 ISSN:2302-8149
e-ISSN:2540-9719

Web-Based Inventory Information System using Agile Scrum Method at CV Tunggal Putra Jaya

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(***received*:** 28 April 2025, ***revised*:** 6 May 2025, ***accepted*:** 8 May 2025)

Abstract

CV Tunggal Putra Jaya is a building materials store that still manages inventory manually using Microsoft Excel. This approach leads to data inaccuracies, difficulties in real-time stock monitoring, and risks of overstocking or stock shortages. This research aims to design a web-based inventory system to address these issues, with key features such as real-time stock monitoring, order and pre-order creation, and automatic financial report generation. The system is developed using the Agile Scrum method with a sprint duration of 14 days to ensure flexibility to changes in requirements. The implementation results show an efficiency increase of up to 92.73%, marked by a reduction in invoice creation time from 5–10 minutes to 1 minute, stock monitoring from 30 minutes to 1 minute, and financial report generation from 10 minutes to 1 minute. The system has also successfully passed Black Box testing for all features, and user validation indicates that this system can significantly reduce working time.

Keywords: inventory information system, web, agile scrum method

1 Introduction

In the current era of digitalization, Information Technology (IT) has become a main pillar for many companies in achieving competitive advantage, making Strategic Information Systems Planning (SISP) very important. The proper implementation of IT not only enhances operational efficiency and organizational productivity but can also drive better innovation, broader market expansion, and decision-making strengthened by accurate real-time data [1]. In line with current technological advancements, various business sectors are now using effective information systems to support various operational activities, starting from data management to more optimal decision-making [2]. One important aspect of managing a company's operations is the inventory system. The inventory system plays a crucial role for the company as it can efficiently support business operations [3]. The inventory system is a system that can manage the inventory of goods in the warehouse. Inventory is a core component that is very important in a business because inventory is continuously sold to ensure the smooth operation of the business [4].

Although digital transformation has become widespread, many companies, including CV Tunggal Putra Jaya, still use a manual system based on Microsoft Excel for inventory management. This approach often leads to various issues, such as data inaccuracies, the risk of overstocking or stock shortages, and difficulties in monitoring stock in real-time. As a result, rusted items are hard to detect and ultimately cannot be sold, causing financial losses because the investment in producing those goods does not return. Additionally, the process of purchasing goods from suppliers and delivering goods to customers is still done conventionally, using fax, email, and manual recording on delivery notes and invoices. This approach is highly susceptible to human error.

As explained in the book "Fundamentals of Management" by Rukhviyanti et al [5], Management is a combination of science and art that includes designing, organizing, guiding, and monitoring efforts within an organization. Therefore, efficient management not only focuses on managing resources and operational processes but also on enhancing innovation, improving service quality, adapting to market changes, and optimizing added value [6].

This research aims to develop a web-based inventory information system using the Agile Scrum method to address the issues faced by CV Tunggal Putra Jaya. This system is designed to monitor

 ISSN:2302-8149
e-ISSN:2540-9719

stock in real-time so that the company can prevent damage to goods that could harm the company, optimize inventory management, and avoid excess or shortage of stock. Additionally, this research aims to improve the operational efficiency of the company by integrating the processes of purchasing goods from suppliers and delivering goods to customers, which can reduce reliance on time-consuming manual processes. Finally, this system will also be equipped with an integrated financial reporting module to facilitate real-time financial analysis. This research is expected to provide benefits for CV Tunggal Putra Jaya, both in terms of operational and managerial aspects. In addition, the results of this research are expected to serve as a reference for other companies interested in adopting web-based technology to optimize their operational efficiency.

2 Literature Review

Previous research has proven the effectiveness of a web-based inventory information system in optimizing inventory management efficiency. The study conducted by Anugrah, Saputra, and Haryono in 2024 titled "Designing a Web-Based Inventory System for Optimizing Goods Inventory Management at PT Bumi Daya Plaza" explains that the implementation of a web-based inventory system at PT Bumi Daya Plaza successfully reduced recording errors, optimized work efficiency, and strengthened data-driven decision-making [7]. Similar research conducted by Widiarta, Mulyanto, and Sutrianto in 2023 titled "Design and Build an Inventory Information System Using Agile Software Development Method (Case Study of Toko Nada)" explains that the results of this research can facilitate the management of item data, payments, generating purchase reports, and sales reports at Toko Nada [8].

Although previous research has shown the effectiveness of web-based inventory information systems in improving the efficiency and accuracy of record-keeping, there are still shortcomings, particularly in terms of real-time financial reporting integration. In the digital era, financial reports play a crucial role as they provide ease of access to data and information that can be utilized for more in-depth analytical processes [9]. This feature is essential to assist companies in conducting financial analysis quickly and accurately, as well as serving as a basis for business decision-making. To address these shortcomings, this research develops a web-based inventory information system for CV Tunggal Putra Jaya by adding an integrated financial reporting module. This module is designed to help monitor financial income and expenditures in real-time. The researcher employs the Agile Scrum Method due to its flexible and iterative nature in the software development process. This approach is suitable for addressing existing shortcomings, as it ensures that the developed features truly meet the business needs of CV Tunggal Putra Jaya.

3 Research Method

The researchers used data collection methods and system development to produce an inventory information system that meets the company's needs. The stages of the research are explained as follows.

3.1 Data Collection Method

Data collection in this study was conducted to obtain more accurate information related to the issues being researched to support the study. The researcher used three data collection methods, namely observation, interviews, and literature study.

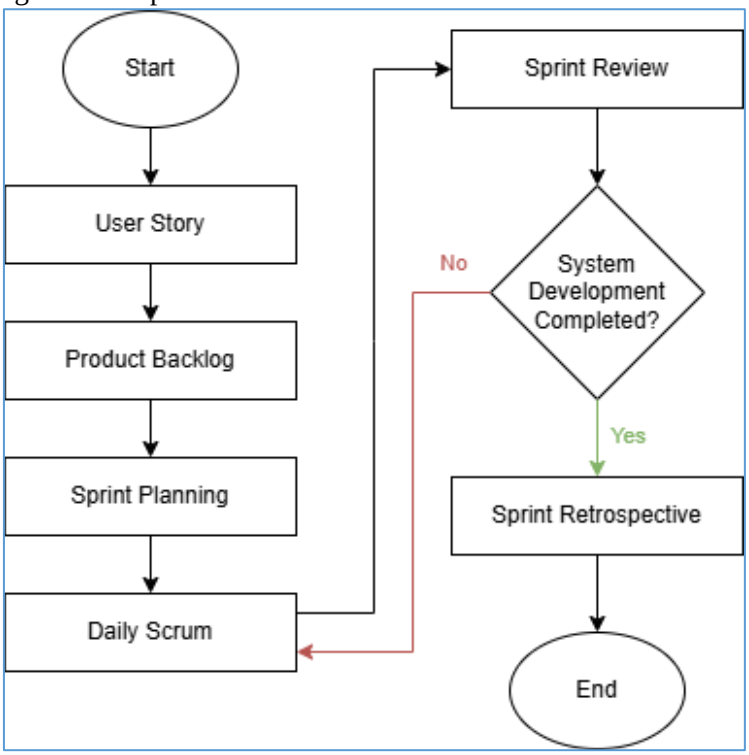
1. Observation
   Researchers conducted observations to identify problems and collect data directly at CV Tunggal Putra Jaya. The purpose of this observation is to understand the system used for stock recording and ordering goods, as well as to gather data for the development of a web-based inventory information system.
2. Interview
   The interview was conducted with Mrs. Risma, the admin of CV Tunggal Putra Jaya. The purpose of this interview is to obtain relevant information regarding the issues faced by CV Tunggal Putra Jaya in the development of the inventory information system.
3. Literature Study

 ISSN:2302-8149
e-ISSN:2540-9719

The researchers also conducted a literature study by reviewing books, articles, and journals relevant to the research topic. This literature study aims to gain a deeper understanding from similar research regarding the development of inventory information systems.

3.2 System Development Methodology

Researchers use the Agile method with a Scrum approach as the system development methodology. The method employed allows for adjustments to changes in user needs, increases efficiency, and organizes the system development process into short work cycles called sprints. This method enables the development of functional products in a relatively short time. Below is an explanation of the Agile Scrum process flow as follows:



Figur 1. Agile scrum process flow [10]

The Agile Scrum process flow, as shown in Figure 1, consists of several stages described below.

1. User Story It is a brief description from the user's perspective that explains the needs and objectives of the developed system. The user story describes the needs of each user role, such as admin, warehouse staff, and finance, that exist in CV Tunggal Putra Jaya.
2. Product Backlog contains a list of features needed by users in the system development. This list is continuously updated to ensure that the features remain aligned with user needs.
3. Sprint Planning is the stage of determining the tasks from the product backlog that will be worked on in one sprint. In this study, each sprint lasts for 14 days.
4. Daily Scrum It is a daily meeting to ensure progress continues according to the initial plan. In this meeting, we discuss the work that has been completed, the tasks that will be undertaken, and the challenges faced during the project execution.
5. Sprint Review conducted at the end of each sprint, where users review the work results and provide feedback to ensure that the developed system meets the needs.
6. Sprint Retrospective focusing on evaluating the effectiveness of the developed system, identifying emerging challenges, and outlining improvement steps for the next sprint. The goal is to ensure the system can enhance efficiency and accuracy in inventory management at CV Tunggal Putra Jaya.

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4 Results and Analysis

This section explains the analysis results obtained during the system development process using the Agile Scrum approach. The explanation is presented below.

4.1 User Story

User stories serve to describe the needs and goals of system users from their perspective. Additionally, they ensure that the developed product aligns with user needs. The user story is very important as it will be used for the subsequent system development [11].

Table 1. User story

As	I Want	So That
Admin	Managing warehouse and finance staff data	Admin can add, edit, and change the data of warehouse and finance staff
	Checking product stock	The admin can see the product status
	Managing orders and pre-orders	Admins can add products and manage existing products when creating a pre-order, as well as process orders requested by customers when placing an order
	Managing backup databases	Admin can perform backups manually or automatically through the web
Warehouse staff	Managing category list	Warehouse staff can add a list of new product categories that will be displayed in the category list
	Managing the supplier list	Warehouse staff can add a new supplier list if needed
	Managing the product list	Warehouse staff can add new products and manage inventory accurately
Finance	Checking product stock	Finance can see the product status
	Managing financial reports	Finance can generate financial reports automatically through the web

The description of the user story in Table 1 explains the features needed by three user roles at CV Tunggal Putra Jaya, namely admin, warehouse staff, and finance. Each row describes the actions that the user wants to take along with the expected outcomes. This information is used as a reference in formulating system requirements and the main direction of the subsequent development process.

4.2 Product Backlog

The product backlog is a list of features that need to be completed in the system development process. This list includes all requirements, modifications, and improvements needed by users. This aims to achieve the targets that have been agreed upon by the team [12].

Table 2. Product backlog

User	Feature Requirements	Feature Details	Description
Admin	System management	Login, dashboard, manage staff & finance, product	The admin can monitor business data, manage user data and product

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e-ISSN:2540-9719

		management, pre-order, order, and database backup	management, process orders, and ensure data security through backups
Warehouse staff	Warehouse management	Login, dashboard, manage categories, supplier, products, check product status	Warehouse staff can manage the category list, supplier list, and product list, as well as monitor the stock status of products through the dashboard
Finance	Financial management	Login, dashboard, check product status, automatic financial reports	Finance can monitor product stock and automatically generate financial reports, with the report results exportable in Excel format

As shown in Table 2, this system has three main roles with different features, namely Admin, Warehouse Staff, and Finance. The Admin is responsible for system management, such as login, dashboard, managing warehouse and finance staff data, managing products, creating orders and pre-orders, and performing database backups. Warehouse Staff is responsible for warehouse management, such as login, dashboard, managing warehouse data (including categories, suppliers, and products), and checking product status. Meanwhile, Finance is responsible for financial management, such as login, dashboard, checking product status, and generating automated financial reports that can be exported in Excel format. Complete details of each feature can be found in Table 2.

4.3 Sprint Planning

The development duration of the web-based inventory information system was 1 month and 26 days. The detailed workflow can be seen in Table 3.

Table 3. Sprint planning

Sprint	Feature	Time Estimation
Sprint 1	Admin, Warehouse Staff, and Finance Login	6 Days
	Admin dashboard	8 Days
Sprint 2	Staff management	4 Days
	Finance management	4 Days
	Warehouse staff dashboard	6 Days
Sprint 3	Category management	4 Days
	Supplier management	4 Days
	Product management	6 Days
Sprint 4	Finance dashboard	6 Days
	Product stock check management	4 Days
	Pre-order management	6 Days
	Order management	6 Days
	Database backup	4 Days
	Financial reports	6 Days
	System optimization and testing	6 Days

Table 3 shows that each sprint focuses on the development of features based on user roles, namely admin, warehouse staff, and finance. Sprint 1 includes the admin login and dashboard features. Sprint 2 focuses on staff management, financial management, and the warehouse dashboard view. Sprint 3 continues the development of category, supplier, and product management features for

 ISSN:2302-8149
e-ISSN:2540-9719

warehouse staff. Sprint 4 includes complex features such as financial dashboards, stock checks, pre-order and order management, data backup, financial reporting, as well as system optimization and testing.

4.4 System Design

This design involves creating a system model using UML (Unified Modeling Language), a standard language used to document, specify, and develop software [13]. The models used are the use case diagram and the class diagram.

1. Use Case Diagram

   The use case diagram in Unified Modeling Language (UML) is applied in software engineering to illustrate various actors operating within the system, including users and other systems. UML is used to describe, specify, and implement a software system. The use case diagram describes the actions that must be performed within the system [14]. The following is the use case diagram illustration.

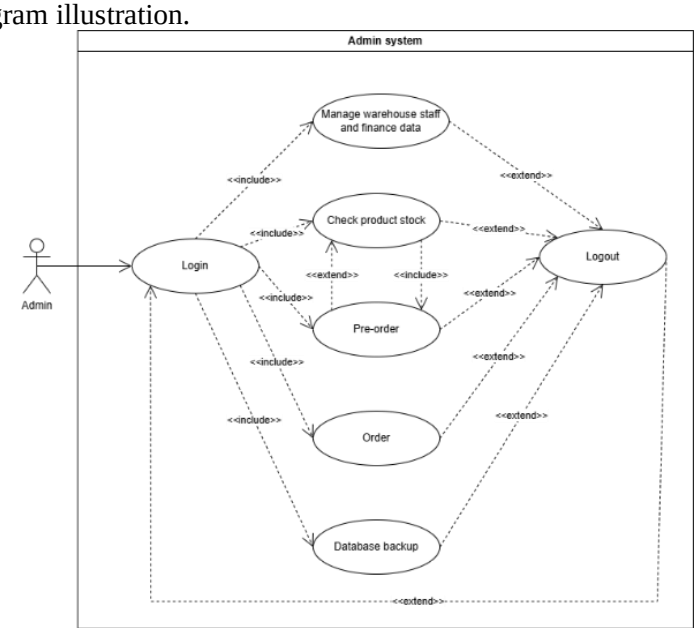

Figure 2. Admin use case diagram

The admin use case diagram shown in Figure 2 illustrates that the admin must first log in. After logging in, the admin can manage warehouse staff and finance data, check product stock, handle pre-orders and orders, and perform database backups.

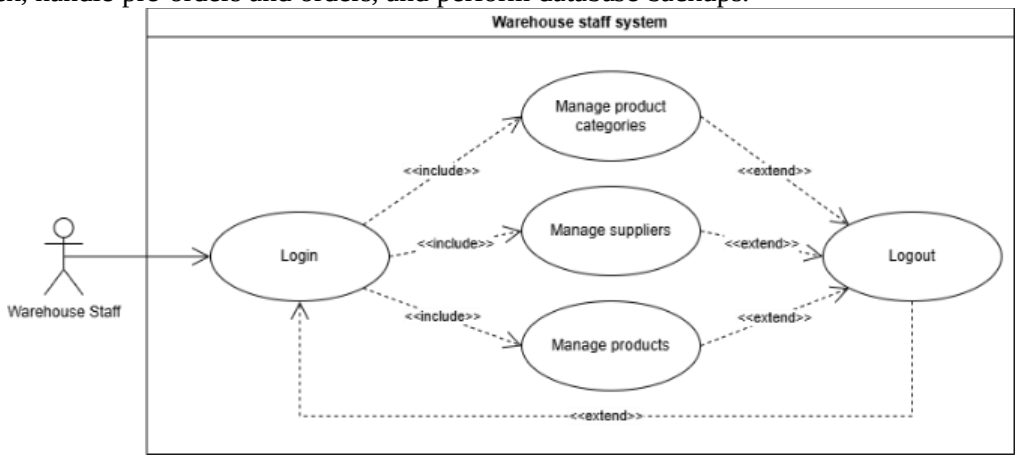

Figure 3. Warehouse staff use case diagram

The warehouse staff use case diagram shown in Figure 3 illustrates that the warehouse staff must first log in. After logging in, the warehouse staff can manage product categories, manage suppliers, and manage products.

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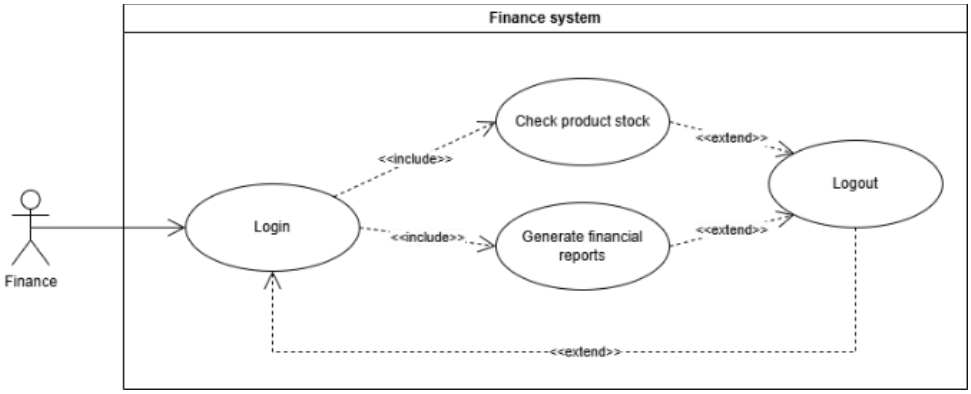

Figure 4. Finance use case diagram

The finance use case diagram shown in Figure 4 illustrates that the finance staff must first log in. After logging in, the finance staff can check product stock and generate financial reports.

2. Class Diagram

A class diagram is a diagram used to illustrate the structure of objects within a system. This diagram displays the class objects that form the system and the relationships between these class objects [15]. The following is the class diagram illustration.

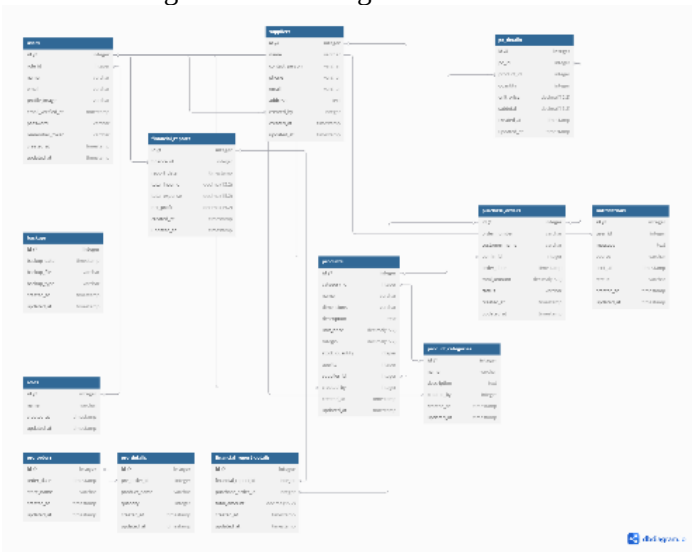

Figure 5. Class diagram

The diagram shown in figure 5 illustrates an inventory management system that includes user and role management, product and category grouping, supplier management, pre-orders and purchase orders, financial reporting, notifications, and data backup, with all tables interconnected according to their flow.

4.5 Daily Scrum

Daily Scrum is a stage to ensure that system development remains aligned with the previously planned sprint goals. Its main objective is to maintain focus on achieving the sprint objectives set during sprint planning.

1. Application
   a. First Phase

      The first phase of work includes the implementation of the login feature for admin, warehouse staff, and finance, as well as the development of the admin dashboard. The results can be seen in the image below.

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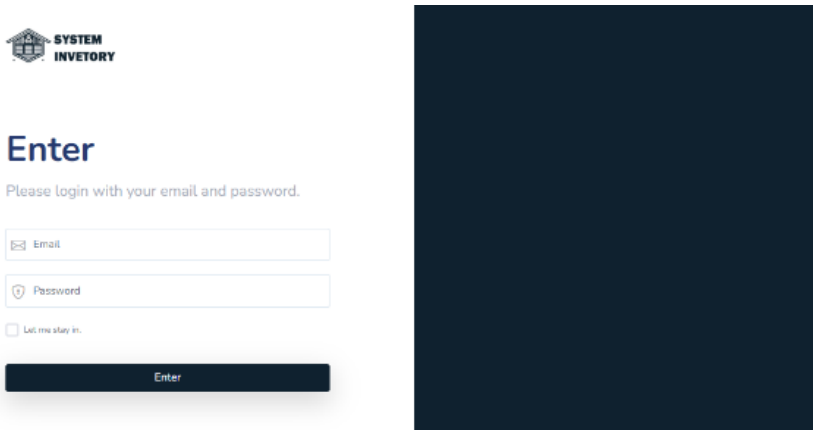

Figure 6. Admin, warehouse staff, and finance login interface

To maintain security and role-based access distribution, the system provides different login interfaces for admins, warehouse staff, and the finance department. Each role has access rights according to their respective tasks, as shown in Figure 6.

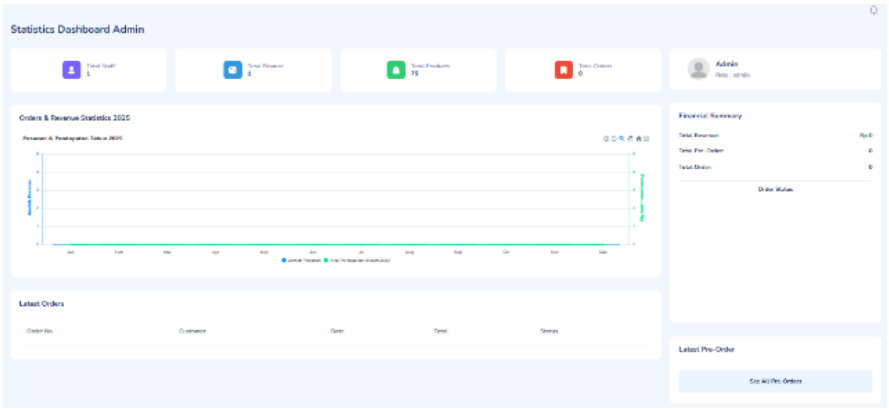

Figure 7. Admin Dashboard Interface

After successfully logging in, the admin will be directed to the main dashboard that displays important information related to business activities. This dashboard includes order and revenue statistics, financial summaries, recent orders, pre-orders, as well as notifications to monitor operations in real-time, as shown in Figure 7.

b. Second Phase

The second phase includes the implementation of warehouse staff management features, finance management, and the warehouse staff dashboard. The results can be seen in the image below.

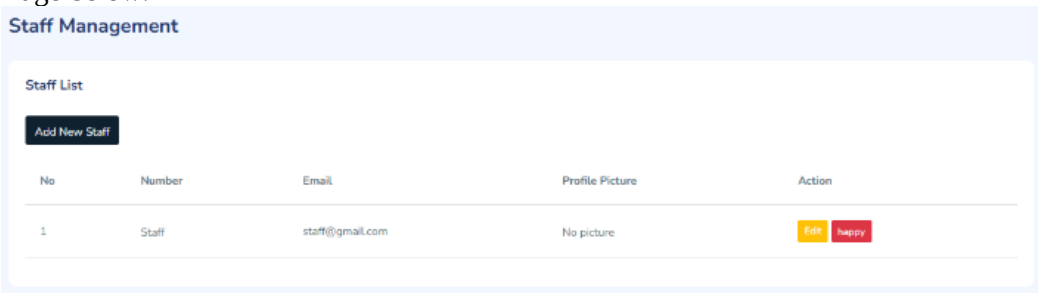

Figure 8. Warehouse staff management interface

In the management of warehouse staff data, the admin has access to view, edit, and delete staff data as needed. This interface can be seen in Figure 8.

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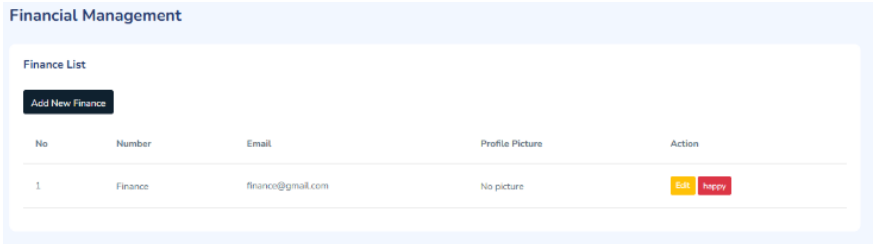

Figure 9. Finance Management Interface

In addition, to manage finance data, the admin can view, edit, and delete finance data as needed. This interface can be seen in Figure 9.

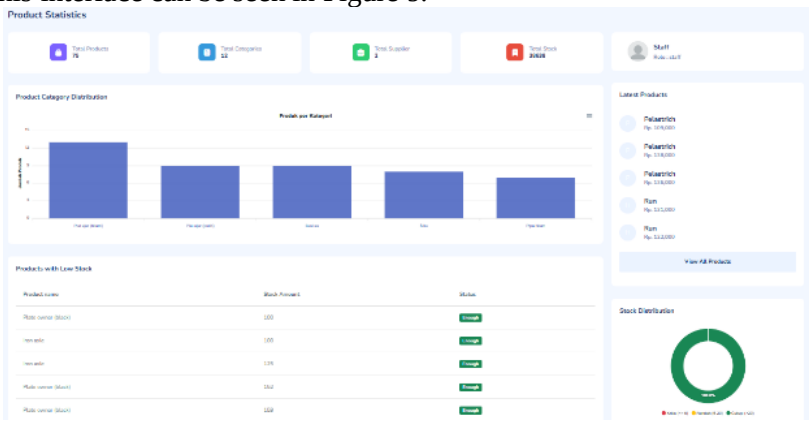

Figure 10. Warehouse staff dashboard interface

To facilitate warehouse staff in monitoring stock and product status, the system provides a dedicated dashboard that displays the distribution of product categories, a list of the latest products, products with low stock, and visualizations of product status in the form of diagrams. A complete view of this dashboard can be seen in Figure 10.

c. Third Phase

The third task includes the implementation of category management, supplier management, and product management features. The resulting display can be seen in the image below.

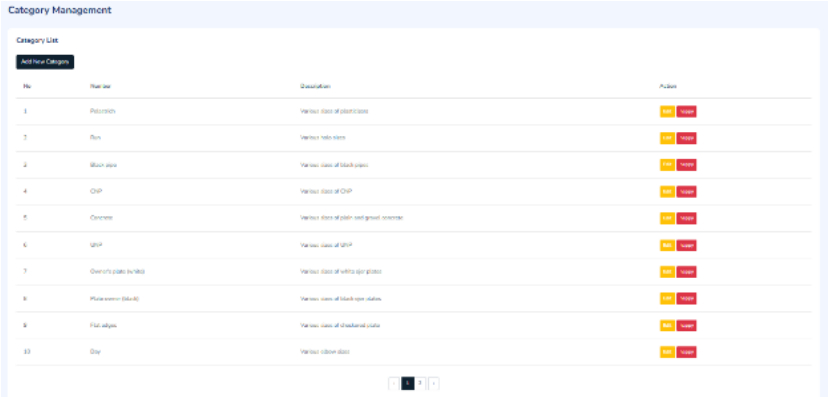

Figure 11. Category management interface

To facilitate product grouping, the system provides a category management feature that allows warehouse staff to add, edit, and delete product categories. This interface is displayed in Figure 11.

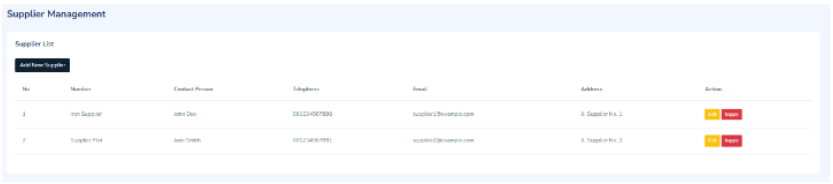

Figure 12. Supplier management interface

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e-ISSN:2540-9719

In addition to managing categories, warehouse staff also have access to manage supplier data. The system provides a dedicated interface for adding, editing, and deleting supplier data, as shown in Figure 12.

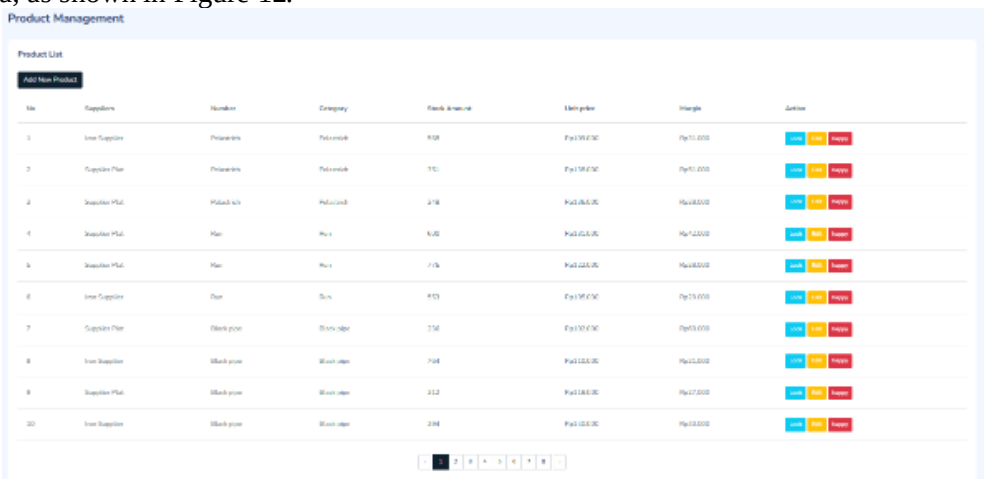

Figure 13. Product management interface

In product management, warehouse staff can add new products through the provided form, as well as view, edit, and delete product data. This interface is shown in Figure 13.

d. Fourth Phase

The fourth phase includes the implementation of several features, namely a finance dashboard, product stock check management, pre-order management with automatic invoice creation, and order management also equipped with automatic invoice creation. In addition, this phase includes database backup and financial reports. The visual results of these features can be seen in the image below.

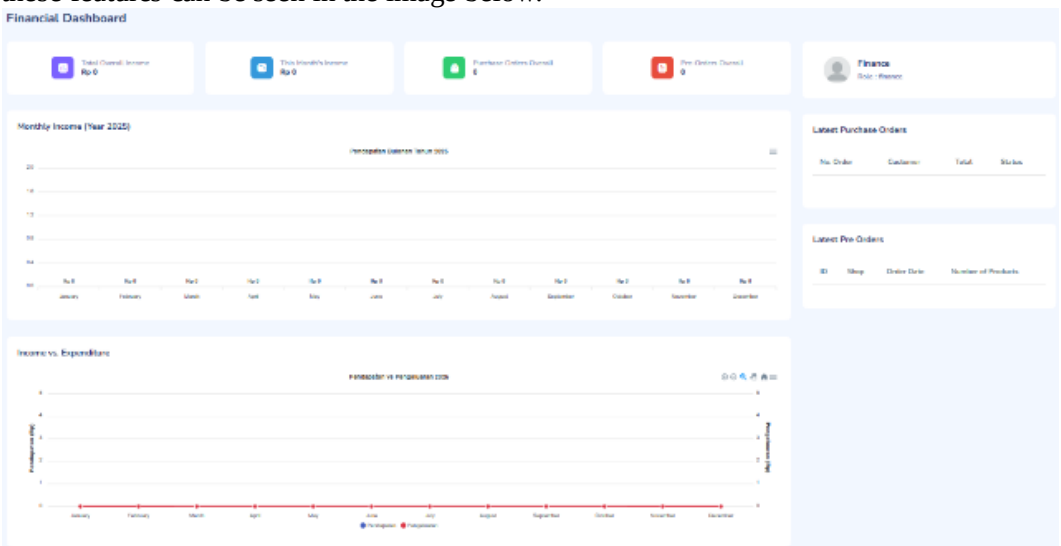

Figure 14. Finance dashboard interface

To support financial management, the system provides a dedicated dashboard that displays information on monthly income, a comparison of income and expenses, as well as the latest order data. The complete view of this dashboard can be seen in Figure 14.

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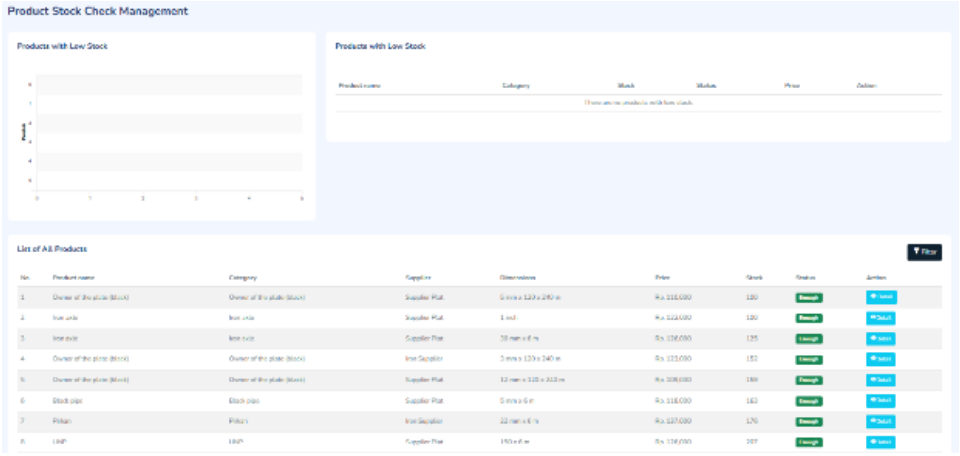

Figure 15. Product stock checking management interface

In addition, to ensure stock availability, the system is equipped with a product stock checking feature. This feature displays a depleting stock graph as well as a list of all available products. This interface is shown in Figure 15.

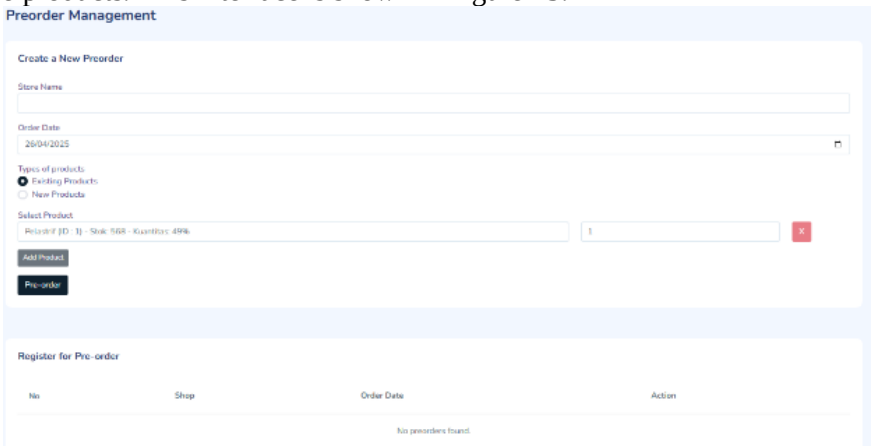

Figure 16. Pre-order management interface

To facilitate the recording of orders, the system provides a pre-order feature equipped with a fillable form. The interface of this feature is displayed in Figure 16.

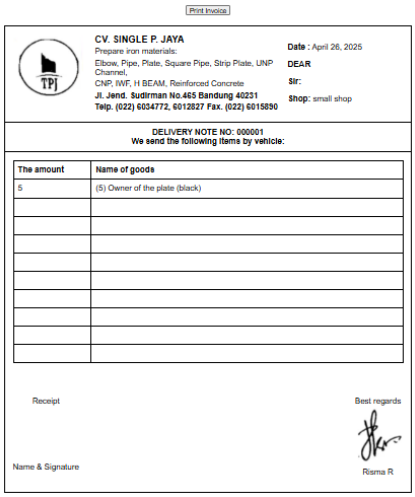

Figure 17. Automated invoice creation interface (pre-order)

After the pre-order form is filled out and saved, the system will automatically generate an invoice based on the entered data. An example of the generated invoice can be seen in Figure 17.

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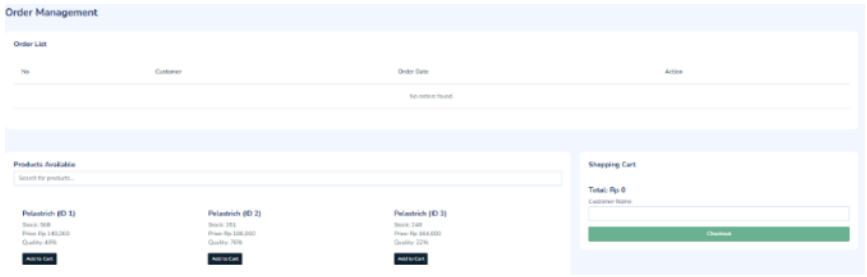

Figure 18. Order management interface

The system provides an order feature to handle the customer ordering process. This interface allows the admin to add products to the shopping cart and record the customer's name. The view of this feature can be seen in Figure 18.

Figure 19. Automated invoice creation interface (order)

After the order is successfully created, the system will automatically generate an invoice based on the order data. An example of the generated invoice can be seen in Figure 19.

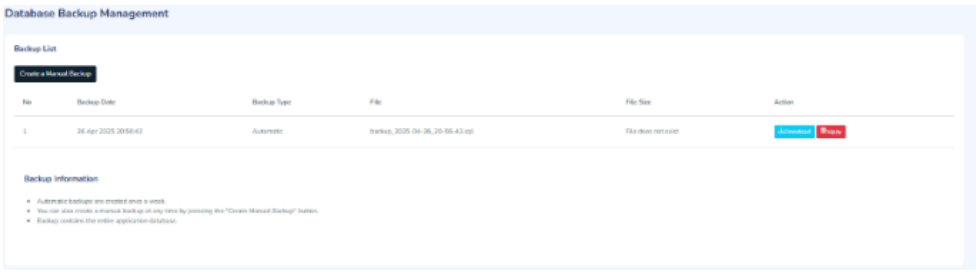

Figure 20. Database backup interface

To ensure data security, the system is equipped with database backup features, both manually and automatically on a weekly basis. The display of this backup feature is shown in Figure 20.

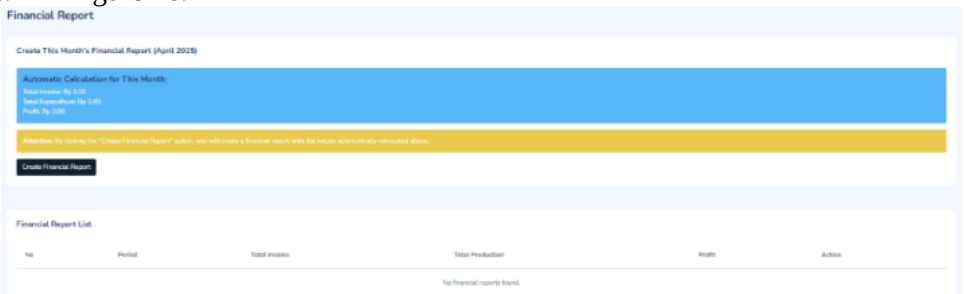

Figure 21. Financial report interface

 ISSN:2302-8149
e-ISSN:2540-9719

The system provides an automatic financial report generation feature that allows admins to produce monthly financial reports. Once the "Create Financial Report" button is pressed, the system will automatically calculate total income, total expenses, and profit. The results of this report will then appear in the report list and can be exported in Excel format. The interface of this feature can be seen in Figure 21.

2. Testing

Furthermore, the system is tested using the Black Box method. The test flow is executed according to the previously determined design, where the main focus is whether the system's performance output is successful or failed [16]. The test results are presented in Table 4.

Table 4. Black box testing

Actor	Feature	Scenario	Input	Output
Admin	Login	Successful login	Valid admin email and password	Successfully logged into the admin dashboard
		Failed login	Invalid admin email and password	Failed to log into the admin dashboard
	Logout	Successful logout	Click "Logout" button	Successfully logged out
	Manage Users	Add new warehouse staff	Warehouse staff data (name, email, password, password confirmation, profile image)	Warehouse staff successfully added
		Edit/Delete warehouse staff data	Edit/delete warehouse staff data (name, email, profile image)	Staff data successfully updated
		Add new finance staff	Finance staff data (name, email, password, password confirmation, profile image)	Finance staff successfully added
		Edit/Delete finance staff data	Edit/delete finance staff data (name, email, profile image)	Finance data successfully updated
	Check Product Stock	View product status	Access "Product Stock Check" menu	Displays list of products with stock status
		View products with low stock	Product stock reaches minimum threshold	Pre-order option appears
	Pre-Order	Create pre-order to supplier	Pre-order data (store name, order date, product type, product selection,	Pre-order successfully created, invoice can be printed

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			quantity)	
		View pre-order list	Access "Pre-Order List" menu	Displays list of pre-orders with actions
	Order	Add products to shopping cart	Select product and quantity	Product added to cart successfully
		Input customer name during order	Customer name	Order created successfully, invoice can be printed
	Database Backup	Perform database backup	Access "Database Backup" menu	Backup successfully created, file saved
Warehouse Staff	Login	Successful login	Valid warehouse staff email and password	Successfully logged into the warehouse staff dashboard
		Failed login	Invalid warehouse staff email and password	Failed to log into the warehouse staff dashboard
	Logout	Successful logout	Click "Logout" button	Successfully logged out
	Product Categories	Add new product category	Product category name and description	Product category successfully added
		View product category list	Access "Product Category List" menu	Displays list of product categories
	Supplier	Add new supplier	Supplier data (name, contact person, phone, email, address)	Supplier successfully added
		View supplier list	Access "Supplier List" menu	Displays list of suppliers
	Products	Add new product	Product data (supplier, name, category, dimensions, description, unit price, margin, stock quantity)	Product successfully added
		View product list	Access "Product List" menu	Displays list of products with details
Finance	Login	Successful login	Valid finance staff email and password	Successfully logged into the finance dashboard
		Failed login	Invalid finance staff email and password	Failed to log into the finance dashboard
	Logout	Successful	Click "Logout"	Successfully

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e-ISSN:2540-9719

		logout	button	logged out
	Check Product Stock	View product stock status	Access "Product Stock Check" menu	Displays list of products with stock status
	Financial Report	Create financial report automatically	Access "Create Financial Report" menu	Financial report successfully created
		View financial report history	Access "Financial Report History" menu	Displays list of financial reports

The description in Table 4 shows that the Black Box testing successfully proved that all features function well for all user roles, namely admin, warehouse staff, and finance.

3. Specific Evaluation Metric (User)

The description in table 5 presents a comparison of evaluation metrics that compare the time and efficiency improvements between the manual process (using Excel) and the web-based system for specific tasks frequently performed by users.

Table 5. Specific evaluation metric

Process	Manual Time	System Time	Time Reduction	Efficiency Improvement
Invoice Creation (Few Items)	5 minutes	1 minutes	4 minutes	80%
Invoice Creation (Many Items)	10 minutes	1 minutes	9 minutes	90%
Warehouse Stock Monitoring	30 minutes	1 minutes	29 minutes	96.67%
Financial Report Generation	10 minutes	1 minutes	9 minutes	90%
Total	**55 minutes**	**4 minutes**	**51 minutes**	**92.73%**

The description in table 5 shows that the web-based inventory information system significantly improves operational efficiency at CV Tunggal Putra Jaya by reducing the time needed to complete various specific tasks. Invoice creation, which previously took 5–10 minutes, now only takes 1 minute, resulting in an efficiency gain of 80–90%. Warehouse stock monitoring, which used to take 30 minutes, can now be completed in 1 minute, increasing its efficiency by 96.67%. The preparation of financial reports has also accelerated, from 10 minutes to 1 minute (90% efficiency). Overall, the system successfully reduced total operational time from 55 minutes to just 4 minutes, with an efficiency improvement of 92.73%. This makes business processes much more effective and work time more efficient.

4.6 Sprint Review

Features that have been completed according to the initial plan will be reviewed in a meeting at the end of each sprint. The goal is to present the developed product to users to ensure that the product being worked on meets their needs and allows for quick adjustments based on the feedback received.

Table 6. Sprint review

Feature Requirement	Estimated Work Time	Work Order	Actual Work Time	Review Decision
Admin, warehouse staff, and finance login	6 days	1	6 days	Successfully implemented
Admin dashboard	8 days	1	8 days	Successfully implemented
Warehouse staff management	4 days	2	4 days	Successfully implemented
Finance	4 days	2	4 days	Successfully

 ISSN:2302-8149
e-ISSN:2540-9719

management				implemented
Warehouse staff dashboard	6 days	2	6 days	Successfully implemented
Category management	4 days	3	4 days	Successfully implemented
Supplier management	4 days	3	4 days	Successfully implemented
Product management	6 days	3	6 days	Successfully implemented
Finance dashboard	6 days	4	6 days	Successfully implemented
Product stock check management	4 days	4	4 days	Successfully implemented
Pre-order management	6 days	4	6 days	Successfully implemented
Order management	6 days	4	6 days	Successfully implemented
Database backup	4 days	4	4 days	Successfully implemented
Financial report	6 days	4	6 days	Successfully implemented
System optimization and testing	6 days	4	6 days	Successfully implemented

Table 6 explains the evaluation results of each feature based on estimated completion time, order of execution, and actual time required. The review results show that all features were successfully implemented according to the initial plan without any delays or significant technical issues. This reflects that the system development was effective and met user expectations.

4.7 Sprint Retrospective

At this stage, the system development team evaluates the completed sprint. The goal is to check whether the work is progressing well, analyze aspects that need improvement, and determine steps for the next sprint.

Table 7. Sprint retrospective

Feature Requirements	Description	Sprint Retrospective Result
Login	Implementation of login for admin, warehouse staff, and finance roles	Successful
Admin Dashboard	Displays order statistics and financial summaries	Successful
Staff Management	Manage warehouse staff data	Successful
Finance Management	Manage finance staff data	Successful
Warehouse Staff Dashboard	Shows product category distribution and pie charts	Successful
Category Management	Add, edit, and delete product categories	Successful
Supplier Management	Manage supplier data	Successful
Product Management	Add, edit, and delete products	Successful
Finance Dashboard	Displays income and expense charts	Successful
Product Stock Monitoring	Monitor low stock products	Successful
Pre-order Management	Create pre-orders with	Successful

 ISSN:2302-8149
e-ISSN:2540-9719

	automatic invoice generation	
Order Management	Create orders with automatic invoice generation	Successful
Database Backup	Manual and automatic database backup	Successful
Financial Report	Generate financial reports and export to Excel	Successful
System Optimization and Testing	Final optimization phase before deployment	Successful

Table 7 shows the evaluation results of all the features that have been developed during the sprint process. These features are the result of user needs that have been described in user stories and the product backlog. Each feature used by the admin, warehouse staff, and finance has been successfully implemented without any issues. This proves that all features have been developed according to the initial plan by the development team.

5 Conclusion

This research successfully developed a web-based inventory information system for CV Tunggal Putra Jaya using the Agile Scrum method. This system significantly improves business operational efficiency, particularly in terms of data accuracy, real-time stock monitoring, and financial management through integrated reporting. As a result, task completion time was reduced by up to 92.73%. However, this system still has limitations, namely the absence of a mobile version, which can restrict user flexibility in accessing inventory outside the office. Therefore, developing a mobile version is an important step to enhance flexibility and ease of use in the future.

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