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Odoo-Based ERP System Design At Distribution Company

Rama Julian Dwi Andika[1], Sophia Fadhila Albany Tanjung[2]
[1,2]Teknik Industri, Universitas Singaperbangsa Karawang, Karawang, Jawa Barat
Jl. HS. Ronggowaluyo, Telukjambe Timur, Karawang
E-Mail: ramajulian318@gmail.com, sophia.fadhila@ft.unsika.ac.id

ABSTRACT

PT XYZ is a distribution company engaged in the sale of consumer products. Business processes in warehouse management are still carried out manually, resulting in various obstacles such as delays in stock recording, the risk of human error, and difficulties in tracking goods. This study aims to analyze system requirements and design a digital solution through the implementation of the Inventory module in Odoo ERP. The methods used include direct observation, interviews with related parties, and document analysis to understand the ongoing business processes and identify key problems. The results show that the existing system does not support real-time stock management automation, recording of goods receipts and expenditures, and effective reporting. The proposed solution is the design of an Odoo-based information system that includes the functions of goods receipt, goods expenditure, and stock mutation tracking with an easy-to-use interface integration. This document presents use case diagrams, activity diagrams, and a system requirements analysis as the basis for development. The conclusion of this study is that the implementation of Odoo Inventory can help improve warehouse operational efficiency, reduce recording errors, and provide accurate and up-to-date stock data to support managerial decision-making.

Keywords: *Warehouse Management, Information Systems, Odoo ERP, Inventory Management, System Requirements Analysis.*

Introduction

The development of information technology has brought significant changes to various aspects of company operations, one of which is warehouse management [1]. A reliable and integrated information system is essential for managing inventory to prevent excess or shortages that could hamper distribution and customer service activities. PT XYZ, a building materials distributor, currently relies on manual processes for recording incoming and outgoing goods, resulting in discrepancies between field data and administrative data. This problem creates inefficiencies in inventory management and increases the potential for human error and loss of goods [2].

Several previous studies have examined the implementation of ERP-based warehouse management information systems. [3] examined the implementation of the Odoo system in a logistics company and found improved inventory data accuracy. However, the study did not address integration with specific business processes such as building materials distribution. Meanwhile, a study by [4] highlighted the challenges of migrating from manual systems to ERP systems, but was limited to the manufacturing sector. This study addresses these shortcomings by focusing on building materials distribution and conducting a comprehensive system analysis, including mapping legacy business processes, identifying new system requirements, and proposing an Odoo Inventory-based solution [5]. The novelty of this study lies in the detailed integration of distribution business processes with Odoo module features and the application of a needs analysis approach based on mapping the current system.

Despite the growing body of literature on ERP implementation, particularly studies focusing on Odoo-based inventory systems, most prior research tends to emphasize technical deployment outcomes rather than in-depth system engineering analysis. Existing studies largely assess improvements in data accuracy or user satisfaction after implementation, but provide limited discussion on how ERP systems

are systematically aligned with complex, sector-specific warehouse operations. This creates a research gap in understanding how ERP solutions can be engineered to fit unique operational characteristics, especially in non-manufacturing distribution environments such as building materials logistics [6].

The warehouse operation at PT XYZ presents a distinctive case due to the nature of building materials distribution, which involves high product variety, irregular item dimensions, bulk handling, and frequent stock movement across multiple storage zones. Unlike manufacturing warehouses that rely on standardized production flows, PT XYZ's warehouse activities are driven by fluctuating customer demand, manual handling constraints, and inconsistent recording practices. These characteristics demand a more adaptive ERP configuration, making generic ERP implementation models insufficient to address operational inefficiencies and data discrepancies experienced in the company's current system [7].

This study contributes to the existing literature by offering a comprehensive system engineering perspective on ERP-based warehouse management. Rather than focusing solely on implementation success, the research systematically analyzes legacy warehouse processes, identifies operational bottlenecks, and translates business requirements into functional ERP specifications. The study also evaluates how Odoo Inventory features—such as stock movement tracking, location management, and real-time inventory updates—can be configured to support the specific workflow of a building materials distributor, thereby strengthening the operational relevance of ERP adoption [8].

The novelty of this research lies in its integrative approach that combines detailed business process mapping, requirements analysis, and ERP module configuration within a real distribution warehouse context. Unlike previous studies that treat ERP implementation as a technological upgrade, this research positions Odoo as a system engineering solution tailored to operational realities. By bridging the gap between warehouse operational needs and ERP system design, this study provides a replicable framework for distribution companies seeking to improve inventory accuracy, reduce manual errors, and enhance warehouse performance through ERP-based solutions [9].

This study explicitly aims to analyze and redesign the warehouse management information system at PT XYZ by focusing on inventory control and stock movement processes within the company's distribution warehouse. The research concentrates on warehouse-related functions, including goods receipt, storage, internal stock movement, and goods issuance, while excluding other ERP domains such as accounting, procurement planning, human resources, and sales order management. By clearly limiting the system scope, the study ensures that the analysis remains focused on operational inefficiencies that directly affect inventory accuracy and warehouse performance.

The primary objective of this research is to develop a structured system design for an ERP-based warehouse management solution using the Odoo Inventory module. The study emphasizes system analysis and design activities, including legacy business process mapping, identification of functional and non-functional system requirements, and alignment of warehouse workflows with available Odoo Inventory features. This design-oriented approach allows the proposed system to be grounded in actual operational needs rather than generic ERP implementation models.

Method

This research adopts a qualitative case study approach with a descriptive design to analyze the raw material inventory management system at PT XYZ and to develop an ERP-based solution using the Odoo Inventory module. The case study method was chosen to enable an in-depth understanding of real warehouse operations, business processes, and operational constraints within their actual organizational context. The research focuses on system analysis and design, accompanied by limited functional validation, rather than full-scale system implementation [10].

Primary data were collected from multiple sources to ensure a comprehensive understanding of the warehouse system. In-depth interviews were conducted with four key respondents who are directly involved in warehouse operations and inventory administration: one warehouse supervisor, one inventory administrator, one logistics staff member responsible for goods receiving and issuance, and one operational manager overseeing distribution activities. These respondents were selected purposively based on their roles and knowledge of the existing inventory management process. Each

interview session lasted between 45 and 60 minutes and was conducted once for each respondent, with follow-up clarification carried out when necessary [11].

Observations were conducted directly in the warehouse to capture actual inventory handling and recording practices. The observation process was carried out over a period of two weeks, with daily observation sessions lasting approximately 2–3 hours during operational hours. The observations focused on key activities such as receiving raw materials, recording incoming and outgoing goods, stock placement, and report preparation. In addition, internal company documents—including stock cards, raw material demand records, and inventory reports—were reviewed to support and triangulate the interview and observation findings. Secondary data were obtained from relevant literature, including scientific journals, books, and prior studies related to ERP systems and inventory management.

Data analysis was performed using descriptive qualitative analysis through several systematic stages. First, data from interviews, observations, and documents were classified and categorized based on warehouse process stages. Second, operational problems and inefficiencies in the manual system were identified and summarized narratively. Third, existing business processes were mapped and compared with the standard workflow supported by the Odoo Inventory module to identify gaps and system requirements. To ensure data validity, triangulation techniques were applied by cross-checking interview results with observation findings and document analysis. Member checking was also conducted by confirming key findings with the warehouse supervisor to ensure accuracy and consistency of interpretation. This methodological approach ensures alignment between data collection, analysis activities, and the resulting system design and functional validation [9]**.**

Results And Discussion

Business Processes Running

The warehouse submits the goods requirement to the Admin. The Admin verifies and sends the order to the Vendor. The Vendor ships the goods, and the Admin checks for conformity. If appropriate, payment is made. The goods are received and recorded by the Warehouse. The process is complete after all stages have been completed. This can be seen in Figure 1.

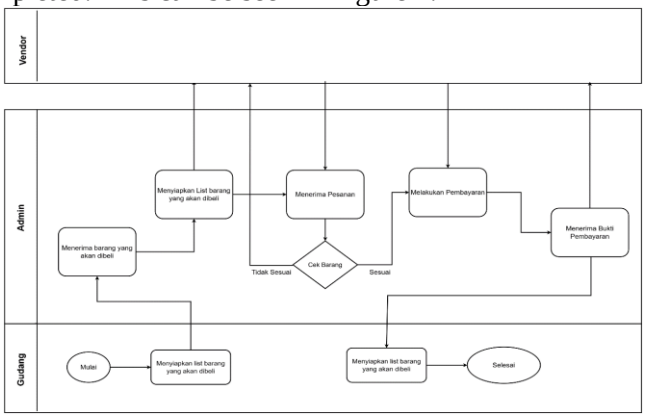

Figure 1. Current Business Process of PT XYZ

Needs, Weaknesses, Solutions

The purchasing system requirements at PT XYZ encompass the core functions of warehouse, administration, and vendor management, smooth communication, accuracy, neat documentation, and human resources and supporting tools. The manual Excel-based system results in errors and reporting delays. The proposed solution is the implementation of the Odoo ERP Inventory module to automate and integrate stock management, improving efficiency, accuracy, and inventory reporting [12].

Business Process

The proposed system utilizes an integrated database to improve the efficiency and accuracy of purchasing goods. The process begins with checking stock, compiling a needs list, purchasing from

vendors, and inputting goods data into the system. All activities are digitally documented, supporting effective monitoring and evaluation by addressing functional, non-functional, and resource requirements. Figure 2 shows this.

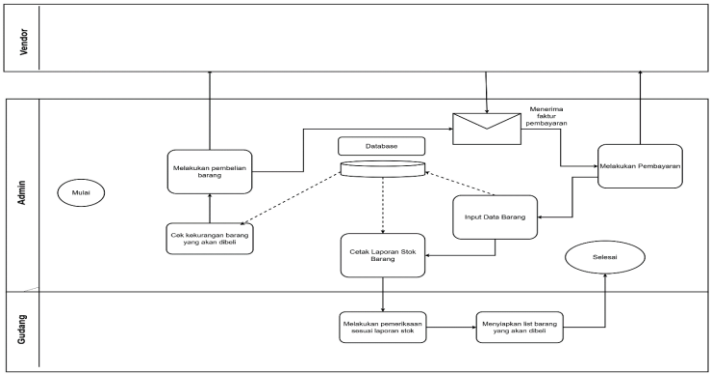

Figure 2. Proposed Business Process

Identify Needs

System requirements for the purchasing process include functional, non-functional, and resource requirements. Functionally, the system must be able to print stock reports, verify stock shortages, input and update data, record transactions, generate supporting documents, integrate between departments, and monitor transaction history. Non-functionally, the system must be easily accessible in real time, secure with authentication and backup, easy to use, stable, and responsive. The resources required include hardware (computers, servers), software (databases and applications), trained human resources (Admins and Warehouse), and system guidance and training [13].

Stocktaking Process Using the Odoo Inventory Module

The stocktaking process at PT XYZ is crucial for ensuring a match between system data and the physical condition of goods in the warehouse. By using the Odoo ERP system, which includes the Inventory Valuation feature, the company can monitor the quantity, location, and value of goods in real time. This system supports accurate data verification, accelerates the stocktaking process, reduces manual errors, and simplifies reporting and documentation. Implementing Odoo not only improves the efficiency and accuracy of inventory management but also supports more informed and strategic decision-making for the company.

Use Case Diagram

The Use Case Diagram illustrates the admin's interaction with the system, encompassing four main functions: Login, Manage Menu, Manage Storage, and Reports. As the sole actor, the admin has full access to manage item data, warehouse stock, and print reports. This diagram shows the system's scope and the relationships between features used in the overall inventory management process. Figure 3 is shown below.

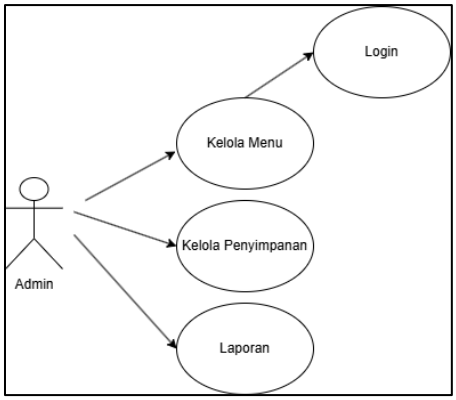

Figure 3. Use Case Diagram

Login Activity Diagram

The login activity diagram shows the flow when the admin enters a username and password, the system verifies it against the database, then grants access if the data is valid, or denies it if it is not. This process ensures the security of user access. Figure 4 is below.

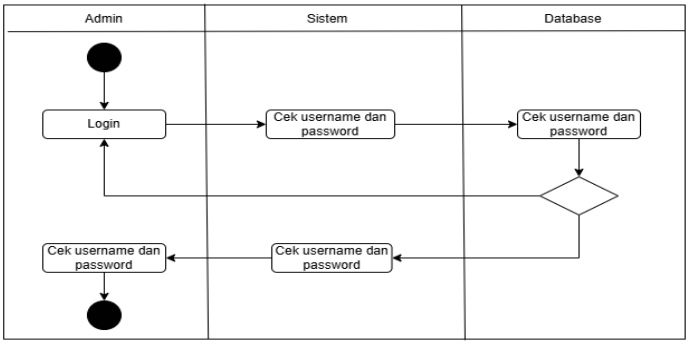

Figure 4. Login Activity Diagram

Product Data Activity Diagram

This activity diagram illustrates the admin's flow when accessing and printing an item data report through the system. Starting with selecting the item data menu, the system sends a request to the database, then displays the data after validation. The admin then chooses to print, and the system provides the option to print or cancel. If approved, the report is printed. This diagram emphasizes the structured interaction between the admin, the system, and the database in managing item data reports. Figure 5 is shown below.

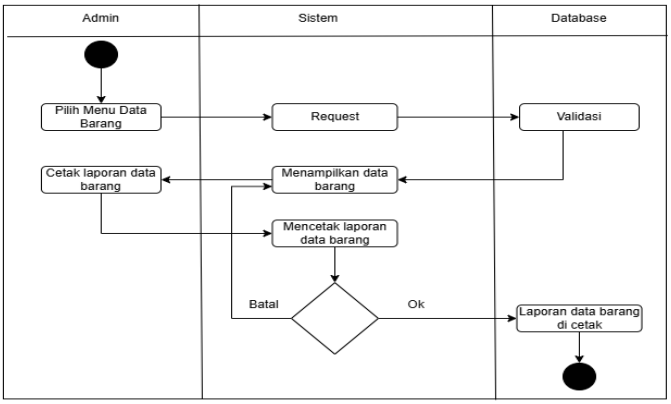

Figure 5. Activity Diagram of Goods Data

Goods Receipt Activity Diagram

This activity diagram shows the admin's flow when accessing goods receipt data through the system, starting from selecting the receipt menu, the system sending a request to the database, data validation by the database, and finally displaying the receipt page. The admin then views the displayed data. This diagram illustrates the systematic and interactive process between the admin, the system, and the database in supporting goods receipt management. Figure 6 is shown below.

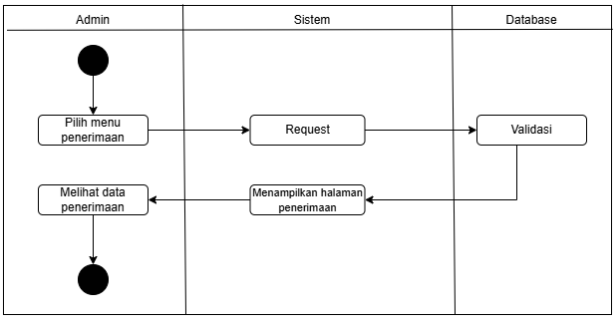

Figure 6. Goods Receipt Activity Diagram

Goods Delivery Activity Diagram

This activity diagram illustrates the admin's flow in accessing shipping data, starting with selecting the shipping menu, the system sending a request to the database, the database validating the data, and then displaying the shipping page for the admin to view. This diagram demonstrates the automated interaction between the admin, the system, and the database that supports efficiency and accuracy in shipping management. Figure 7 is shown below.

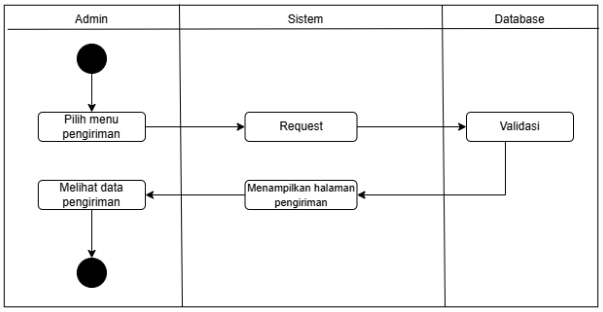

Figure 7. Goods Delivery Activity Diagram

Physical Inventory Activity Diagram of Goods

This activity diagram illustrates the Admin's flow in accessing physical inventory data, starting from selecting the inventory menu, the system sending a request to the database, the database validating the data, and the system displaying the data. This process demonstrates the structured interaction between the Admin, the system, and the database in providing accurate data to support inventory management and decision-making, as shown in Figure 8.

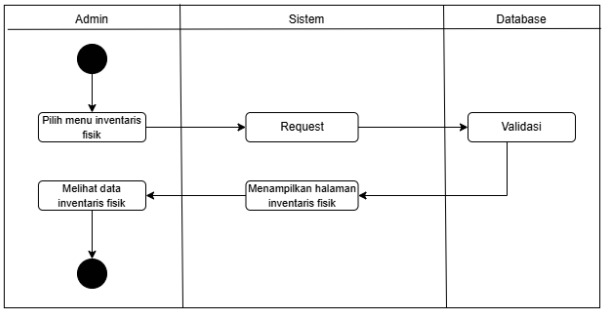

Figure 8. Physical Inventory Activity Diagram of Goods

Activity Diagram for Goods Data Disposal

This activity diagram illustrates the Admin's flow in accessing inventory disposal data, starting with menu selection, the system sending a request to the database, data validation by the database, and finally the inventory disposal data being displayed by the system. This process demonstrates the automated interaction between the Admin, the system, and the database to ensure efficient and accurate inventory disposal management. Figure 9 is shown below.

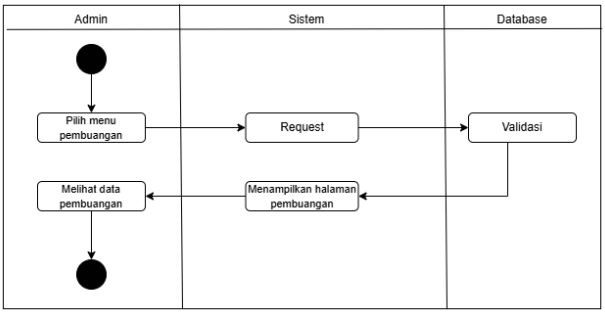

Figure 9. Activity Diagram of Goods Data Disposal

Sequence Diagram for Managing Inventory Stock Data

This sequence diagram illustrates the sequence of interactions between the Admin and the system in the inventory management process, from logging in, recording incoming goods via the Goods Receipt Form, to sending data to suppliers via the Supplier Send Form. Each input data is automatically stored and confirmed by the system. This diagram demonstrates the Admin's central role and how the system systematically responds to each action to support efficient inventory management. Figure 10 shows this.

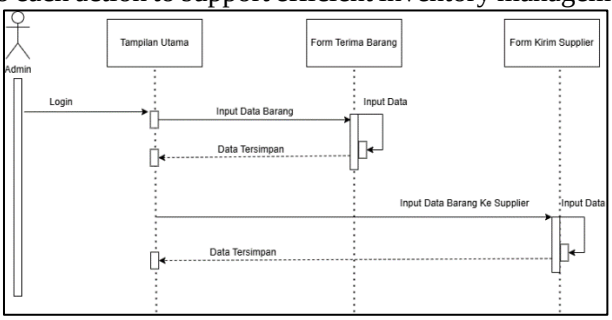

Figure 10. Sequence Diagram of Goods Data

Analysis and Discussion

The system allows PT XYZ to monitor inventory data in real-time and in a structured manner, displaying key information such as product name, unit price, and stock quantity [14]. This minimizes recording errors compared to manual methods such as Excel. In addition to basic data, the system also displays details such as lot codes, descriptions, categories, and product attributes, supporting more accurate inventory management and more informed decision-making (see Figure 11).

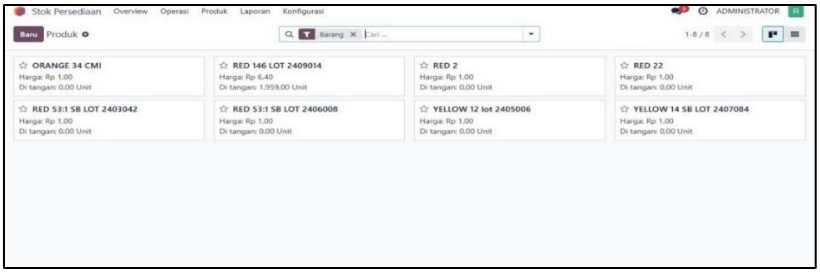

Figure 11. Display of the Products Menu in the Odoo Inventory Module

The Receipts menu in the Inventory Stock module systematically displays goods receipt data, including document references, schedules, and completion status. Each transaction is recorded with a unique code and a status such as "Completed" to indicate receipt completion. This system facilitates accurate tracking, prevents duplication or loss of data, and expedites inventory recording. With this feature, PT XYZ improves warehouse efficiency and supports more reliable data-driven decision-making, as shown in Figure 12.

Figure 12. Receipt Menu Display in Odoo Inventory Module

The Shipping menu in the Inventory Stock module serves as the central point for monitoring and managing goods leaving the warehouse, both for customers and internal distribution. This view displays critical information such as document reference, destination, schedule, and delivery status—for example, the “Waiting” status for code WH/OUT/00001. This feature allows PT XYZ to track

transactions in real time, speeding up decision-making and minimizing recording errors. Furthermore, the system improves warehouse operational efficiency and strengthens logistics control, creating a transparent and well-documented workflow as shown in Figure 13.

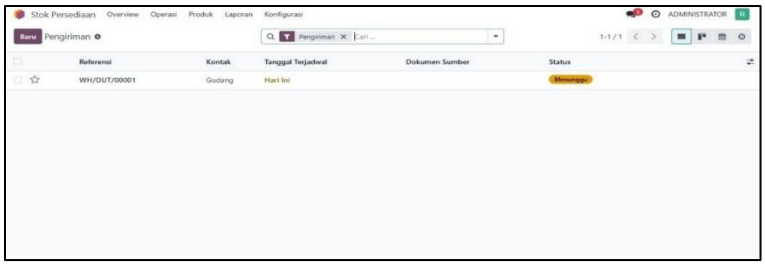

Figure 13. Shipping Menu Display in Odoo Inventory Module

Previously, PT XYZ faced challenges with manual inventory management, which often led to data discrepancies and reporting delays. The solution came through the Inventory Stock Adjustment feature in the Odoo system, which allows for immediate and transparent data correction. This feature records actual versus system quantities, as well as adjustment dates, with automatic detection of stock discrepancies. Users can immediately approve changes through the "Assign" option. This process supports various types of adjustments, reduces the risk of human error, speeds up audits, and improves the accuracy and integrity of PT XYZ's inventory data. Figure 14 shows this.

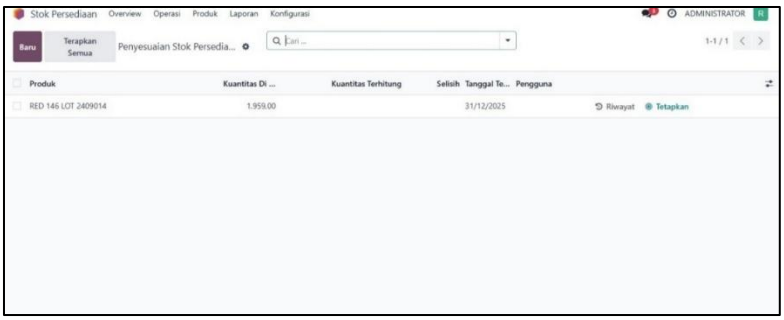

Figure 14. Physical Inventory Menu Display in Odoo Inventory Module

The Discard Order menu in PT XYZ's stock management system provides an efficient and structured solution for handling damaged or unusable goods. The disposal process is systematically recorded, from product, date, quantity, to completion status. This feature ensures accurate stock write-offs, reduces manual recording errors, and maintains transparency with detailed information such as product name and lot number. Real-time confirmation and status accelerate financial reporting and maintain data integrity. This menu supports operational efficiency and accountable and professional inventory governance, as shown in Figure 15.

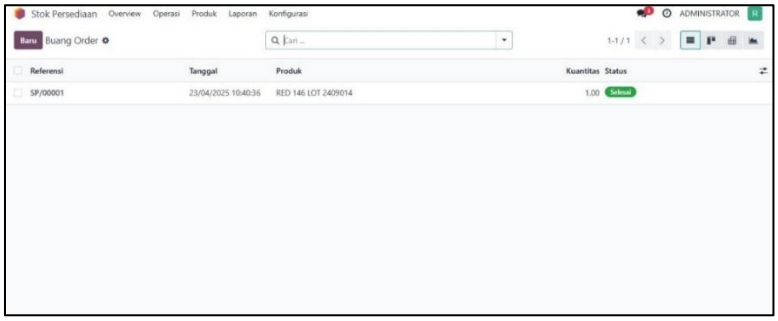

Figure 15. Disposal Menu View in Odoo Inventory Module

Conclusion

This study concludes that the implementation of an Odoo-based ERP system at PT XYZ provides a significant contribution to improving warehouse inventory management from a system engineering perspective. The main contribution of this research lies in the structured analysis and design of an ERP-based warehouse management system that is tailored to the specific operational characteristics of a building materials distribution company. By mapping legacy manual processes and aligning them with Odoo Inventory functionalities such as Inventory Adjustments, Scrap Orders, and Internal Transfers the proposed system demonstrates its ability to increase data accuracy, reduce manual errors, and enhance operational efficiency. Beyond technical improvements, the study also contributes methodologically by presenting a systematic approach for analyzing and designing ERP-based warehouse systems that can be replicated by similar distribution companies transitioning from manual to integrated digital systems [15].

However, this research has several limitations that should be acknowledged. The study focuses primarily on system analysis, design, and limited functional validation, without conducting a full-scale implementation, long-term performance measurement, or comprehensive user acceptance testing. In addition, the evaluation of system effectiveness is based on qualitative assessments and operational observations rather than quantitative performance indicators such as inventory turnover rate, order fulfillment time, or cost efficiency metrics [16]. Future research is therefore recommended to extend the implementation across other organizational divisions, integrate additional ERP modules such as accounting and procurement planning, and employ quantitative performance measurements to evaluate the long-term impact of ERP adoption. Further studies may also explore user behavior, change management, and training effectiveness to ensure sustainable ERP utilization within distribution companies.

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