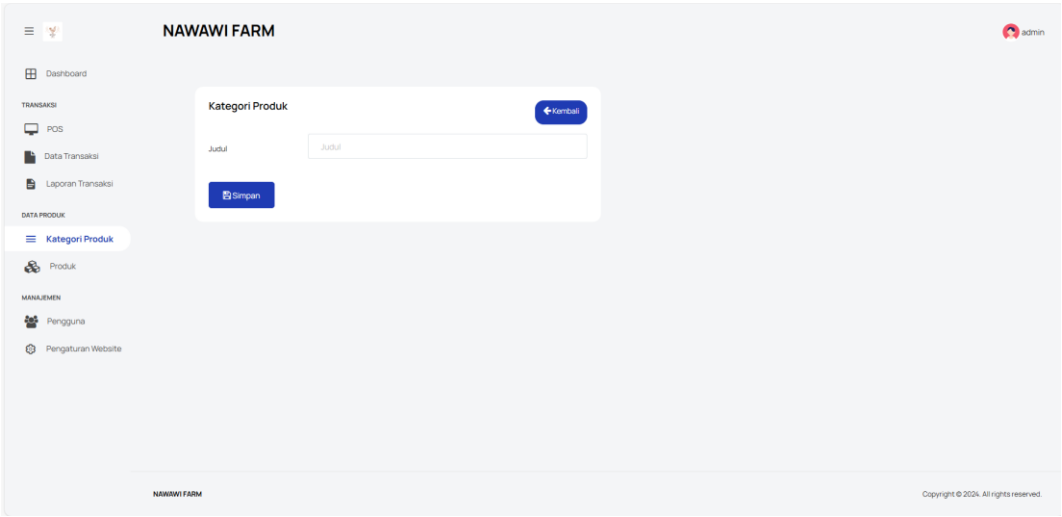
Figure 13: Product Category Interface



9. Product Category Add-on Implementation

On this page, displaying the Add Product Categories page in the Point of Sale (POS) information system at RPH Nawawi Farm is designed to allow admins to add new product categories easily. The following is an image of Add Product Category which can be seen in Figure 14

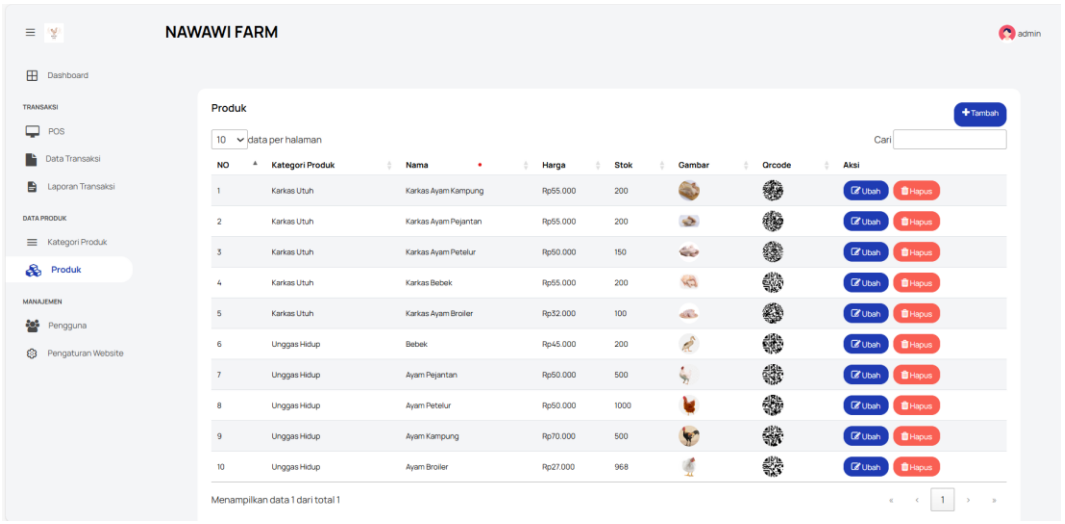
Figure 14: Product Categories Add Interface



10. Product Implementation

This page displays the Product page in the Point of Sale (POS) information system at RPH Nawawi Farm aims to manage the data of products available for sale. The following product images can be seen in Figure 15.

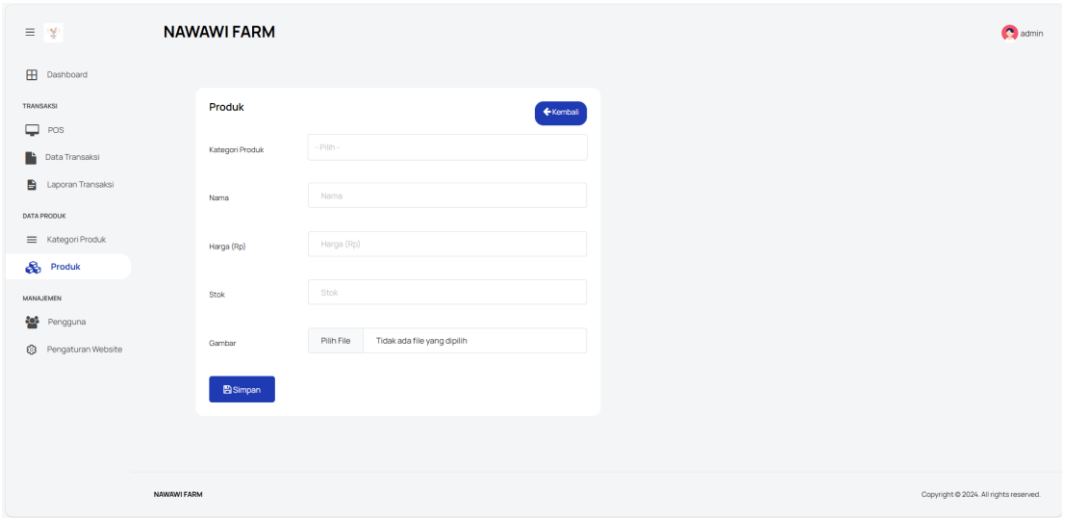
Figure 15*:* Product Interface



11. Apply Add Product

This page displays the Add Products page in the Point of Sale (POS) information system at RPH Nawawi Farm which aims to allow admins to add new products to the system. The following is the Add Product image that can be seen in Figure 16.

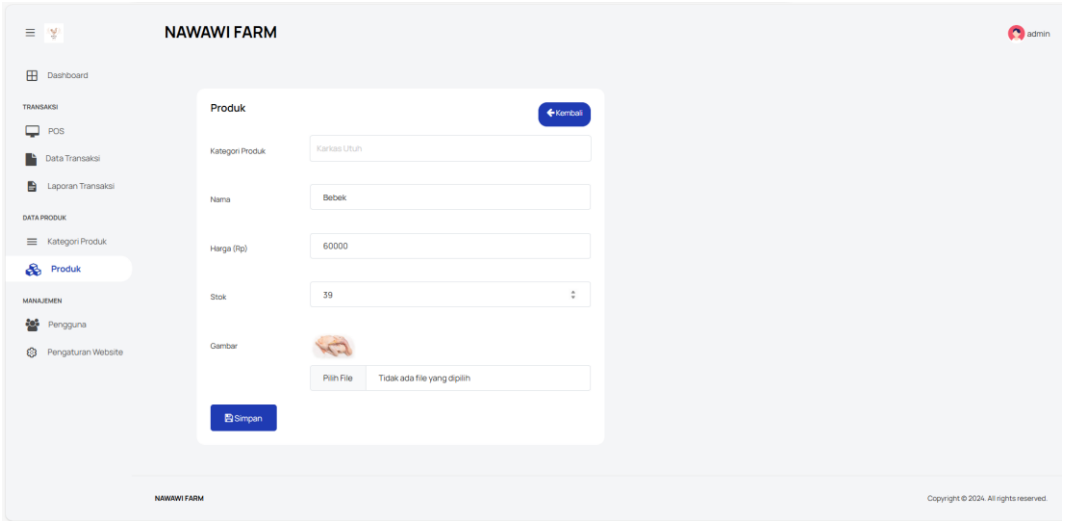
Figure 16: Add Product Interface



12. Implementing Product Changes

On this page, the Change Products page in the Point of Sale (POS) information system at RPH Nawawi Farm allows admins to update the product information in the system. Here is a picture of the Transform Product which can be seen in Figure 17.

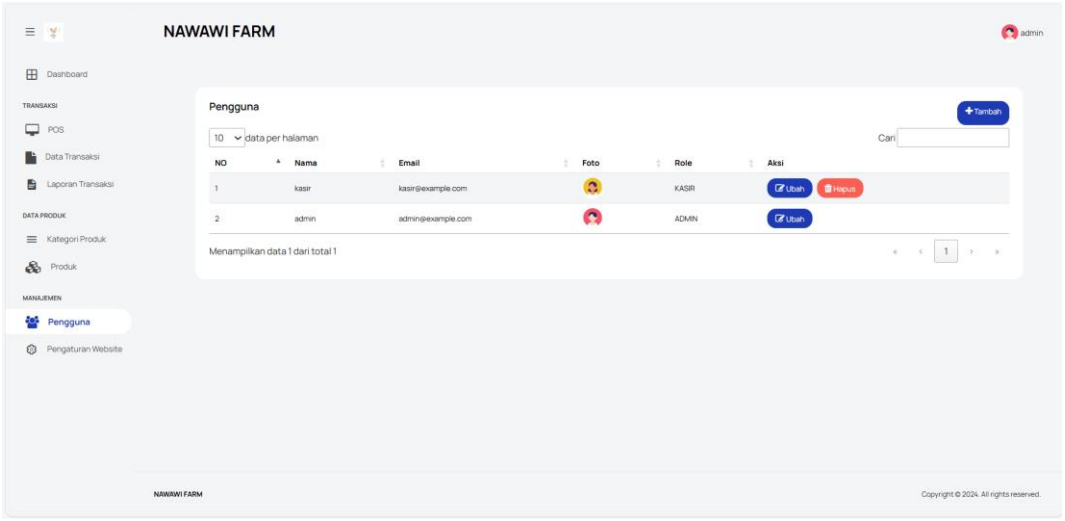
Figure 17: Change Product Interface



13. User Implementation

This page displays the User page in the Point of Sale (POS) information system at RPH Nawawi Farm to allow admins to manage system user data. Here is an image of the User page that can be seen in Figure 18.

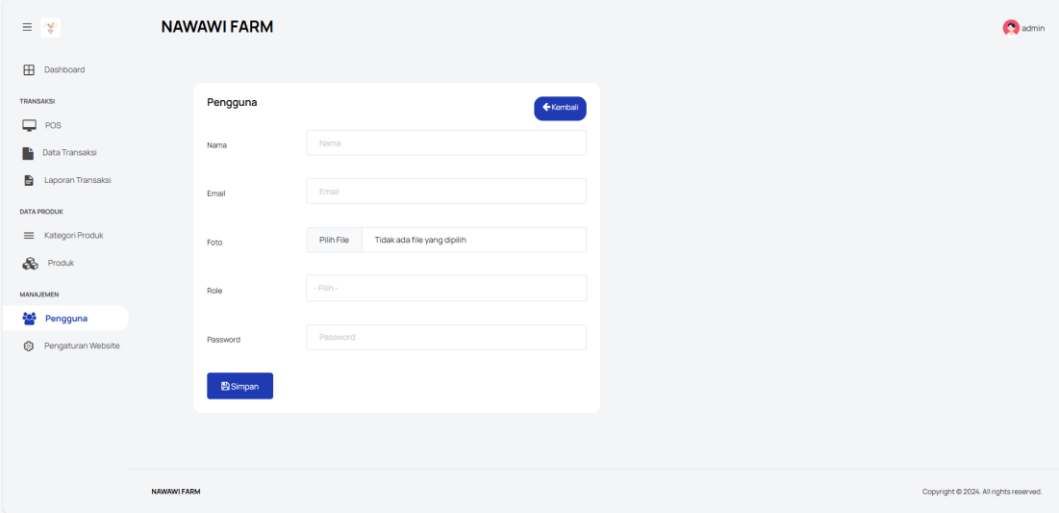
Figure 18: User Interface



14. Add User Implementations

This page displays the Add Users page in the Point of Sale (POS) information system at RPH Nawawi Farm to allow admins to add new user accounts to the system. Here is an image of the Add User page which can be seen in Figure 19.

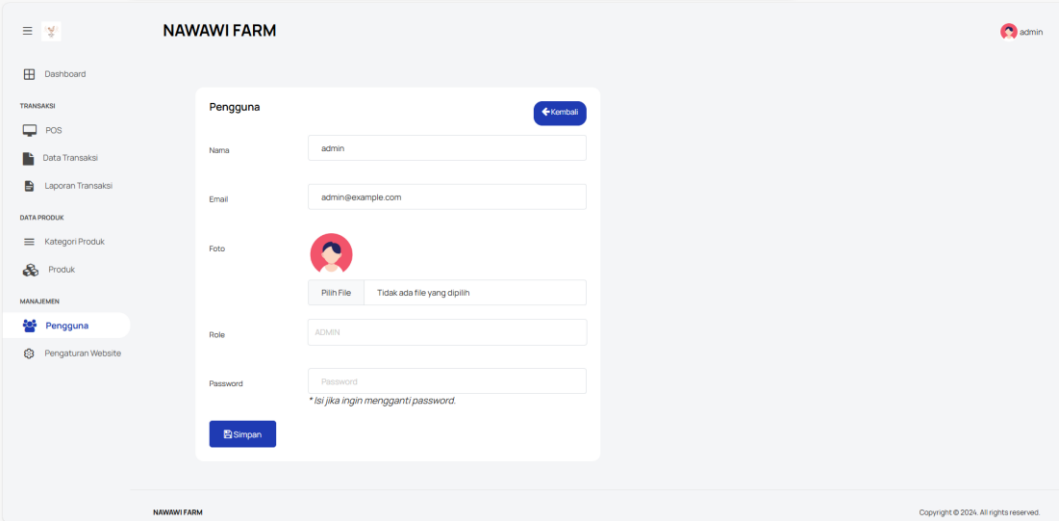
Figure 19: Add User Interface



15. Change User Implementation

This page displays the Change User page in the Point of Sale (POS) information system at RPH Nawawi Farm to allow admins to update the user account information already in the system. Here is an image of the Change User page that can be seen in Figure 20.

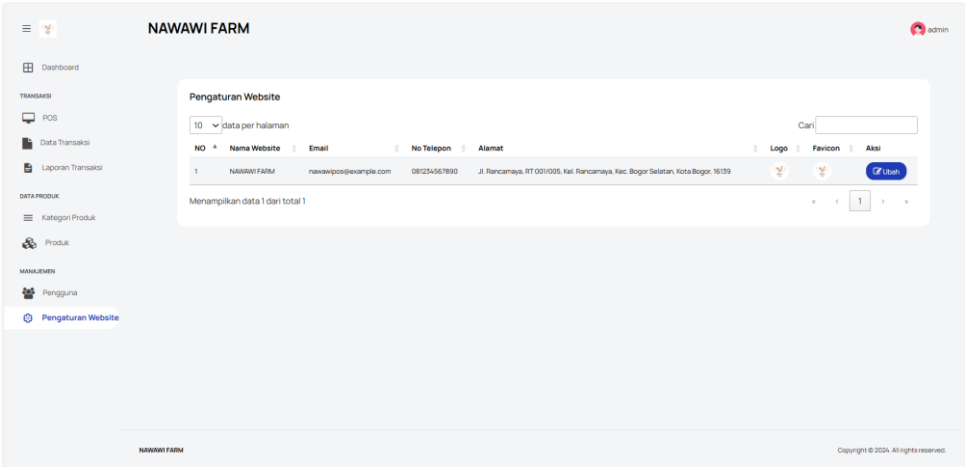
Figure 20*:* Change the User Interface



16. Implementation of Website Settings

This page displays the Website Settings page in the Point of Sale (POS) information system at RPH Nawawi Farm to allow admins to manage the various parameters and configurations required to operate and manage the system. The following is an image of the Website Settings page which can be seen in Figure 21.

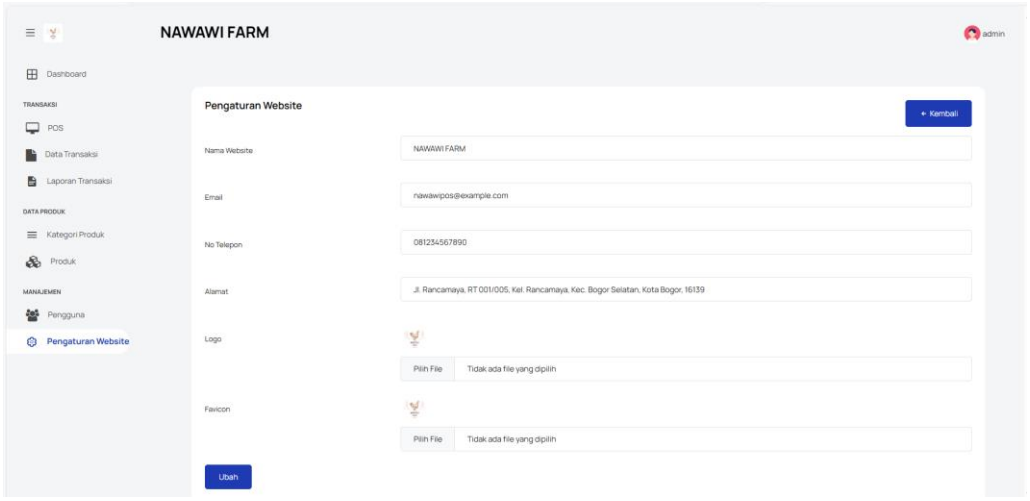
Figure 21*:* Website Setup Interface



17. Implementation of Change Website Settings

This page displays the Change Website Settings page in the Point of Sale (POS) information system at RPH Nawawi Farm to allow admins to update system configurations related to the website's appearance and operational parameters. The following is an image of the Change Website Settings page which can be seen in Figure 22.

Figure 22*:* Interface Change Website Settings



System Testing

Table 1: Testing Black Box Equivalence Partition Login Testing System

No.	Test Form	Testing Scenarios	Expected Results	Conclusion
1.	Menu Login	Enter the correct Username and	When entering the Login Menu, a login form will appear and	[√] Success

No.	Test Form	Testing Scenarios	Expected Results	Conclusion
	Admin and Cashier	Password of the Admin and Cashier	when the login form is filled in with the correct username and password, a welcome notification will appear admin/cashier then will enter the Dashboard Menu	
2.	Login menu with incorrect Username and Password data	Enter the wrong Username and Password data.	When entering the login menu, a login form will appear and when the login form is filled in with the wrong username and password, a notification will appear that the login failed will appear and then it will return to the login menu.	[√] Success

Based on the results of the test at the Nawawi Farm RPH, the system showed a significant improvement in operational performance. Sales transaction time decreased from an average of 6–8 minutes to 2–3 minutes (increased efficiency ±60%). The transaction recording error rate which previously reached 7.5% dropped to 1.4% after the system was implemented. In addition, the results of a simple survey show a user satisfaction rate of 90%, especially regarding the ease of use of the interface and the speed of data processing. This quantitative data proves that the developed Laravel-based system is able to have a real impact in increasing the operational effectiveness of RPH.

CONCLUSION

Based on the research that has been conducted, it is important to implement an information system that can improve operational efficiency, one of which is a website-based Point of Sale (POS) information system. With this system, Nawawi Farm can automate the transaction process, speed up order recording, and reduce errors due to manual recordkeeping. In addition, the website-based POS system enables real-time data integration that supports more efficient stock management, sales reports, and performance analysis, which is expected to significantly improve operational efficiency and provide convenience in the transaction process and daily management. To ensure the optimal functioning of the POS system, some suggestions that can be applied include the development of additional features such as integration with accounting systems, improved system security to protect transaction data, and exploration of the latest technologies such as mobile application integration to improve the functionality and scalability of POS systems.

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