Development of E-Supply Chain Management Design for Crispy Soybean Snacks Products Using Odoo 13.0

Arrazy Elba Ridha[1,2] Enny Widawati[3] Marsellinus Bachtiar[4]

[1] PSPPI, Indonesian Catholic University Atma Jaya, Indonesia

[2] Industrial Engineering Department, Engineering Faculty, Universitas Teuku Umar, Indonesia

[3,4] Engineering Faculty, Indonesian Catholic University Atma Jaya, Indonesia

[1] arrazy.elba.ridha@utu.ac.id

Abstract – To compete for market share in business, a business or company must manage resources and be able to integrate between business elements. Supply Chain Management is a concept that aims to integrate all aspects of a business. SCM with a combination of information systems and databases is also known as e-SCM. E-SCM is the collaborative use of technology to improve supply chain operations and management. Cv. XYZ's Soy Snacks Business is a manufacturing company that manufactures and sells tempe snacks. The supply chain, specifically the procurement of soybean raw materials and several other raw materials used to make tempe, production planning, and finished product sales activities, are the main business activities/processes in tempe snack companies.The ERP system, powered by Odoo software, enables Cv. XYZ to integrate suppliers, manufacturers, and distributors, where the modules in the Odoo application are integrated to make doing business easier and to audit sales data in real time. The Entity Relationship Diagram (ERD) method is used to design e-SCM on Cv. XYZ, which method aims to design each entity and element associated with the e-SCM network, where ERD can make attribute structuring more optimal with the stages of making 1. Use case diagram, 2. Data relations, 3. Business process and supply chain diagrams, and 4. Realization of pages on odoo.

Keywords – E-SCM, Enterprise Resource Planning (ERP), Software Odoo, Entity Relationship Diagram (ERD)

I. INTRODUCTION

Today's technological advancement is so rapid that it has an impact on business competition. Both businesses and companies require technology in business development to manage resources optimally and to innovate in the products or services produced. Companies and businesses must manage their resources and innovate in order to compete for market share. The desire to be the market leader Medium-sized businesses, in addition to large corporations, pursue sustainable development in winning market share by optimizing all well-managed business processes so that they can compete in the market. The concept of Supply Chain Management, which can map all business process management related to the network to suppliers, production, and distributors, is used to manage this business network. Supply Chain Management, also known as Supply Chain, is critical to meeting rising market demands [1]. Supply Chain Management (SCM) enables the efficient and effective coordination of all organizational supply activities from suppliers and partners to customers [2]. Good relationships between suppliers, partners, and customers improve a company's performance [3].

The current SCM concept has collaborated with digital concepts, particularly information system and database concepts, which have evolved into e-SCM (electronic SCM). E-SCM is the collaborative use of technology to improve the operation and management of supply chain activities [4]. SCM activities in manufacturing companies range from raw material procurement to production planning and implementation, as well as sales and shipping processes. Jaya and Andita conducted previous research in

2016 to build an information system that could help the raw material procurement process be more efficient and to create good relationships with company partners [5]. Rapid population growth has a direct impact on business market opportunities . Soybean snacks business produced by Cv. XYZ is a manufacturing company that operates by producing and selling tempeh snacks. The main activity/business process in a tempe snack company is related to the supply chain, specifically procurement of soybean raw materials and several other raw materials used to make tempe, production planning, and finished product sales activities. Raw material planning and control can help to stabilize the manufacturing and marketing processes [6]. The goal of raw material procurement is to reduce production uncertainty caused by fluctuations in raw material supply. As a result, this business process must be properly managed in order to compete in the market in the future. Companies can use software to develop supply chain management within the company during its implementation.

Odoo is an open source ERP (Enterprise Resource Planning) software that includes a variety of business application program modules such as Sales, Customer Relationship Management, Project Management, Warehouse Management, Manufacturing, Finance and Accounting, Human Resources, and others [7]. Odoo is programmed in Python, XML, and JavaScript [8]. The modules in the Odoo application are already integrated, making it easier to run a business [9]. Odoo can be used as a software development framework [10]. Odoo's architecture is made up of three parts: the database, the server, and the client. The database is responsible for information storage and is managed by the Odoo server, while the server is responsible for business logic and interactions with database applications, and the client provides information to users and allows servers to operate using other applications [11]. Based on the foregoing, research was conducted to develop the e-Supply Chain Management design for Crispy Tempe products using Odoo 13.0. It is hoped that this research will lead to the creation of an e-SCM design that will assist crispy tempeh products in effectively and efficiently managing business activities.

II. THEORETICAL FRAMEWORK

2.1. Bill Of Materials (BOM)

A bill of materials (BOM) is a structure or element in a product that contains information on all materials, components, or subassemblies required to transform a raw material into a finished product. BOM is more than just a list of items required; it also includes a list of structures that describe the sequence of steps in a product's manufacturing process. So a bill of materials (BOM) is used to plan which materials will be used and how much will be required to create a finished product. Parts in the BOM become information that is used to create a Supply Chain Management network, where the company can find suppliers for each part in the material by looking at the map from the BOM. The BOM in this study takes the form of crispy soybean snacks, which are made up of a variety of materials, which will be described below;
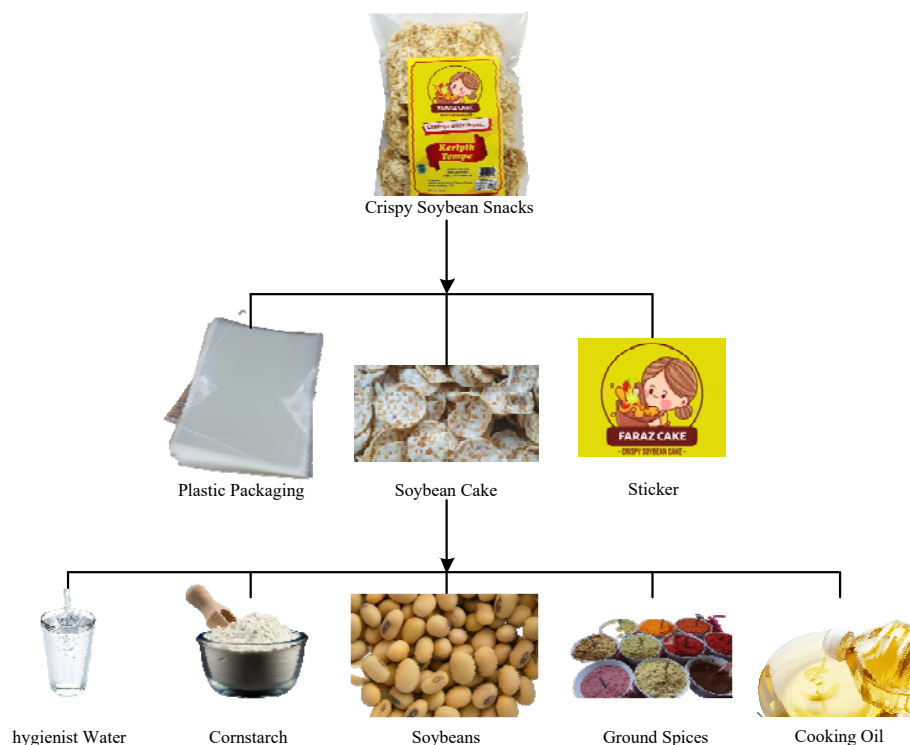
Fig. 1. Bill of materials Crispy soybean snack

2.2. Enterprise Resource Planning (ERP)

Enterprise Resource Planning (ERP) is a software application that integrates information from all divisions of an organization into a single database. If the ERP implementation is done on the company's premises, the database can be stored locally, but it can also be cloud-based [12]. Because ERP is an open source system, it can help developing MSME businesses save money on IT infrastructure, software and hardware, and IT staff. In terms of product category, this soybean cake snack is an MSME product with a relatively conventional information system infrastructure; therefore, ERP development using open source software will be very beneficial in increasing the product's market share. ERP has a functional operating area that theoretically covers all organizational needs, such as Marketing and Sales (M/S), Supply Chain Management (SCM), Accounting and Finance (AF), and Human Resources (HR). This research implements several aspects of the ERP operations area, specifically the SCM area. SCM is made up of several warehousing and logistics-related business functions. This study's business functions connect suppliers, production, and distribution, which will be synergized using Odoo-based ERP [13]. The ERP integration scheme used in this study is depicted in the figure below;
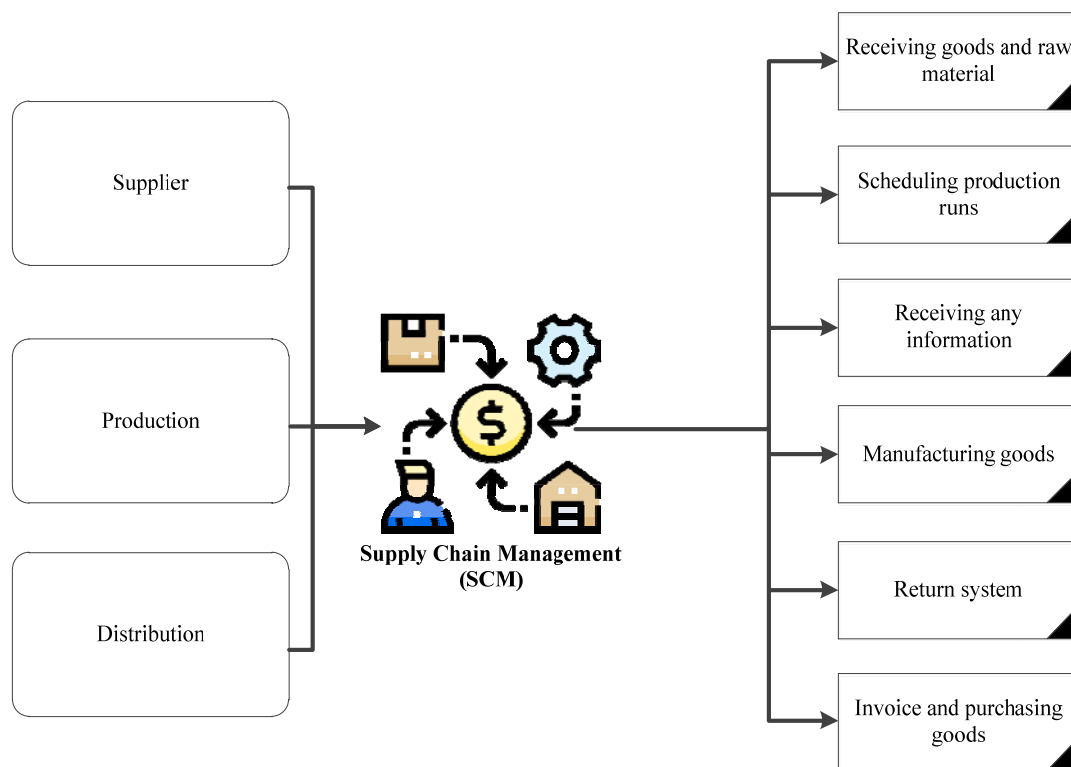
Fig. 2. Design ERP for the networking of Supply Chain Management

Figure 2 depicts the Supply Chain framework, which connects various resources to achieve output, specifically the production of crispy soybeans in a timely and real-time manner, and can make the supply chain flow controllable and capable of meeting market demand. As a result, ERP based on Odoo 13.00 software is beneficial for information systems and database connections that will be used for the needs of the flow of goods, money, and information. ERP based on Odoo 13.00 software is also a concept that promotes pro-environmental behavior, as no physical documents are required for any integration between suppliers, manufacturers, and distributors [14].

III. METHOD & DESIGN

This is a description of the relationship between data that between Supply Chain networks.Supply chains networks use the odoo configuration system, which allows suppliers and distributors to access the database. Cv was interviewed in order to collect data. XYZ, which manufactures crispy soybean snacks, collects secondary data by reviewing reports on suppliers and purchasers of these snacks, also known as distributors. The Entity Relationship Diagram (ERD) method is used in this study's data analysis stage, which is a model for explaining the relationship between data in a database based on basic data objects with relationships between them. This method can be used to map the company's business processes that will be implemented with Odoo.

Using Odoo is expected to help simplify the process of purchasing, manufacturing, and effectively managing warehouses in the crispy soybean snack production business. Data processing entails using Odoo to create configurations in the Purchasing, Inventory, and Manufacturing modules based on the raw materials that will be used to make soybean snacks. This study's flowchart is shown below:
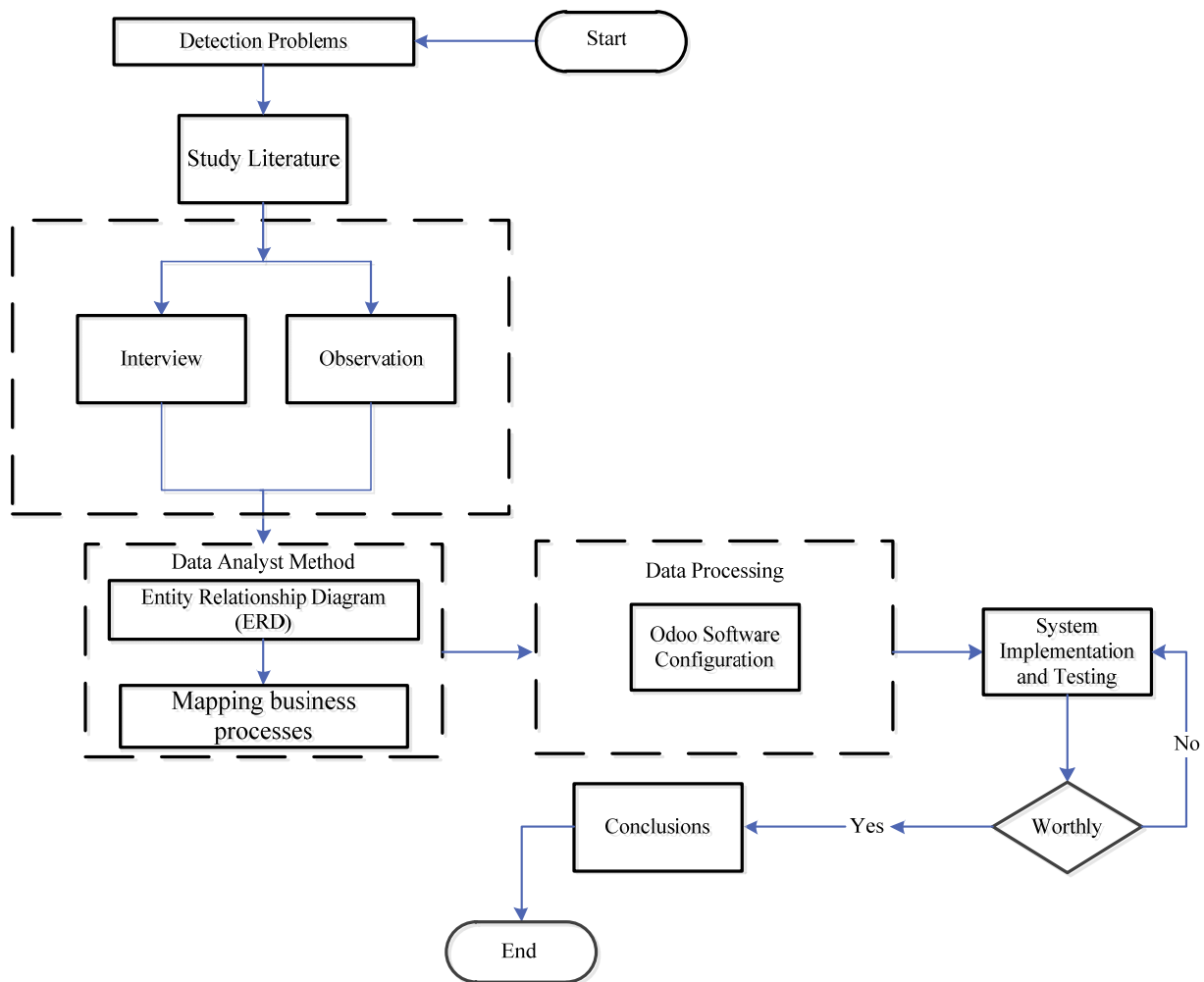
Fig. 3. Flowchart of research

IV. RESULT AND ANALYSIS

Flowchart of research In the SCM process, this research will design an ERP concept based on the Odoo application. .CV. XYZ, which manufactures crispy soybean snack products. The Odoo application-based ERP design is used for Website integration processes, as well as Sales, Invoicing, Manufacturing, Purchasing, and Inventory Modules. The Odoo website is used to connect the flow of suppliers to consumers, which is useful for quickly and precisely gaining market share. To create an Odoo application-based ERP on CV, XYZ employs the Entity Relationship Diagram (ERD) method [15], which will be described in detail each day;

a. Use case diagrams

The Odoo software's configuration system allows users to be developed using only one account, which can be developed into administrators/admins and employees/employees. Admin is a user who has full access rights to existing odoo configurations, such as adding and removing users, and can share user accounts with suppliers and distributors for the purposes of goods transactions such as orders, invoices, and others, whereas employees/employees are general users who have rights to orders, invoices, and other items. Only inputting and receiving are permitted. After the admin adds the user, the user can use the same Odoo account as the admin, but with limited access rights to only the modules that the admin has used. The following is a use case diagram that can describe the system's functionality;
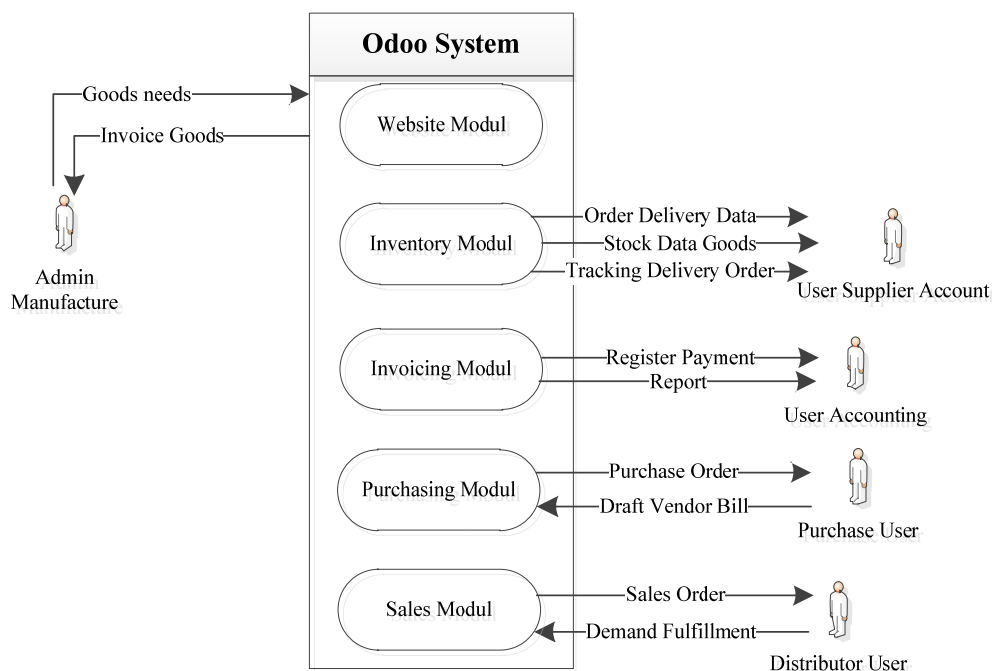
Fig. 4. Use Case Diagram

b. Data relations

Data cardinality is a "description of the relationship between data entities that are related to each other and participate in one data access." In this study, the cardinality type of data is One to Many, which means that each entity in entity set A can relate to many entities in entity set B, but not vice versa, where each entity in entity set B is associated with at most one entities in entity set A[16]. This is closely related to the fact that in the production process of crispy soybean snacks, there are suppliers and distributors involved, with suppliers aiming to supply raw materials such as plastic wrap and cooking oil, and distributors acting as parties who distribute the product to retail sellers. The odoo configuration is used to create a data relationship that connects the production of crispy soybean snacks with suppliers and distributors. The following diagram depicts the data relationships.
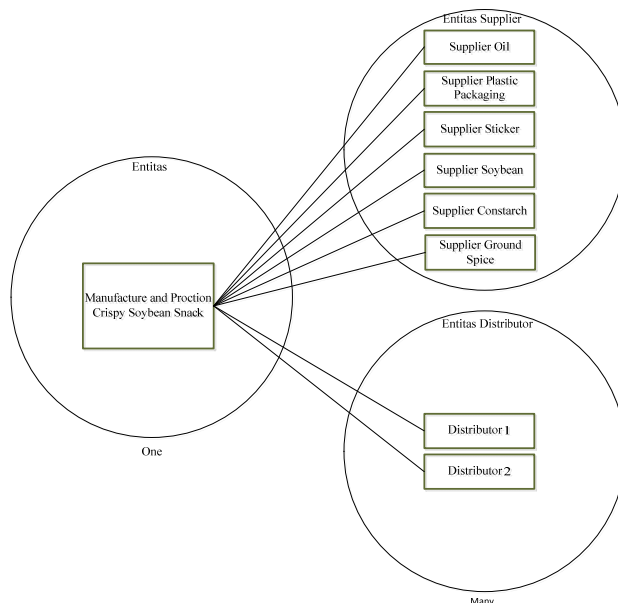

Fig. 5. Use Case Diagram

c. Business process and supply chain diagrams

The flow of activities in a business process is simply defined as the flow of supply chain activities. The process is carried out to achieve a specific goal (for example, to produce goods or services). A business process, in another sense, is a collection of structured tasks/activities that can result in the production of a specific service or product for consumers. The eSupply Chain system's business processes include acquiring raw materials from suppliers, manufacturing processes, and product distribution processes. The eSupply Chain system business process includes three activities [17], which are as follows:

1. Acquisition of raw materials

This is a business process that includes purchasing, invoicing, inventory, and suppliers. Make a purchase requisition (request purchases) for raw materials in the Purchases section, and if the request is approved, immediately make purchase orders purchases) to suppliers. Purchases section creates vendor bills based on purchase orders. The invoicing section pays purchase invoices from suppliers based on vendor bills. Raw materials received from the supplier by the inventory section. The process is depicted in the diagram below;
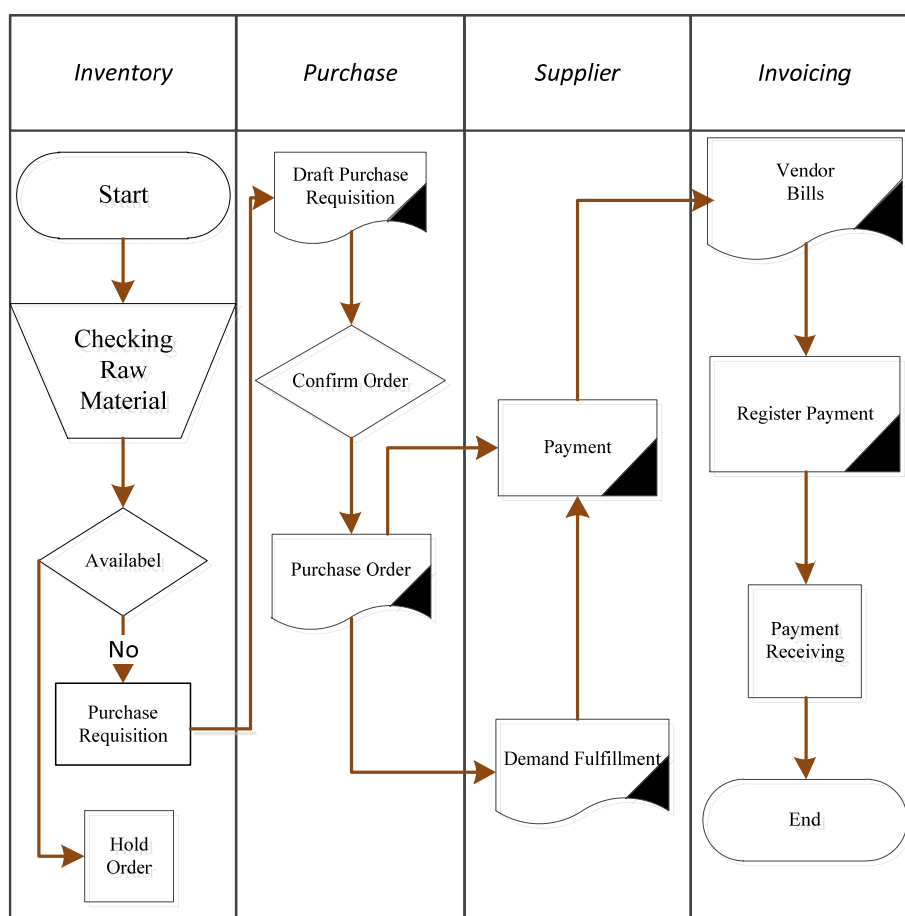

Fig. 6. Acquisition Diagram of raw materials

2. Manufacturing business processes

Parts inventory, purchasing, and production are all part of the production business processes. Part production is used to complete the manufacturing process in accordance with production orders. After parts production, check the availability of materials standard, if not available, purchase raw materials by purchasing, and if available, parts production perform work orders or production process. Inventory has already delivered the ordered product to the customer. The business production process is depicted in below;
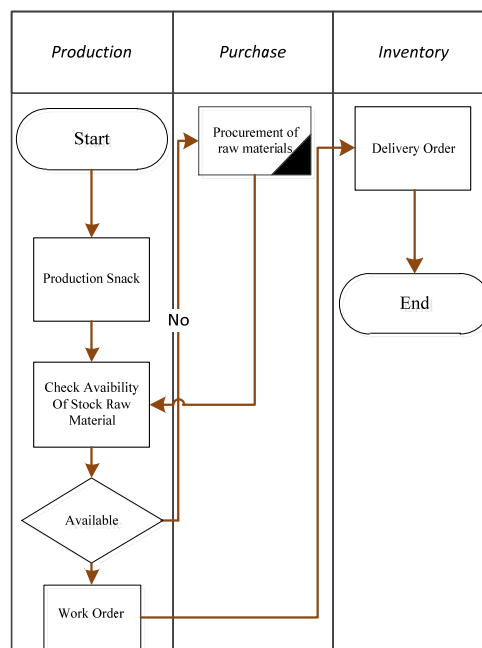
Fig. 7. Acquisition Diagram of Manufacturing Business Processes

3.   Process of Sales and Business Distribution

In this study, sales are made through distributors who distribute each snack to outlets or Point of Sale wholesalers. Working with distributors, where the snacks are distributed by the agent at every wholesaler and small outlet that has previously worked with the agent, is the business process of selling through this distribution channel. Distributors, retailers, and customers are all involved in this distribution. Because there are already distributors who sell directly to consumers, this system allows manufacturers to sell their snack products without having to go directly to consumers. it to the cashier to be paid.

The use of ERP with Odoo software allows the production party to see the goods sold and unsold immediately and audit the stock in the distributor's warehouse. Sales are declining. Customers, sales, invoicing, inventory, and production are all part of the sales order business process. Customers place orders with sales, and sales place orders with customers. Distributors who collaborate closely with production parties will receive a 25% profit share per pack. Each distributor sales report will serve as a reference for the production system, allowing it to predict the production of goods based on predicted orders obtained from sales history. The sales distribution process is depicted in the figure below;
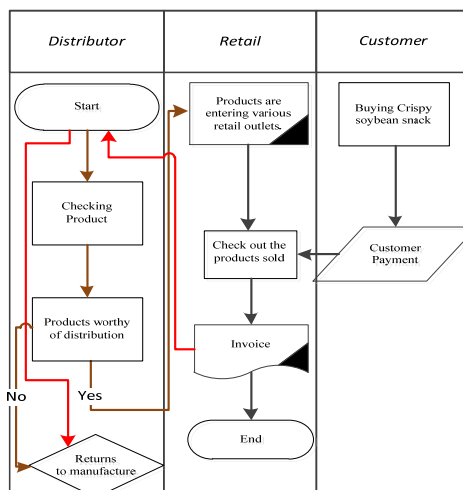

Fig. 8. Acquisition Diagram of process sale and business distributiom

d. Realization

The final stage is to implement the ERP system using Odoo 13 software; the display results are as follows.
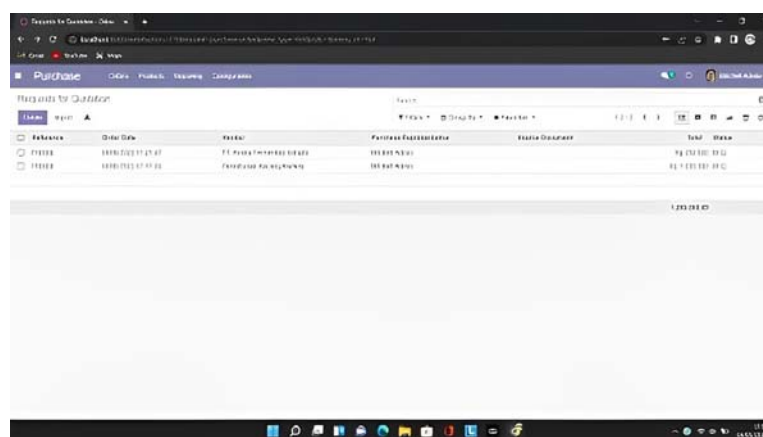
1. The raw material procurement

The Purchases page is accessed by clicking the Purchases menu in the built system. The Purchases page is used to complete the procurement of raw materials from suppliers. The raw material procurement process begins with a purchase request for raw materials, followed by the creation of a Vendor Bill, payment registration, and receipt of raw materials.

2. Production Page

The manufacturing process is managed through the Manufacturing menu. Making a production order from the Manufacturing Orders menu starts the production process. The product to be produced is first checked for raw material availability; if all raw materials are available, the production process can begin by initiating work orders. The work order process begins with the first work order stage and continues until all production stages have been completed. If an error occurs during the creation process, work orders can be paused or blocked.

3. Product sales and distribution page

When a customer makes a purchase, the sales process is completed, and the purchase data is updated on the Odoo website every day by distributor employees. Profit sharing can be done after the products that sell well have been calculated in one month. Furthermore, if there are large orders, the distributor will contact the manufacturer to meet these needs, with the goal of serving consumers precisely and quickly, and production will begin once the customer has made a payment for products ordered in large quantities. Customers can access order data such as invoices and the delivery status of their purchases via the distributor's website's account menu.
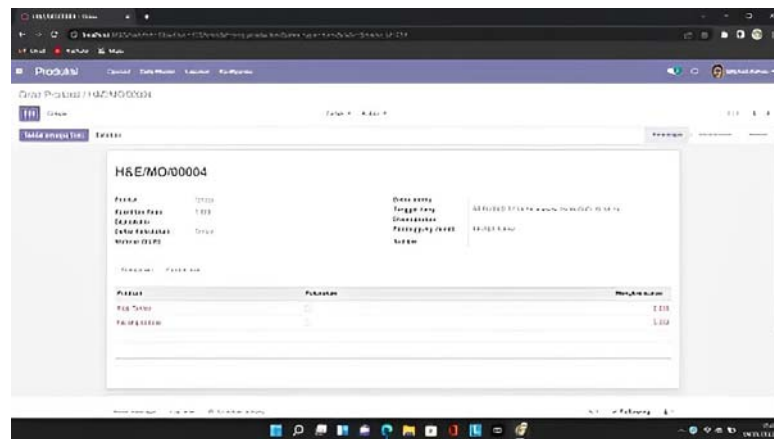

Fig. 9. Purchases page
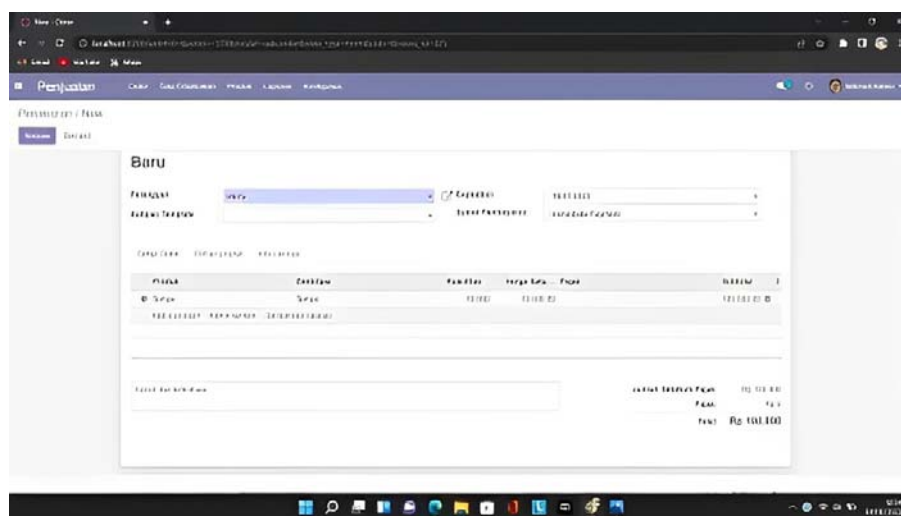
Fig. 10. Manufacturing Orders page
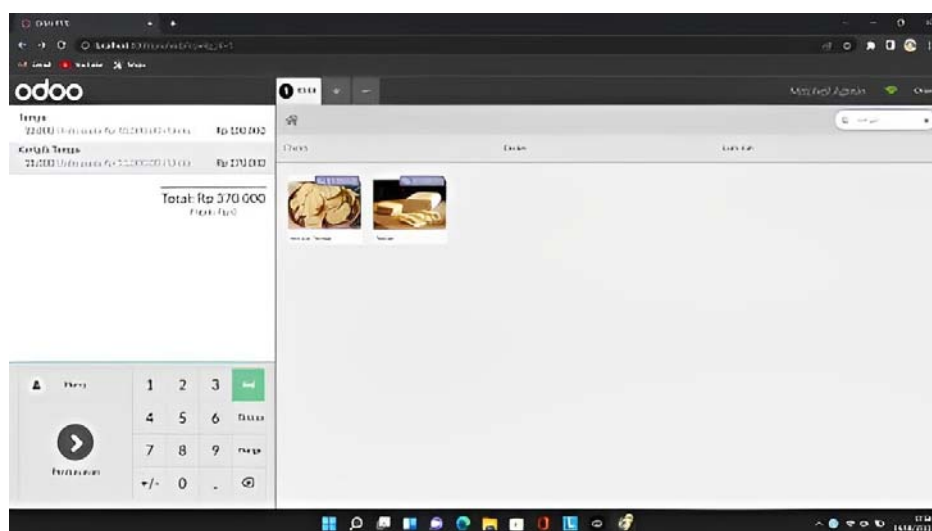

Fig. 11. Sales Page

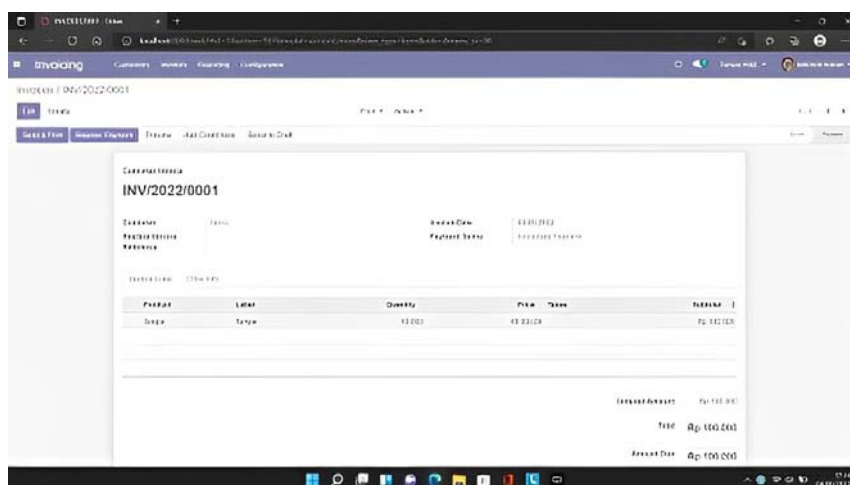Fig. 12. Order distribution page

Fig. 13. Invoices page

V. Conclusion

The following conclusions are drawn from research on e-Supply Chain Management on crispy soybean snack products using Odoo 11.0:

1. Using Odoo 13.0, E-SCM in the Tempe Business was successfully built through the stages of data collection, data analysis, system business process design, and system development.

2. The Odoo network configuration system allows data to be obtained quickly and in real time

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