



Design and Construction of a Web-Based Information System for Product Performance Monitoring and Inventory Management at John Store

Farras Fadhlur Rohman¹, Nining Rahaningsih², Bani Nurhakim³

^{1, 2, 3}Manajemen Informatika, STMIK IKMI Cirebon, Indonesia

Email Author: farrasfr.193@gmail.com, niningr157@yahoo.co.id, baninurhakim@gmail.com

Article Info

Article history:

Received March 16, 2025

Revised March 30, 2025

Accepted April 16, 2025

Keywords:

Inventory Management

Product Performance

Monitoring

Waterfall Method

Web-Based Application.

ABSTRACT

It must be able to stand alone since abstracts are frequently given apart. The utilization of information technology has developed into a vital instrument in enhancing operational efficiency and business competitiveness, particularly in the medium-scale retail sector. Accurate inventory management is the primary foundation for business sustainability to maintain consistent customer satisfaction. However, John Store currently faces complex operational obstacles as it relies entirely on manual recording methods. The absence of a structured internal database system causes significant data synchronization issues between administrative records and physical stock in the warehouse, thereby increasing the risk of sudden stockouts. The most fundamental and crucial issue lies in managing bundling category products, where a single package transaction often fails to accurately deduct the stock balance of individual components due to the high risk of human error in manual calculation. To address this inefficiency, this research aims to build the web-based John Store Information System (SIJOHNS) as an integrated internal back-office solution. System development applies the Waterfall method systematically, covering requirements analysis, system design through Flowmap, Data Flow Diagram (DFD), and Entity Relationship Diagram (ERD), to implementation using PHP programming language and MySQL database. Key system features include the automation of bundling stock mapping and multi-role access rights management. Based on Black Box Testing, the system is proven valid. The implementation of SIJOHNS successfully transforms inventory management into a digital format, ensures the accuracy of stock deduction in real-time, and presents analytical data visualization on the dashboard to facilitate the store owner in monitoring sales trends for more strategic and targeted business decision-making.

Corresponding Author:

Farras Fadhlur Rohman,

STMIK IKMI Cirebon, Indonesia

Jl. Perjuangan No.10B, Karyamulya, Kesambi, Kota Cirebon, Jawa Barat 45131, Indonesia

Email: farrasfr.193@gmail.com



1. INTRODUCTION

The advancement of information technology and the internet has driven a fundamental transformation in consumer consumption patterns, shifting from physical store transactions to an online ecosystem leveraging marketplace platforms. In Indonesia, platforms such as Shopee, TikTok Shop, and Tokopedia have become the primary pillars for businesses to expand their market reach without geographical boundaries. The integration of digital technology has proven significant in assisting Micro, Small, and Medium Enterprises (MSMEs) in increasing sales volume and competitiveness through digital promotion strategies and transaction efficiency[1][2][3].

This trend not only opens up vast market opportunities but also necessitates more structured management of product, inventory, and sales data through an integrated information system. However, challenges arise as sales and stock reporting features on marketplace platforms typically provide data based on registered Stock Keeping Units (SKUs), which often represent bundled products as a single entity.

John Store, as the subject of this case study, frequently employs product bundling or composite product strategies (e.g., the complete Civil Servant Equipment Package). Reliance on raw marketplace data without an intermediary system (middleware) leads to the phenomenon of inventory decoupling, or a data discrepancy between bundled sales and physical warehouse stock. This complicates the monitoring of sales volume per individual unit and the synchronization of physical inventory.

Furthermore, internal inventory management for raw materials and packaging supplies, such as boxes, bubble wrap, and shipping labels, is still performed manually using spreadsheets. This reliance on manual tracking introduces operational risks, including data discrepancies, delays in critical stock information, and reporting inefficiencies[4][5]. Based on these urgencies, this research proposes a web-based information system design for product performance monitoring and inventory management to address the challenges of component stock data integration and raw material management.

2. LITERATURE REVIEW

2.1 Information System

Information systems are defined as integrated systems comprising hardware, software, databases, networks, and human resources that interact to transform data into valuable information. These systems play a pivotal role in supporting organizational operations, management control, and decision-making processes[6]. The implementation of structured information systems has been proven to enhance data accuracy and work effectiveness[7], particularly web-based systems, which offer rapid and organized data management[8].

2.2 Product Performance Monitoring

Product performance monitoring is the process of tracking sales activities to identify trends and performance variations within a specific period. Its objective is to evaluate the effectiveness of sales strategies and determine appropriate corrective measures[9].

2.3 Inventory

Inventory encompasses the stock of goods including (finished products, raw materials, and operational) supplies required to support business operations. Inventory management aims to ensure stock availability, prevent overstocking, and minimize the risk of stockouts[10].

2.4 Web-Based Information Systems

The system is developed as a web-based application, offering high accessibility and ease of maintenance via a browser[11]. This technology is deemed effective for MSMEs due to its flexibility in accessing data across various devices[12][8].

2.5 PHP (Hypertext Preprocessor)

It is utilized as a server-side programming language. PHP was selected due to its open-source nature, extensive database compatibility, and reliability in developing dynamic web applications at the MSME scale[13][10].

2.6 MySQL

It is utilized as a Relational Database Management System (RDBMS) to store product, transaction, and user data. MySQL is recognized for its stability, high performance, and effectiveness in handling transactional data within inventory systems[8].

2.7 Waterfall

The development method used is Waterfall, which is a systematic and sequential approach model starting from needs analysis, design, implementation, testing, to maintenance[14]. This method was chosen because the characteristics of the system requirements at John Store were clearly defined and had a stable scope, making it suitable for ensuring a structured development flow[10][7].

3. RESEARCH METHODS

The method used in the research “Design and Construction of a Web-Based Information System for Monitoring Product Performance and Inventory Management at John Store”. The method applied includes the stages of needs analysis, design, implementation, and system testing to produce an information system that is able to assist in monitoring product performance and managing inventory effectively and in an integrated manner.

3.1 Data Source

The data source for this final project uses primary data obtained directly from the research object, namely John Store, which has a production house in the Penggung area, Cirebon City. Through direct interaction with the owner and admin of John Store. The data collected includes:

1. Product data includes all detailed information regarding the product specifications managed by John Store. This entity not only contains individual product attributes such as nametags, Korpri pins, ties, and other attributes, but also defines the composition structure for bundled products.
2. Inventory data functions as a record of the physical stock conditions available in the storage warehouse.
3. Sales data contains historical transaction track records sourced from export reports from various marketplace platforms.

3.2 Data Collection Techniques

The data collection techniques used in this final assignment include two main methods: observation and interviews. A detailed explanation of these data collection techniques is as follows:

1. Observation: conducted by directly reviewing operational activities at the John Store production house. The main focus of the observation was to observe how the admin managed orders from various marketplaces.
2. Interviews: Interviews were conducted with the owners and admins of John Store to understand the specific needs of the back-office system.

3.3 Analysis

The needs analysis process was conducted through direct observation and interviews with involved parties, such as operational staff and the owner of John Store. The analysis involved directly reviewing the company's business processes to understand the need for a web-based monitoring information system. The analysis revealed that John Store required a system capable of processing sales data from various marketplaces more quickly and efficiently by integrating manual marketplace history checks into the internal computer system. The primary focus at this stage was determining crucial features such as automatic mapping of packaged products to individual items and bulk input.

3.4 System Design

System design aims to produce a clear and structured design based on the results of previous analyses. This process includes various modeling tools to visualize the system architecture:

1. Flowmap

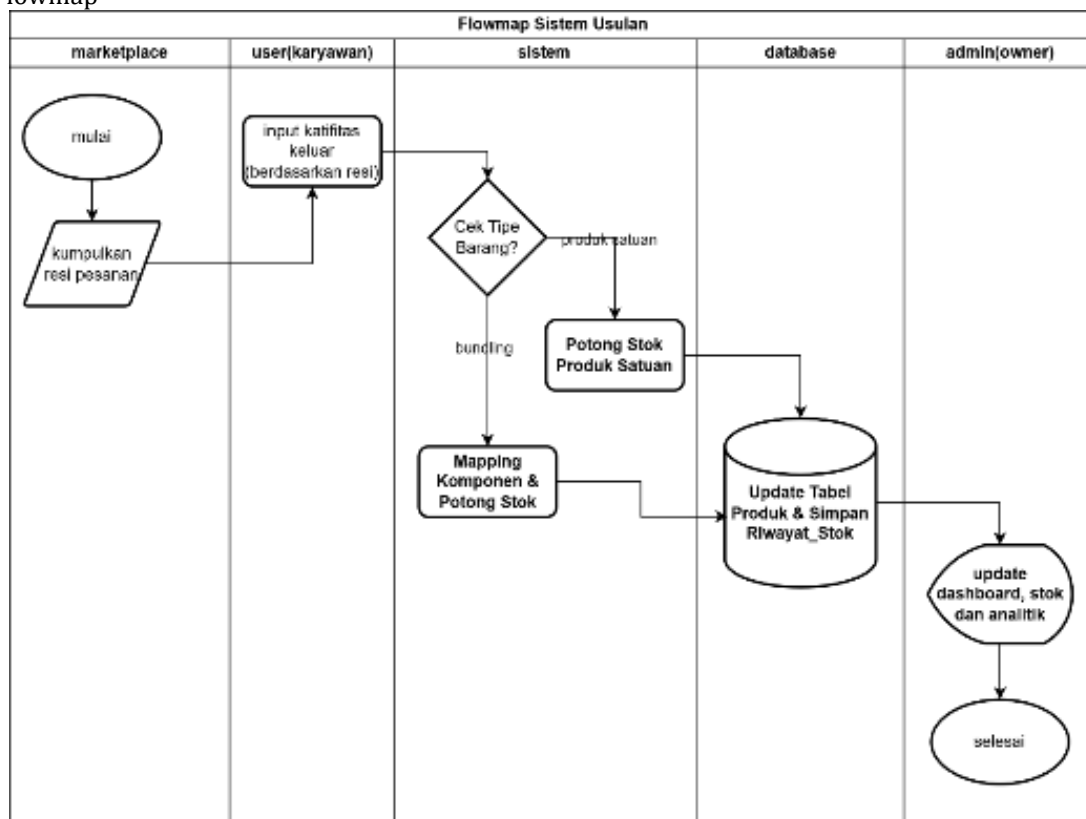


Figure 1. Proposed System Flowmap

The proposed system flowmap design describes the flow of documents and work procedures in the system systematically.

2. Flowchart

Automatic stock reduction logic synchronizes item data in real time. When a bundled transaction occurs, the system automatically maps components through a looping process, reducing the stock of each component item simultaneously and accurately without the need for additional manual input.

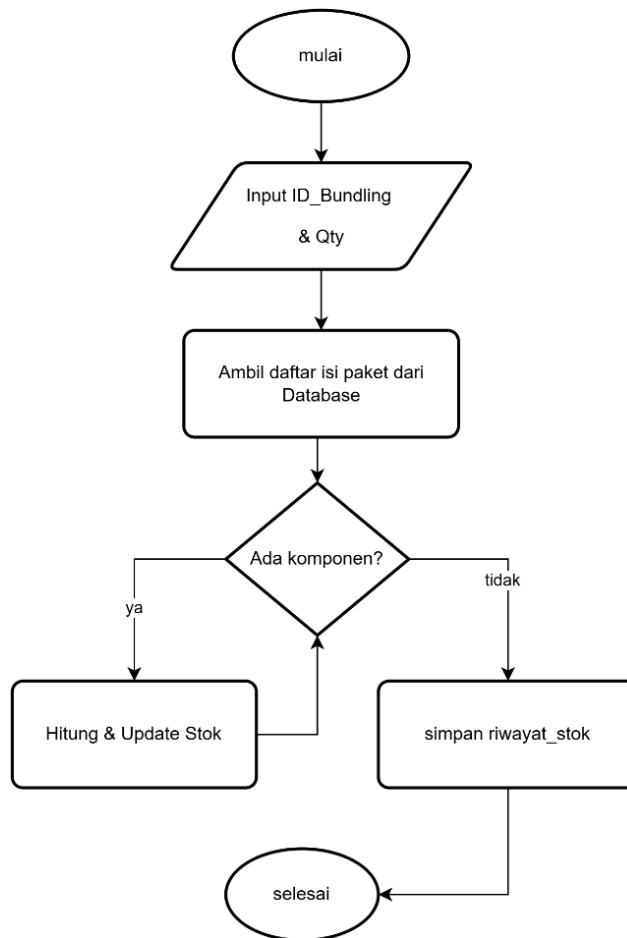


Figure 2. Bundling Stock Reduction Logic Flowchart

3. Data Flow Diagram (DFD)

A Data Flow Diagram (DFD) is used to depict the flow of data within a system, from external entities to processes to data stores. A DFD demonstrates how bundled transaction data is processed by the system, how it is stored, and how stock information is updated and displayed to users, based on established business rules.

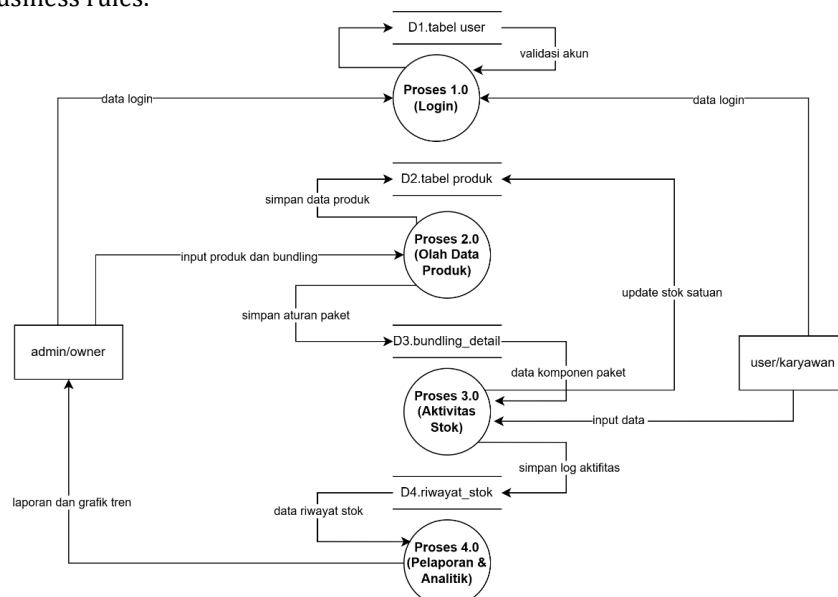


Figure 3. Data Flow Diagram (DFD) Level 0

4. Entity Relationship Diagram (ERD)

The database design uses an ERD to model the relationships between tables. The core of this system lies in the `bundling_detail` table, which links parent products to their component units, allowing stock update commands to be executed automatically based on predefined business rules.

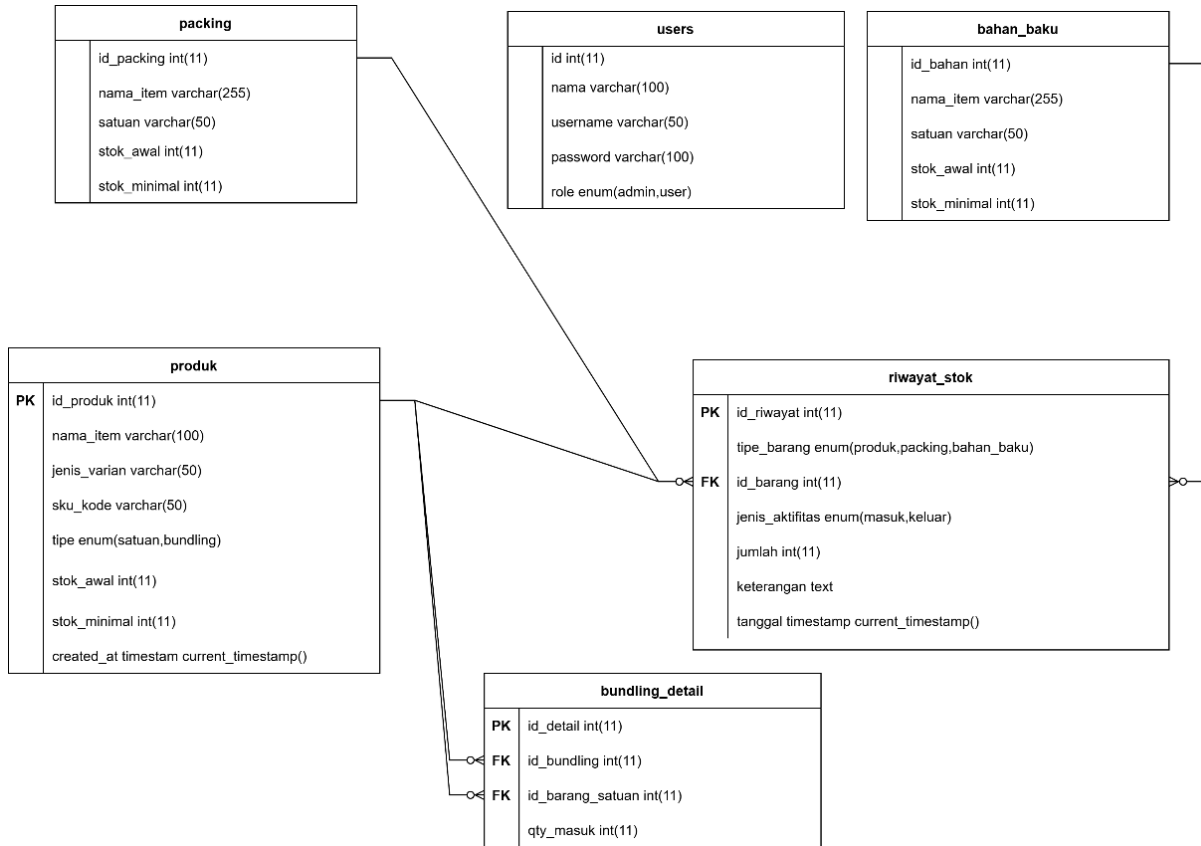


Figure 4. Entity Relationship Diagram (ERD)

3.5 Database Design (Table Structure)

The database implementation in the John Store Information System (SIJOHNS) was carried out by transforming the logical ERD design into a physical table structure. This database consists of six main tables that are interrelated to ensure the integrity of stock and transaction data. Each table is designed with a specific data type to optimize storage, and is equipped with Primary Keys and Foreign Keys to maintain consistency of relationships between data entities. The following is a detailed table structure used:

1. Users Table

This table is designed to handle system user authentication and authorization management. The role column uses an enum data type to strictly delimit access rights between 'admins' (owners) and 'users' (warehouse employees), ensuring operational data security.

Table 1. Users table

Name	Type	Index	Description
id	int(11)	Primary Key	User's unique ID
name	varchar(100)	-	User's full name
username	varchar(50)	-	Username for login
password	varchar(100)	-	Account password
role	enum('admin','user')	-	User access rights

2. Product Table

The Products table serves as the master data repository for all items sold. The type and sku_code columns are crucial in this table. The type column differentiates between individual items and bundled items, which then serves as a reference for the system's logic in automatically reducing inventory.

Table 2. Product Table

Name	Type	Index	Description
Product ID	int(11)	Primary Key	Unique product ID
Item Name	varchar(100)	-	Item name
Variant Type	varchar(50)	-	Variant (color/type)
SKU Code	varchar(50)	Unique Key	Unique item type SKU code
Enum('Unit','Bundling')	-	Type of product	
Initial Stock	int(11)	-	System initial stock
Minimum Stock	int(11)	-	Stock warning limit
Created at	timestamp	-	Data creation time

3. User Bundling Table

This table is a relational table (junction table) that plays a vital role in resolving the problem of package stock discrepancies. This table maps one bundled Product ID to several individual Product IDs and their quantities (qty_masuk), allowing the system to determine which components should be reduced in stock when a package is sold.

Table 3. Bundling Detail Table

Name	Type	Index	Description
id_detail	int(11)	Primary Key	ID detail bundling
id_bundling	int(11)	Foreign Key	Parent product ID (package) id_item_id
int(11)	Foreign Key	Unit product ID	-
(content) qty_entered	int(11)	-	Number of contents per package

4. Raw Material Table and Packing Table

To support John Store's internal production operations, the system separates the management of raw materials and packaging supplies from finished products. The structure of both tables is similar, recording item specifications, units of measurement, and minimum stock levels (stock_minimal) to trigger restock notifications.

Table 4. Raw Material Table

Name	Type	Index	Description
material_id	int(11)	Primary Key	raw material ID
item_name	varchar(255)	-	raw material name
Unit	varchar(50)	-	Unit (sheet/kg)
initial_stok	int(11)	-	Curent stock
minimum_stok	int(11)	-	minimum stock limit

Table 5. Packing Table

Name	Type	Index	Description
id_packing	int(11)	Primary Key	Packing equipment ID
Item_name	varchar(255)	-	Name of packing item
unit	varchar(50)	-	unit (dozen/pcs)
initial_stock	int(11)	-	Current stock
minimum_stock	int(11)	-	Minimum stock limit

5. Stock History Table

This table serves as an audit trail or digital record. Every incoming or outgoing item is recorded here. A key feature of this table is the `stock_before` and `stock_after` columns, which provide historical data transparency to facilitate tracking in the event of a discrepancy in the physical quantity of goods in the warehouse.

Table 6. Stock History Table

Name	Type	Index	Description
history_id	int(11)	Primary Key	Transaction history ID
item_type	enum(product,'packing'...)	-	Item category
item_id	int(11)	-	Related item ID
type_activity	enum('in','out')	-	Transaction type
amount	int(11)	-	Number of items in stock_before
int(11)	-	stock before transaction	-
stock_after	int(11)	-	stock after transaction
description	text	-	Additional note
date	timestamp	-	Transaction time

3.6 Implementation

The implementation phase involved transforming the design into program code using the PHP and JavaScript programming languages (using the Chart.js library), and MySQL as the database management system. In this phase, each designed function, particularly the feature for mapping packaged products to individual products, was technically implemented. This web-based system was built to support dynamic and interactive inventory data management and sales recapitulation.

3.7 Testing

After implementation is complete, the system is tested using black box testing. This testing is conducted to ensure that each function, such as sales data entry and automatic stock deductions, runs as required without having to examine the internal code structure. This is done to ensure that the system's reports are accurate and valid for operational needs.

3.8 Maintenance

The final step is system maintenance, which involves regular performance monitoring. This includes software updates to ensure data security, fixing bugs that arise during use, enhancing features based on user feedback, and performing regular data backups to prevent the risk of transaction data loss. A comprehensive evaluation is conducted to ensure the application continues to optimally support John Store operations.

4. RESULTS AND DISCUSSION

The system is built using the PHP technology stack for back-end logic and MySQL as a relational database management system (RDBMS). Functionally, SIJOHNS has successfully automated the process of mapping product stock in the bundling category and provides real-time monitoring features for three main stock categories: Individual Products, Raw Materials, and Packing Supplies.

4.1 System Test Results

Testing is carried out using the Black Box Testing method to ensure that the system functionality runs according to user needs.

Table 7. Black Box Testing Results

Test Scenario	Expected Results	Test Results	Conclusion
<i>Admin & User Login</i>	The system differentiates menus based on access rights (roles).	The system successfully displays the menu according to the role.	valid
Bundling Transaction Input	The stock of components is automatically reduced according to the number of packages.	Unit stock is automatically reduced.	valid
Incoming Goods Input	Stock increases in real-time.	stock increases.	valid
Critical Stock Notification	A warning appears if the stock is below the minimum limit.	A warning appears on the Dashboard.	valid

4.2 Dashboard Admin (Owner)

Focusing on high-level monitoring, displaying graphs of individual product expenditure trends, warnings of items that need to be restocked immediately, as well as notifications of the latest Admin Dashboard activities from employees (incoming, outgoing, and stocktaking activities).

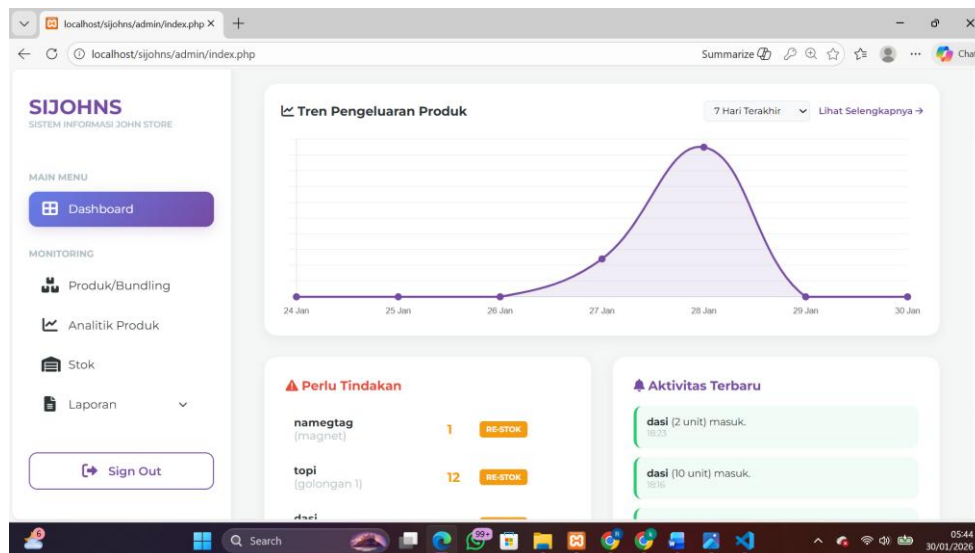


Figure 5. Admin Dashboard

4.3 User Dashboard (Employee)

Berfokus pada ringkasan operasional harian, menampilkan empat kartu jumlah item (Produk, Bahan Baku, Packing, Bundling) serta notifikasi aktivitas masuk dan keluar barang.

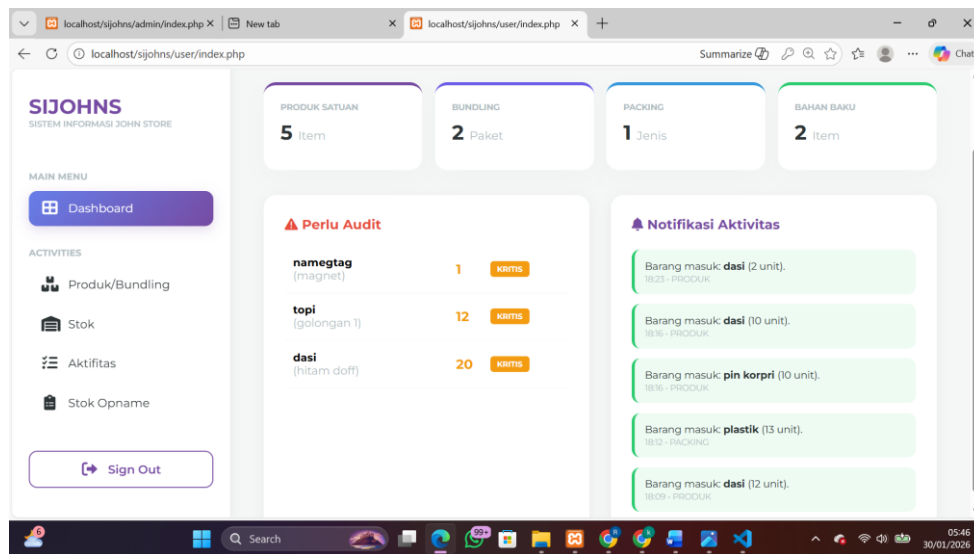


Figure 6. User Dashboard

4.4 Results of Stock Management and Bundling Implementation

The system provides a clear separation of stock displays for easy item identification. In the "Stock" menu, both Admins and Users can monitor inventory balances for Individual Products, Raw Materials, and Packaging through separate category tabs.

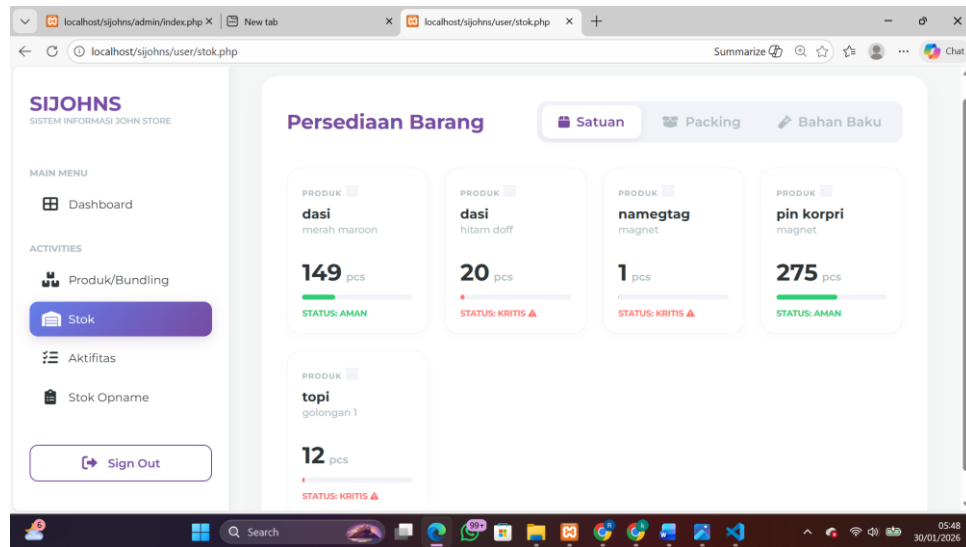


Figure 7. Stock Monitoring

This system's flagship feature is product bundling automation. Through the bundling_detail relational table, the system can recognize package contents. Implementation results demonstrate accurate stock synchronization, with component stock automatically decreasing when a package transaction is entered.

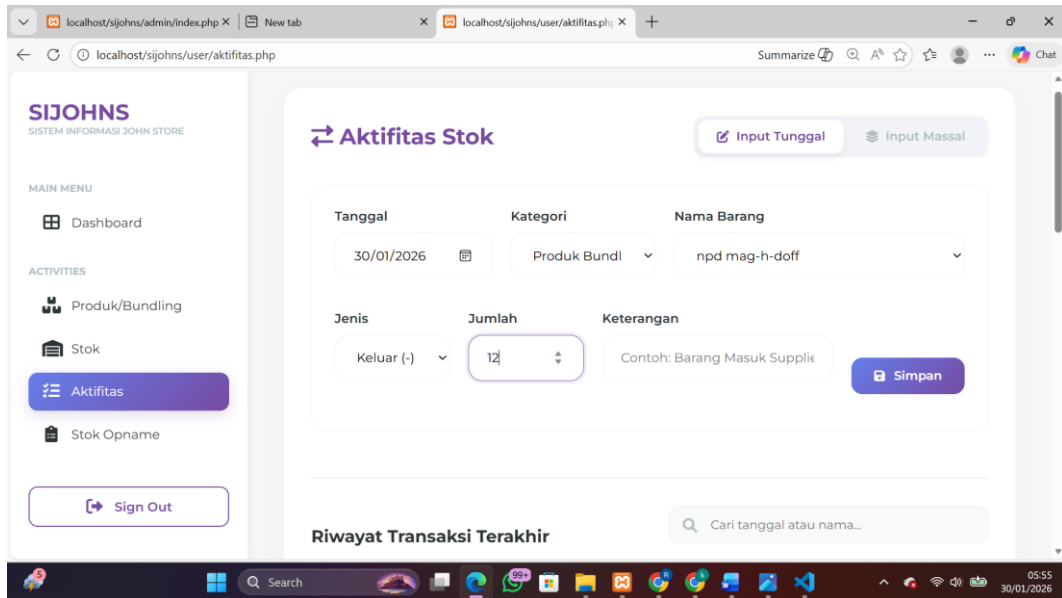


Figure 8. Bundling Data Input Process

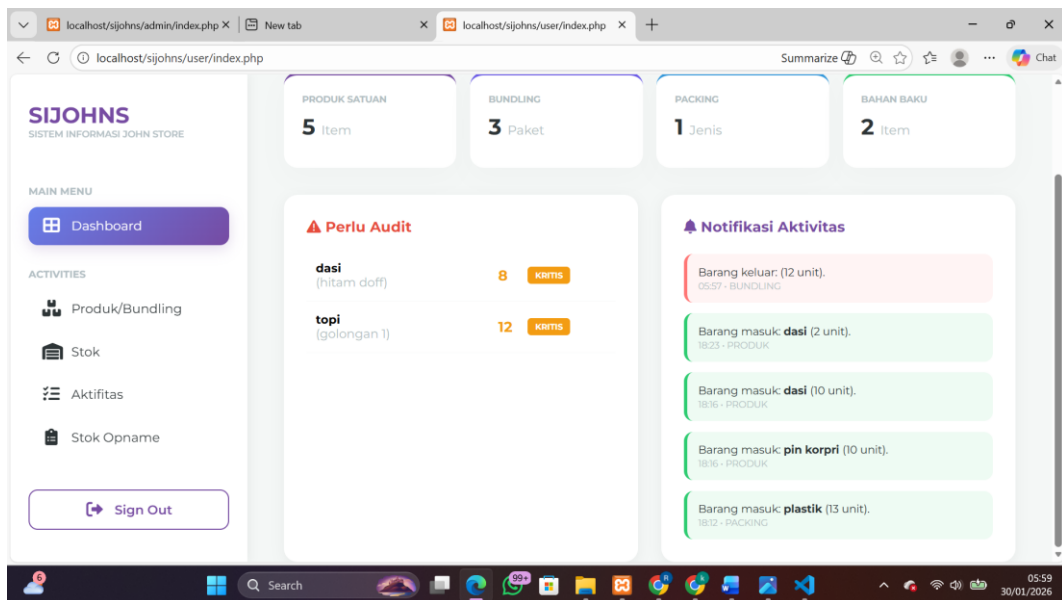


Figure 9. Successfully Inputted

4.5 Implementation of Stock and Stocktaking Activities

On the user side, the "Activities" feature allows for both single and bulk input of incoming and outgoing items. This feature is designed to expedite the warehouse administration record-keeping process.

The screenshot displays the 'Aktifitas Stok' form in the SIJOHNS system. The form is titled 'Aktifitas Stok' and has two tabs: 'Input Tunggal' (selected) and 'Input Massal'. The form contains several input fields: 'Tanggal' (Date) with a calendar icon, 'Kategori' (Category) with a dropdown menu, 'Nama Barang' (Item Name) with a search dropdown, 'Jenis' (Type) with a dropdown menu, 'Jumlah' (Quantity) with a text input, and 'Keterangan' (Description) with a text input. A 'Simpan' (Save) button is located at the bottom right of the form. Below the form, there is a section for 'Riwayat Transaksi Terakhir' (Recent Transaction History) with a search bar. The left sidebar shows the main menu with 'Aktifitas' highlighted.

Figure 10. Activity Input Form

Meanwhile, the "Stock Opname" feature is implemented to reconcile data between system quantities and physical quantities in the warehouse. This feature records stock discrepancies and the reasons for the changes for audit purposes.

The screenshot displays the 'Input Stok Opname' form in the SIJOHNS system. The form is titled 'Input Stok Opname' and has a 'Produk' dropdown menu. The form contains two input fields: 'Tanggal Opname' (Opname Date) with a calendar icon and 'Nama Petugas' (Employee Name) with a text input. Below the form is a table showing stock discrepancies for various items. The table has five columns: 'ITEM & VARIAN', 'SISTEM', 'FISIK (ASLI)', 'SELISIH', and 'KETERANGAN'. The table contains three rows of data:

ITEM & VARIAN	SISTEM	FISIK (ASLI)	SELISIH	KETERANGAN
dasi merah maroon	149	...	0	Catatan...
dasi hitam doff	8	...	0	Catatan...
namegtag magnet	188	...	0	Catatan...

The left sidebar shows the main menu with 'Stok Opname' highlighted.

Figure 11. Opname Stock

5. CONCLUSION

Based on the design, implementation, and testing results, the John Store Information System (SIJOHNS) has successfully transformed the stock management process at John Store from a manual method based on physical receipts to an integrated digital system. The implementation of automation logic in the bundling feature has proven effective in handling the complexity of packaged products, where the system is able to map and reduce the stock balance of individual products automatically when

a transaction occurs. This significantly minimizes human error and maintains real-time inventory data synchronization.

Furthermore, the clear division of access rights between Admin (Owner) and User (Employee) makes daily operational flows more structured, secure, and transparent. Support for analytical dashboard features and critical stock notifications provides store owners with clear visibility into inventory movement trends. This visual information facilitates faster and more accurate strategic decision-making, such as determining the right time to restock, because it is data-driven.

REFERENCES

- R. Fachrina and M. Nawawi, "Analisis Strategi Promosi Digital dan Efisiensi Transaksi pada UMKM," *J. Ekon. dan Bisnis*, 2022.
- A. Rahmawati and et al., "Peningkatan Volume Penjualan Melalui Integrasi Teknologi Digital," *J. Manaj. Pemasar.*, 2022.
- D. Saputri and et al., "Daya Saing UMKM dalam Ekosistem Toko Online," *J. Bisnis Digit.*, 2023.
- F. Ramadhan and et al., "Dampak Pencatatan Manual Terhadap Akurasi Stok pada Usaha Ritel," *J. Sist. Inf. Akunt.*, 2024.
- A. Rohman and S. Bhakti, "Perancangan Sistem Informasi Persediaan Berbasis Web Menggunakan PHP dan MySQL," *J. Inform. dan Rekayasa Perangkat Lunak*, 2022.
- A. Putri and I. Ahmad, "Peran Sistem Informasi dalam Pengambilan Keputusan Organisasi," *J. Manaj. dan Bisnis*, 2021.
- J. Rahmadoni and et al., "Pentingnya Landasan Teori dan Sistem Informasi Terstruktur dalam Penelitian," *J. Ilm. Teknol. Inf.*, 2021.
- Y. Triana, "Efektivitas Sistem Informasi Berbasis Web pada Skala UMKM," *J. Sist. Inf.*, 2024.
- M. Olva and et al., "Integrasi Data pada Sistem Informasi Inventori UKM," *J. Sains dan Teknol.*, 2021.
- D. Mulyadi and A. Susila, "Analisis Pengelolaan Inventori dan Penerapan PHP pada Sistem UMKM," *J. Akunt. dan Teknol.*, 2021.
- B. Setiawan, "Implementasi Teknologi PHP dalam Pengambilan Keputusan Manajerial," *J. Tek. Inform.*, 2020.
- S. Marli'aini and D. Anggoro, "Kemudahan Pemantauan Stok Melalui Sistem Inventori Terkomputerisasi," *J. Rekayasa Perangkat Lunak*, 2024.
- R. Fauzan and M. Ridwan, "Pemanfaatan PHP dalam Pengembangan Aplikasi Web Dinamis," *J. Inform.*, 2024.
- T. Kurniawan and H. Saputra, "Implementasi Metode Waterfall pada Pengembangan Perangkat Lunak," *J. Tek. Komput.*, 2022.