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Business Process Reengineering for Inventory Module Manufacturing Company using Odoo V12.0 Application

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Abstrak

Enterprise Resource Planning digunakan oleh perusahaan manufaktur untuk membangun integrasi, dan meningkatkan kinerja perusahaan. Penelitian yang dilakukan bertujuan untuk memberikan usulan bisnis proses reengineering pada departemen inventory dengan menggunakan aplikasi Odoo V12.0 Community Edition, agar bisnis proses dapat terintegrasi. Metodologi yang digunakan yaitu BPR (Business Process Reengineering), dimana penelitian yang dilakukan difokuskan pada modul inventory. Bisnis proses yang sedang berjalan di perusahaan yaitu penerimaan bahan baku, pencatatan produk, pengiriman, dan pelaporan masih dilakukan secara manual tanpa menggunakan sistem. Reengineering yang sudah dilakukan yaitu pencatatan dan penerimaan bahan baku melalui sistem Odoo V12.0, pencatatan produk di dalam database Odoo V12.0, pencatatan dan pengiriman produk melalui sistem Odoo V12.0, Pelaporan otomatis, dan request pembelian secara otomatis melalui reordering rules. Reengineering sudah berjalan cukup baik, dan sudah diuji menggunakan metode User Acceptance Test. Peneliti memperoleh respon yang cukup baik. Adapun hasil yang diperoleh untuk departemen inventory yaitu 1215 dari 1760 (hasil positif).

Kata kunci: *Business Process Reengineering, Enterprise Resource Planning, Odoo V12.0, Inventory, User Acceptance Test.*

Abstract

ERP is used by manufacturing companies to build integration and improve company performance. In this case, this research aims to provide a business process reengineering proposal to the inventory department through Odoo V12.0 application to make the business process could be integrated. The methodology used is Business Process Reengineering, where the focus is on the inventory module. However, the currently running business processes in the company namely receiving materials, product registration, and reporting are still done manually without using the system. Meanwhile, the reengineering that has been done were registration and receiving materials through Odoo system, products registration in Odoo database, registration and shipping products through Odoo system, automatic reporting, and automatic purchase request through reordering rules. Afterward, reengineering has been running well and tested using User Acceptance Test. Hereafter, the researcher received good response with the result obtained for the inventory department was 1215 from 1760 (positive result).

Keywords : *Business Process Reengineering, Enterprise Resource Planning, Odoo V12.0, Inventory, User Acceptance Test.*

1. Introduction

Most companies have used information system in managing and improving the company quality. Information system is the interaction used to support the activity with the use of information technology [1]. The sales process is an activity that requires the use of information system because it is very helpful and has important role in processing the customer data, making invoice and goods data so it could carry out the sales process [2]. The sales department will directly deal with the inventory and production departments to find out the number of goods availabilities. Therefore, an integrated information system is needed to help

the company's business process.

The integrated system could be optimally implemented by using ERP or Enterprise Resource Planning method. According to Dewi (2008), ERP or Enterprise Resource Planning is the development of Manufacture Resource Planning II or MRP II which is the evolution of the previously developed Material Requirement Planning. One of the manufacturing industrial companies is PT. XYZ which is engaged in Chicken Slaughterhouse. PT. XYZ has several departments such as sales, inventory, production, and others. Each department has its own tasks. From the result of the interview conducted previously with the head of Purchase and Inventory Department, there were several problems found. Those are at the Inventory Department, in which there is no special system to handle this department that caused many processes are still carried out manually including the recording and reporting.

The research used as the reference is the implementation of ERP for the Information System of Purchasing, Sales, and Drug Inventory at Jaya Padang Herbal Central Pharmacy conducted by Ricky Akbar and Riza Perdamaian. This study discusses the implementation of ERP Odoo System at pharmacy to manage the purchasing, sales, and inventory units. Because the pharmacy does not have any information system, the researcher needs to do business process reengineering and implementation on Odoo as the solution to the existing problem.

Based on the ongoing business process at PT. XYZ, it is necessary to do Business Process Reengineering to optimize business activities and improve customer service [1]. The implemented reengineering will use Odoo V12.0 application and specifically implemented for Inventory Department. Odoo is an ERP open-source software which called as TinyERP previously then called as OpenERP and now called as Odoo which has been downloaded and used by more than 2 million companies. Odoo is a software version 8 of OpenERP. This Odoo application has additional facilities consisting of a website builder, e-commerce, point of sale, and business intelligence [2].

2. Research Methodology

This research was done in six stages, namely literature study, data collection, data processing, data analysis, system testing and implementation, as well as conclusion and suggestion. The application used was the open-source application Odoo V12.0, and the method used was BPR or Business Process Reengineering.

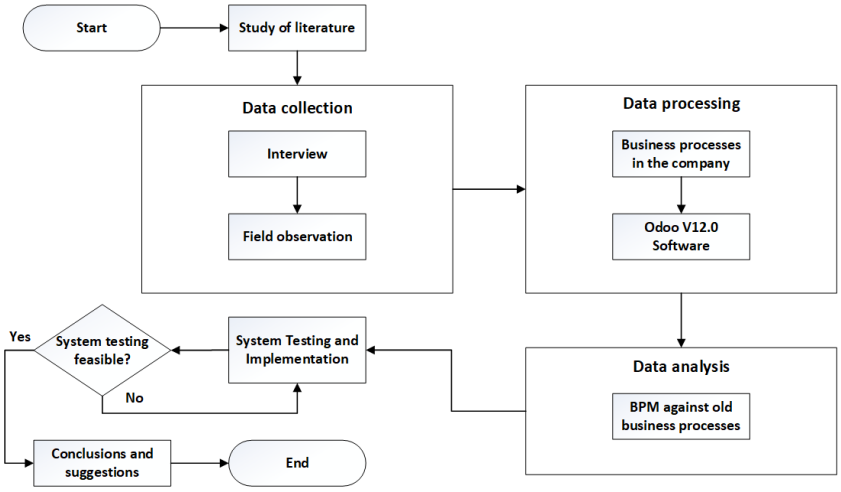

Figure 1. Research Methodology

2.1. Literature Study

The first stage which is literature study is carried out by collecting theories, models or methods that are related to the research problems about ERP, BPM and ERP Odoo software. The sources used as literature study were journals, books, scientific papers, or articles to support the ground theory which will be used also as the basis and reference for this research.

2.2. Data Collection

The data collection stage was done using two methodologies, namely direct observation and interview. The interviews were conducted in face-to-face and direct question and answer with the head of company department and the staffs assigned at each process.

2.3. Data Processing

After all the required data has been collected, the data were processed. In this case, the data were the results of direct observation and interviews conducted previously. The obtained data were processed by using ERP Odoo software. Data processing includes the business processing of the company's existing process.

2.4. Data Analysis

Data analysis was the process of BPM implementation to changes, adjustments, and improvements to the company's business processes by using ERP software namely Odoo. The existing business processes in the company will be inputted into the Odoo software.

2.5. System Testing

System testing and implementation was carried out to test the system's validity at the company based on the previous data analysis. System testing and implementation was done by testing the new system toward the old system and distributing the questionnaire about the user perception toward Odoo application. If the system is considered as valid in the system testing, the next stage is conclusion and suggestion. However, if the system is considered as not valid at the system testing, system testing will be carried out again or the application will be customized to suit the company's needs.

2.6. Conclusion and Suggestion

This stage contains conclusion and suggestion for the research conducted. In addition, the researcher provide suggestion related to the implementation of the application and suggestion to the company.

3. Literature Review

The concepts in this research come from literature review in form of articles, scientific journals, research reports, books, and internet sites that are used as references in this research.

3.1 Information System

Information system has many definitions from many experts. According to McLeod (2001), information system is a system that has the capability to collect and unify information from various resources as well as display the information by using various medias. Tata Sutabri (2005) added that information system is a system that connects the need for daily transaction data processing in an organization that has a managerial nature in strategic activities within an organization that is able to support the organization's functions in providing the outsiders information related to the required reports.

3.2 Inventory

Inventory is a very important business unit in a manufacturing company. The warehouse is a building or unit that is used to store, keep, and manage existing goods in the company. The goods or products stored in the inventory could be the raw material, parts, intermediate good, or processed good by the manufacturing unit [4].

3.3 Enterprise Resource Planning (ERP)

ERP or Enterprise Resources Planning is consisted of 3 words elements, the first term is Enterprise or company, the second term is Resource or property, and the third term is Planning or preparation. Those three terms describe a concept that ends in a working term, namely "planning", which could be concluded that ERP focuses on the planning aspect [5]. Wijaya and Darudiato stated that Enterprise Resources Planning (ERP) is a concept used to manage and plan the resource in a company. Therefore, it could streamline the company

performance and gain maximum profit for both the company and other parties who have interest with the company [6]**.**

3.4 Business Process Reenginering

Business Process Reengineering or BPR is a process of radical rearrangement of business process and its fundamental which aims to dynamically improve the company performance to gain profits for the company and related parties. Business Process Reengineering (BPR) is a brief and extreme change in redesigning strategies, additional value in business system and process, structure and rule in company or organization that could support business activities, as well as to maximize the workflow and productivity in the organization or company [7].

3.5 Odoo V12.0

OpenERP or now called as Odoo is a management software system based on phtyon equipped with various modules to run the company business activities. Fabien Pinckaers started developing Odoo in 2012, but Odoo was officially released in 2005 with open-source software. In its project development, there are 1500 developers who have participated in Odoo software development and more than 500 companies as members of official Odoo partners.

4. Result and Discussion

Result of study contain the discussion about the conducted research. Result and discussion consist of the ongoing inventory business process, business process reengineering, Odoo implementation, and the results of the testing process.

4.1. Inventory Business Process

The company's existing business process involve four departments, those are sales, purchase, inventory, and manufacturing. The business process of existing inventory starts from sales department, in which the purchase department will purchase raw material based on the sales order in the sales department. After the purchase department has finished the purchasing process, the raw material will be received by the inventory department and then forwarded to the manufacturing department. The next stage is the inventory department will receive the finished product from the manufacturing department and store it in the Chill Room or Cold Storage based on the product category.

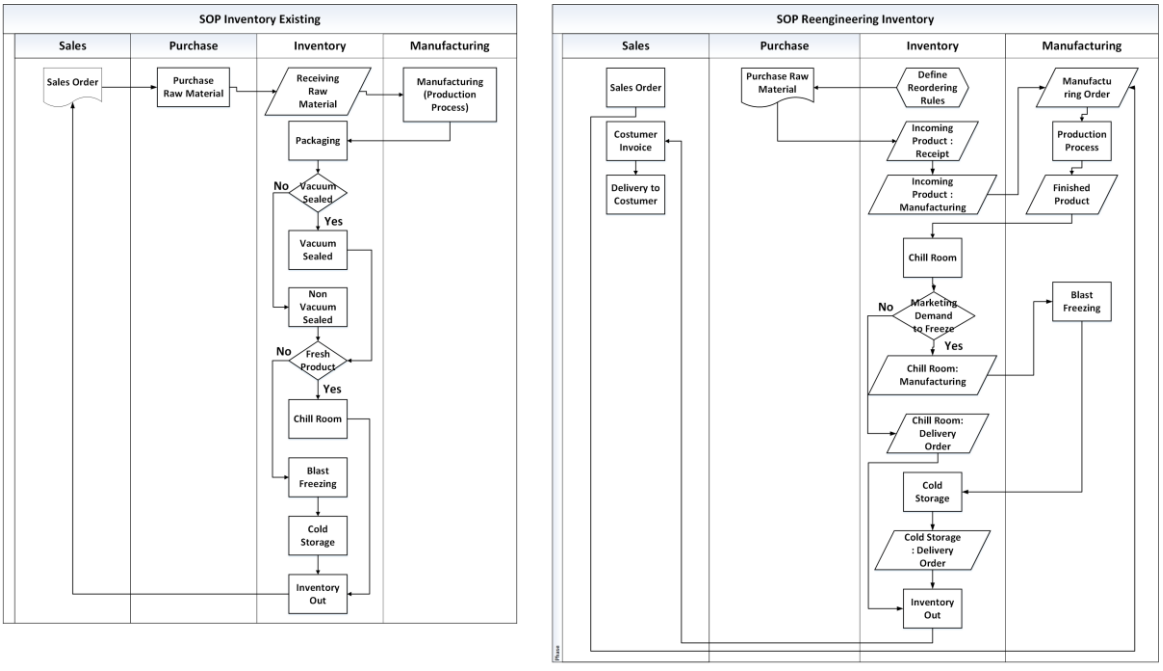

Figure 2. Inventory Business Process

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As the same with the existing business process, the business process reengineering also involves four departments, those are sales, purchase, inventory, and manufacturing. The business process reengineering starts with reordering rules in the inventory, which will trigger the process of purchasing raw material automatically. After the purchasing process is complete, the raw material will be received at the inventory department, specifically at Incoming Product: Receipt. Then, the raw material will be forwarded to the manufacturing department through the process of Incoming Product: Manufacturing. Furthermore, the inventory department will receive finished product in form of fresh product and will be stored in the Chill Room inventory. If there is a demand for frozen product, the fresh product will be returned to the manufacturing department to be frozen in the blast freezing process.

4.2. Business Process Reengineering

Business process reengineering is the adjustment of business process made between the company's existing business process and the business process in the Odoo application. The reengineering of the inventory business process that has been done could be seen as follows.

4.2.1. Process in Incoming Product, Chill Room, and Cold Storage

PT. XYZ actually has two storage units, namely Chill Room and Cold Storage. Each storage unit has a different business process flow, from the business process flow in the storage units. However, to adjust the Odoo system, the researcher added one virtual inventory, namely Incoming Product.

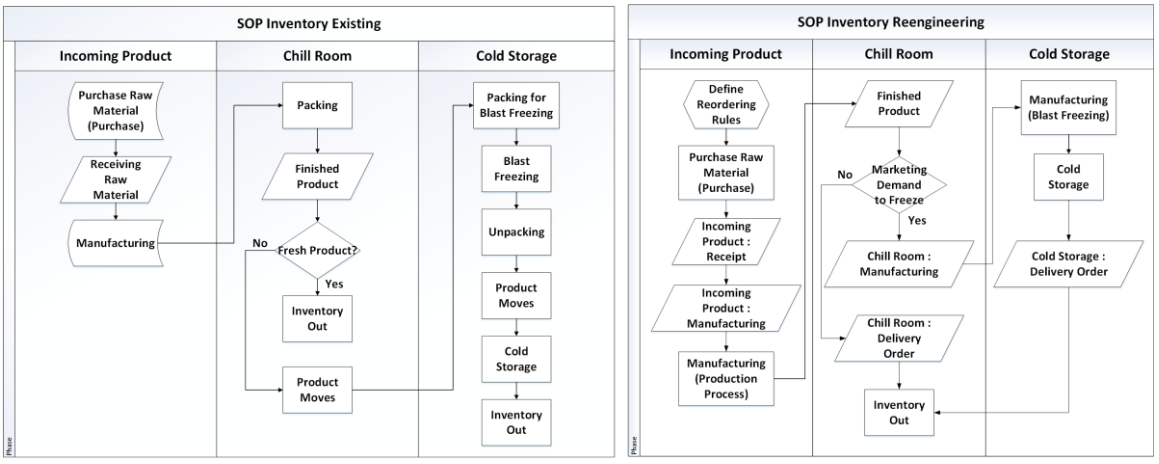

Figure 3. Inventory Business Process in Incoming Product, Chill Room and Cold Storage

There is no business process that have been eliminated, but moved to a more appropriate module. As the example, in the existing inventory business process, there is blast freezing process before the cold storage. But, in the new business process, there is no blast freezing process. The blast freezing process is transferred to the Manufacturing module which can handle the process.

4.2.2. Raw Material Storage Process

Material procurement is the process of adding product stock that involves the purchase department. In general, stock replenishment is done because the stock of a product in the inventory become less in number. Procurement of raw material at PT. XYZ runs automatically and continuously because the company and supplier have their purchase contract.

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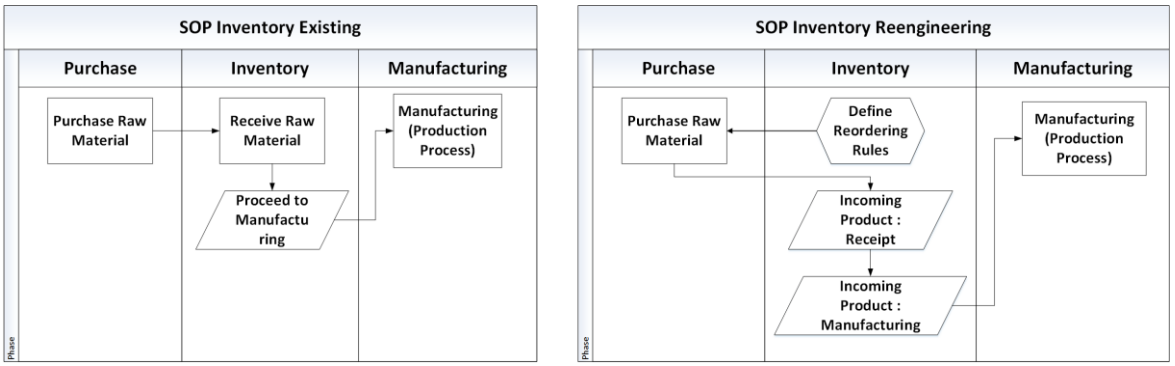

Figure 4. Raw Material Storage Process

Automation of raw material procurement could be applied to Odoo by reordering rules. Reordering rules could create minimum stock rules and trigger the purchase module to make automatic purchase. The purchased raw material will be received by the inventory unit in Incoming Product. Incoming Product is a virtual inventory in the Odoo inventory module for temporarily receiving and storing the raw material sent from supplier.

4.2.3. Manufacturing Process

The inventory module is connected to the manufacturing module through the manufacturing sub-module which functions to record the raw material used for each production process. Meanwhile, the manufacturing module is connected to the inventory module through manufacturing order which functions to request raw material from inventory.

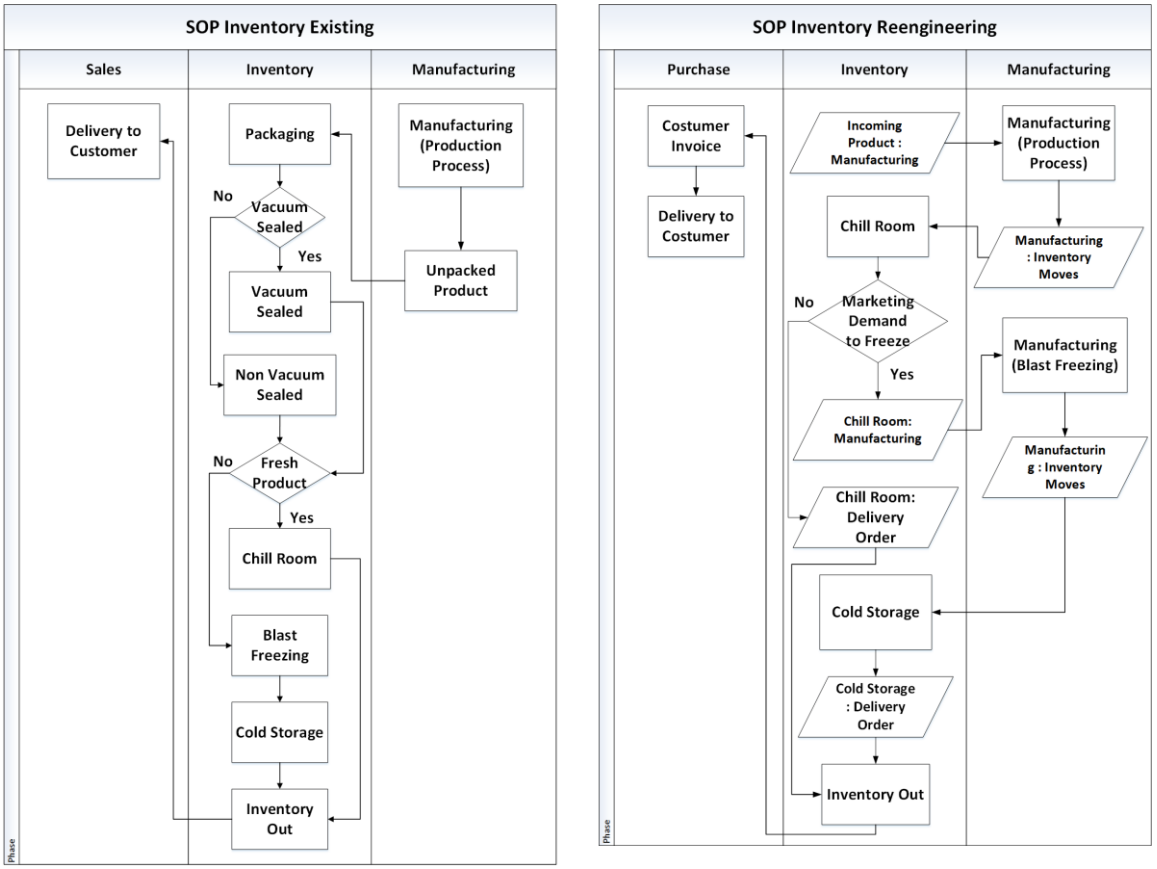

Figure 5. Raw Material Storage Business Process

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Nothing has changed for this manufacturing process because the business process between inventory and manufacturing in the company with Odoo's business process already have a match. A significant difference is in the packaging and blast freezing processes. At the company, the packaging and blast freezing processes is done in the inventory unit. While the inventory module in Odoo does not have the capability to handle the packaging and blast freezing processes that caused a business process reengineering. The reengineering is done by moving the process to a manufacturing module that has the capability to handle the process.

4.2. Odoo Implementation

The implementation of Odoo application for PT. XYZ was done by managing customer database, sales quotation and sales order, customer invoice and payment, also sales report.

4.2.1. Inventory Overview

Inventory overview provides an overview of all operations in the inventory. Those operations are Receipts or product acceptance from the Purchasing Module, Delivery Order or order from Sales Module, Manufacturing or product used for the manufacturing process from Manufacturing Module, and Internal Transfer for moving goods between inventories.

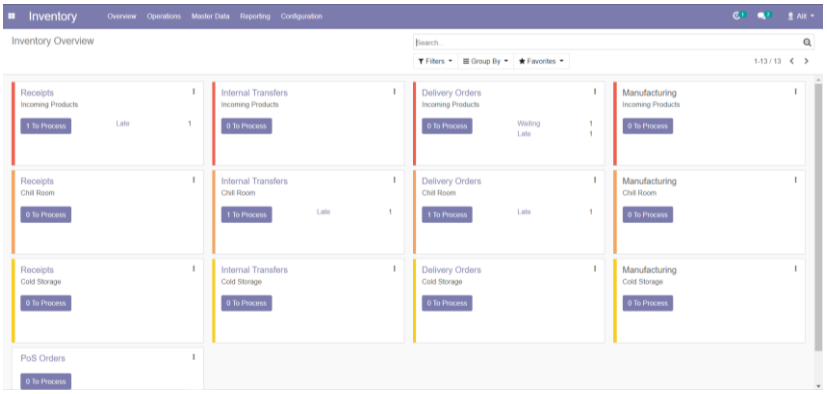

Figure 6. Inventory Overview

Figure 6 is a dashboard overview from Odoo Inventory Module. In its implementation, there are three warehouses used, namely Incoming Product, Chill Room, and Cold Storage. Each warehouse has four types of operations, namely Receipt, Internal Transfer, Delivery order, and Manufacturing.

4.2.2. Product Database

To manage the product in Odoo, select the Inventory menu then the Master Data, after that the Product. In the Product List, the user could see the product list in the inventory. Meanwhile, in the Product Page, the user could add, modify, and delete product in the inventory.

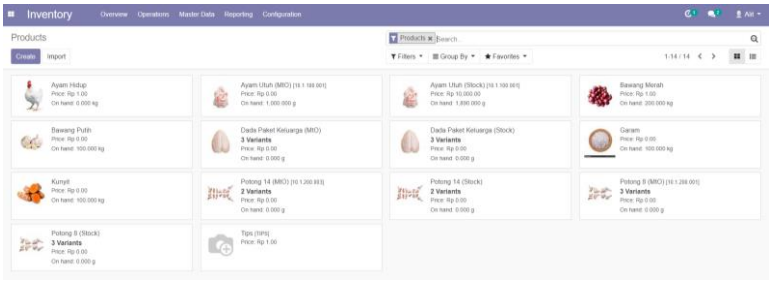

Figure 7. Product List

Product List displays all registered products in the inventory. It could be said that the product list is the summary of the information available from a product. The information

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displayed for a single product is not that much and considered as very important information such as product photo, product name, product code, price, and product stock. The complete information about the product could be seen in Product Page (Figure 7).

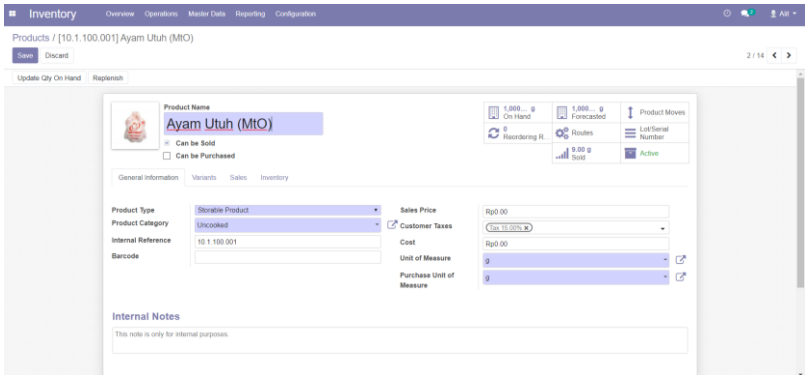

Figure 8. Product Page

Product Page could be found in Inventory>Master Data>Product>Create Product. In this form create product, all fields are very important. It is because each field will give explanation for each product and become its characteristic. This information could be accessed and used by the other modules such as sales and manufacturing. Therefore, the information about the product must be filled in correctly because the information will greatly affect the business process in the company.

4.2.3. Reordering Rules

Reordering Rules serve as a trigger for automatic purchase if the number of the product is less than the minimum stock. Reordering rules will trigger the scheduler to make automatic purchase.

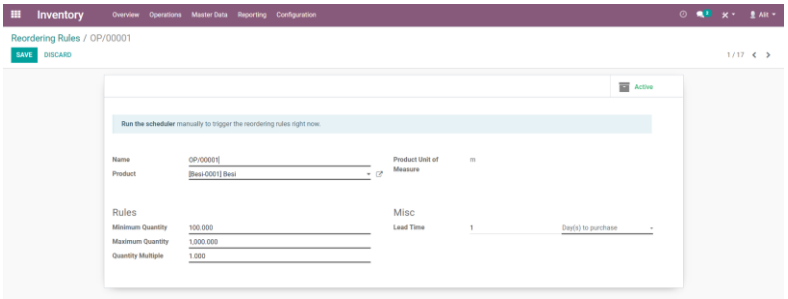

Figure 9. Reordering Rules

Reordering Rules could be found at Inventory>Master Data>Reordering Rules. The scheduler could be run manually via the Operation>Run Scheduler menu or automatically at the specified time when setting up the scheduler. The scheduler could be set by activating developer mode in Setting Module. The explanation of each field in the form reordering rules could be seen as follows.

4.2.4. Product Moves

Product Moves displays the movement in each product, either it is a Receipt or Delivery Order. By looking at Product Moves, the company could find out the detailed and clear moving track based on the existing record at the system.

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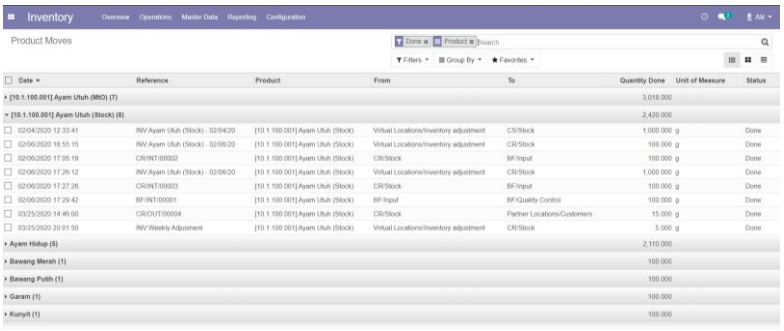

Figure 10. Product Moves

Product Moves could be found in Inventory>Reports>Product Moves. Product Moves displays the number of each product movement, its references, its transfer process, the quantity moved, UOM, and status.

4.2.5. Inventory Report

Inventory Report displays quantity, location, lots, reserved, and UoM of each product in inventory. Inventory Report could be found in Inventory>Report>Inventory Report.

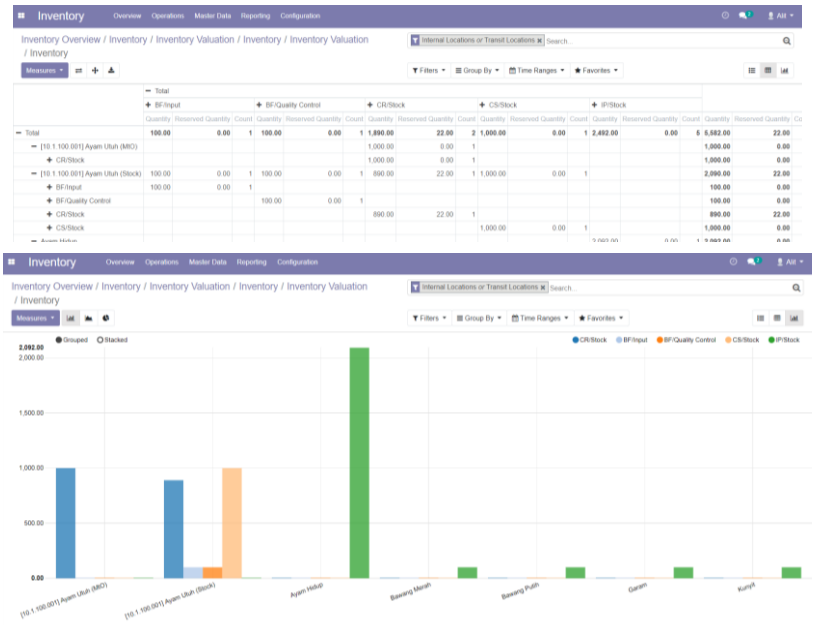

Figure 11. Inventory Report

The data displayed is the name of the product, the inventory location, Lots/Serial Number if the product is equipped with Lots, Reserved or the quantity needed for the production or sales process, On Hand or the current quantity, and Unit of Measure or the unit of the product. Inventory report could display the data in form of list, table, and graph. The list is used to display the general data of each product. The list could be read easily because it only displays a small amount of data, which are lots, quantity, UoM, and so on. Report in form of table provide more detailed and in-depth data about the product such as reserved quantity and count for each inventory. Data graph displays the development of the product owned by the company. Usually, data graph is used to forecasting each or all products.

4.2.6. Inventory Valuation

Inventory Valuation displays the value of the product along with its quantity and UoM. Inventory Valuation helps the company to find out the price value or a product stored in the warehouse.

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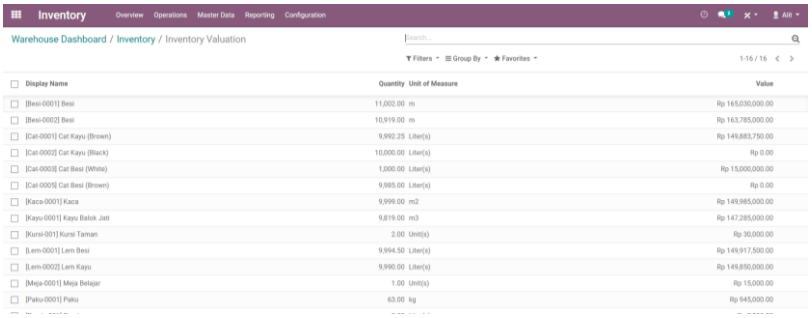

Figure 12. Inventory Valuation

Inventory Valuation could be found in Inventory>Report>Inventory Valuation. The value displayed in the Inventory Valuation is the value calculated based on the quantity held now multiplied by the product price.

4.3. Result

Research testing at PT. XYZ was done through a questionnaire that measure the system validity. Before distributing the questionnaire, the researcher conducted a demo application to give understanding to the respondents. The system testing was done by involving at least 10 respondents consisting of employees and head department. The questionnaire consisted of 5 items with 22 questions. The testing process was done by using UAT (User Acceptance Testing) method and the Likert scale calculation. The Likert scale consists of 5 responses, those are Disagree, Somewhat Disagree, Somewhat Agree, Agree, and Strongly Agree.

Table 1. Result of The System Testing Questionnaire

Item	Frequency				
	1	2	3	4	5
	Strongly Dissagree	Dissagree	Quite Agree	Agree	Strongly Agree
Content Item			58%	42%	
Module Item		3%	55%	41%	1%
Multimedia Element Item		2%	29%	68%	1%
Navigation Aspect		2%	61%	37%	5%
Useful Item			64%	36%	

The conclusion from the table above shows that the largest percentage for each item was the Content Item with 58% of somewhat agree response, the Module Item with 55% of somewhat agree response, the Element Multimedia Item with 68% of agree response, the Navigation Item with 61% of somewhat agree response, and the Function Item with 64% of somewhat agree response.

4.3.1. UAT Calculation

UAT calculation is a measurement on the Odoo application and also focuses on the sales module by using Likert Summated Rating (LSR) scale measurement toward the result of the questionnaire. LSR itself is a scale with measurement based on the correspondent attitude.

1. Total responses of the questionnaire result for each aspect

   Total responses 1 = 0 + 0 + 0 + 0 + 0 = 0
   Total responses 2 = 0 + 2 + 2 + 1 + 0 = 5
   Total responses 3 = 37 + 35 + 23 + 39 + 51 = 185
   Total responses 4 = 27 + 26 + 54 + 24 + 29 = 160
   Total responses 5 = 0 + 1 + 1 + 0 + 0 = 2

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2. Total Likert points of the questionnaire result
   Total responses point 1 = 1 x 0 = 0
   Total responses point 2 = 2 x 5 = 10
   Total responses point 3 = 3 x 185 = 555
   Total responses point 4 = 4 x 160 = 640
   Total responses point 5 = 5 x 2 = 10
   Total all points = 0 + 10 + 555 + 640 + 10 = 1215

3. Total point for each correspondence
   Maximal point: 5 x 22 questions = 110
   Minimal point: 1 x 22 questions = 22
   Median point: 2 x 22 questions = 44
   Quartile I point: 3 x 22 questions = 66
   Quartile II point: 4 x 22 questions = 88

4. Total score for all correspondences
   Maximal: 110 x 16 = 1760
   Minimal: 22 x 16 = 352
   Median: 44 x 16 = 704
   Quartal I: 66 x 16 = 1056
   Quartal III: 88 x 16 = 1408

4.3.2. Total Score Interpretation

1408 < Point < 1760, have a strongly positive interpretation (the system is considered successful). 1056 < Point < 1408, have a positive interpretation (the system is considered quite successful). 704 < Point < 1056, have a negative interpretation (the system is considered less successful). 352 < Point < 704, have a strongly negative interpretation (the system is considered not successful)

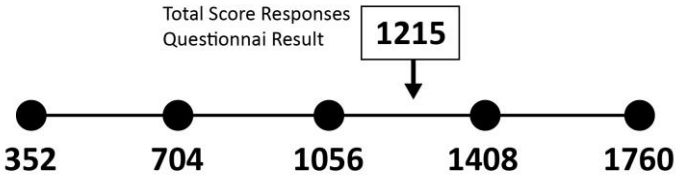

Figure 13. Total Score Interpretation

Based on the research and testing results, the LSR interpretation with a total score of 1215 points obtained based on 16 respondents was 1056 < 868 < 1408 where the total score interpretation belongs to the category of successful.

5. Conclusion

From the result of this research about Odoo software, it could be concluded that the business process at PT. XYZ is still not efficient because there are many business processes that are not yet integrated. Therefore, the implementation of the ERP Odoo V12.0 at the company's business process was done. To maximize the implementation of Odoo application, business process reengineering was carried out first. The implementation of ERP Odoo V12.0 was focused on the Inventory Module. The conducted reengineering process was business process reengineering in Incoming Product, Chill Room, and Cold Storage to make it more suitable with Odoo application used, business process reengineering of more detailed raw material storage to get maximum report, and manufacturing reengineering business process which are moving the process of packaging and blast freezing to a more suitable manufacturing module. Based on the testing process using UAT method and Likert scale, the implementation was considered successful with a total score of 1215 out of 1760. The ERP

Odoo application is expected to develop continuously by providing new features and ease the company as well as being able to fix bugs in the ERP Odoo system.

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