

# Analysis and Design AIS for Raw Materials Inventory and Finished Goods Inventory in Accordance with ISO 9001:2015 at Frozen Food Company

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**Keywords:** Accounting information system, Inventory Control, ISO 9001:2015, FAST, Inventory, Contingency Theory

**Abstract:** The purpose of this study is to analyze and design accounting information system for raw materials inventory and finished goods inventory in accordance with ISO 9001:2015 at PT. XYZ which is engaged in frozen food industry. Data collection methods that have been used are interviews, observations and literatures while the analysis method that has been used is qualitative research method. In this study, the types of data used are primary and secondary data. Designing an accounting information system for raw materials inventory and finished goods inventory at PT. XYZ will use FAST method (Framework for the Application of System Thinking). In this study, there will be also explained about contingency theory, accounting information systems, inventory control, system design tools, inventory, FAST, ISO and ISO 9001: 2015. The problem in this company is the differences between inventories recording and physical stocks which is caused by manually inventories recording and unclear of segregation of duties. The results of this study are expected to provide a design of accounting information systems for raw materials inventory and finished goods inventory in accordance with the provisions of ISO 9001: 2015 (clause 8.5.1) that can be used by the company to smooth inventories recording and the company's production process.

## 1 INTRODUCTION

In PSAK No. 14 (2015), inventories are assets available for sale for business activities, assets in the production process for the sale or assets in the form of materials or equipment for use in the process of production or service delivery. In a company, inventory has an important role because it will affect the level of production and the level of sales. There are two problems in inventory that are very important to note because of their relation to production efficiency and sales optimization, namely controlling raw materials inventory and finished goods inventory.

PT. XYZ is a company engaged in the frozen food industry. This company has been established and operating since 2013. In this company, there are two types of inventory, namely raw materials inventory and finished goods inventory. As stated by the Director of PT. XYZ, the company still manages raw material and finished goods inventory data manually. All activities in and out of raw materials and finished goods are recorded using a stock card,

so that the inventory balance must be adjusted every month after the stock taking.

Director of PT. XYZ also stated that inventory activities often experience delays in reporting and there are often errors in recording the transfer of goods because there are various types of raw materials and finished goods inventory. In addition, the authorization of the entry and exit of inventory should also be separated so that accountability becomes clearer on inventory. Raw materials often run out, even though there are still a lot of inventory in stock card. This often makes raw materials purchased not from major suppliers and prices often change due to the impromptu purchase. Designing accounting information system for raw materials and finished goods at PT. XYZ is needed because of the management of raw materials inventory and finished goods inventory of PT. XYZ is still manual. In designing AIS for the supply of raw materials and finished goods in the company, the author will follow the provisions in clause 8.5.1 on ISO 9001: 2015 related to "Production and Provision of Service Control". ISO 9001: 2015 is an

international standard for the implementation of quality management, which is a strategic decision for a company that can help to improve its overall performance and become a strong basis for sustainable development initiatives.

Therefore, the purpose of this study is to analyze inventory control procedures that exist at PT XYZ and design accounting information systems for raw materials and finished goods inventory according to ISO 9001: 2015.

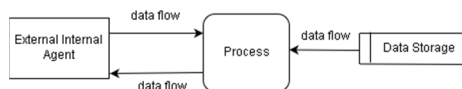
## 2 THEORETICAL FRAMEWORK

The main theory used in this study is contingency theory. According to Duncan and Moores (1989), contingency theory is a function of the compatibility between the system and the environment an organization operates. In addition, according to Nicolaou (2000), contingency theory can support the formation of the effectiveness of accounting information systems. The effectiveness of an information system is influenced by the effects of technology, organizational structure and environment. The effect of technology is closely related to the use of information systems in an organization and the effects of the environment and organizational structure related to the performance of employees working in an organization.

According to Diana and Setiawati (2011), accounting information systems are systems that aim to collect and process data as well as, report information relating to financial transactions. On the other hand, according to Krismiaji (2015), accounting information systems are systems that process data and transactions to produce information that is useful for planning, controlling and processing business. This is useful to be able to produce information needed by decision makers.

System modeling consists of Use Case Diagrams, Data Flow Diagrams (DFD) which are translated into Context Diagrams, Level 1 and 2 Diagrams, Functional Decomposition Diagrams (FDD), Entity Relationship Diagrams (ERD), and user interface designs.

Data Flow Diagrams (DFD) is a process model that is used to describe the flow of data in a system that works supported by the system. All parties involved in this system can see all systems working continuously through DFD. DFD is indicated by a context diagram which is then developed in a level 0 diagram. Figure 1 shows example of DFD:

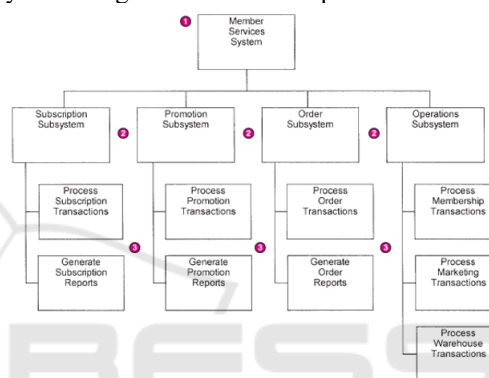


Source: Bentley, Whitten & Dittman (2007)

Figure 1: Data Flow Diagram

Context Diagram is part of the Data Flow Diagram which functions to map environmental models represented by a single circle representing the entire system.

Functional Decomposition Diagram (FDD) is a tool used to describe the decomposition of functions or activities of a system. Decomposition is breaking a system into small partials or also called subsystems. Figure 2 shows example of FDD:



Source: Bentley, Whitten & Dittman (2007)

Figure 2: Functional Decomposition Diagram

Entity Relationship Diagram is a data model that uses many notations or also called cardinality notations to describe data of an entity and the relationships that occur between entities with each of these data.

According to Romney and Steinbart (2011), internal control is a process that is carried out to provide adequate guarantees so that the control objectives have been achieved. Internal control of inventory becomes a difficult thing in management, because the many threats that can cause inventory cannot be calculated properly.

For the design of the system used FAST method which according to Bentley, Whitten & Dittman (2007) here are 8 phases namely Scope definition, Problem analysis, Requirement analysis, Logical design, Decision analysis, Physical design and integration, Construction and Testing, Installation and Delivery.

Viewed from the site iso.org, ISO (International Organization for Standardization) is an international standard setting body consisting of representatives from the national standardization bodies of each

country. ISO establishes world industrial and commercial standards. One of them is ISO 9001. ISO 9001 has undergone several revisions. The latest ISO 9001 is ISO 9001:2015 and ISO was ISO 9001: 2008. As can be seen from the ISO 9001:2008 and ISO 9001:2015 documents issued by Badan Standardisasi Nasional (2008) and Badan Standardisasi Nasional (2015), there are clearly visible differences from ISO 9001:2015 with ISO 9001:2008, which are neater clauses because they are well grouped and attempt to eliminate the impression that the application of ISO 9001 only relies on making SOPs or procedures.

The focus of this research is using ISO 9001:2015 clause 8.5.1 where ISO 9001:2015 is also called a quality management system which is a strategic decision for a company or organization that can help to improve its overall performance and as a solid basis for initiatives for sustainable development. Whereas clause 8.5.1 is a clause that describes "Control of production and service provision".

### 3 RESEARCH METHOD

This study uses qualitative research methods and a case study approach in order to analyze and answer the phenomenon in detail. The definition of qualitative research is research that is used to investigate, find, describe, and explain the quality or features of social influences that cannot be explained, measured or described through a quantitative approach (Saryono, 2010).

In this study, data collection was carried out through interviews, observation and documentation (Fathoni, 2006).

Observations of company activities are carried out especially in the supply of raw materials and finished goods, to find out how the procedure for recording inventory at PT. XYZ. Then, interviews conducted with the operation staff, production staffs, warehouse staffs, to find out more about matters relating to inventory activities of raw materials and finished goods. As well, interviews were also conducted with the director of PT. XYZ, so that the writer knows the comparison of information on the existing conditions and the wishes of the company's management of inventory accounting information systems. Formal interviews that are allowed by the company are only interviews with the operation staff and director. In addition, documentation is carried out to collect data or documents of PT XYZ, as well as collect various references from books related to

accounting information systems for the supply of raw materials and finished goods according to ISO 9001:2015.

The design of inventory information system at PT XYZ applies FAST approach (Framework for the Application of System Thinking). Generally, FAST has 8 phases, but in this study will only use 4 phases, namely (Bentley, Whitten & Dittman, 2007):

1. Phase Scope Definition, in this phase the scope or boundaries of the project are determined.
2. Phase Analysis Problem, in this phase we study the existing system and analyze the findings to provide the project team with a deeper understanding of the problems that trigger the project.
3. Phase Requirement Analysis, in this phase the analyst approaches the users to find out what they need or what they want from the new system.
4. Phase Logical Design, in this phase translation of business requirements into system models is carried out. The system model is a picture of a system that represents the desired reality.

### 4 ANALYSIS

#### 4.1 Analysis of PT XYZ's Raw Material and Finished Goods Inventory Control Procedures

Figure 3 shows the procedure for Demanding raw materials to supplier:

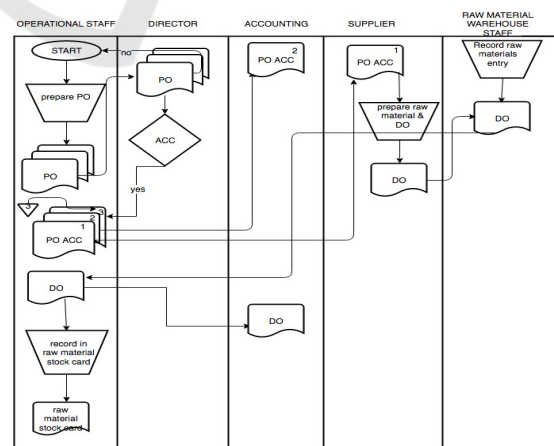


Figure 3: Procedure for Demanding Raw Materials to Supplier

Figure 4 shows the procedure for Demanding raw materials for production :

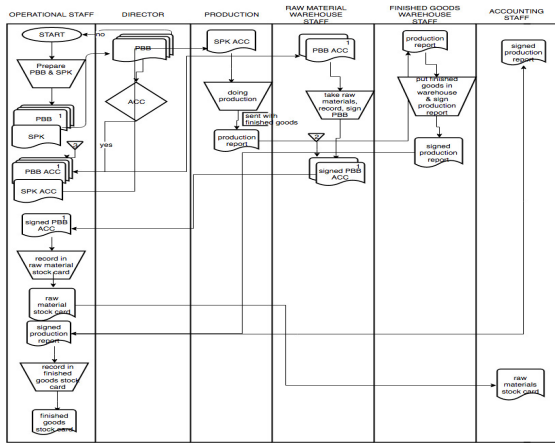


Figure 4: Procedure for Demanding Raw Materials for Production

Figure 5 shows the procedure for Demanding finished goods inventory:

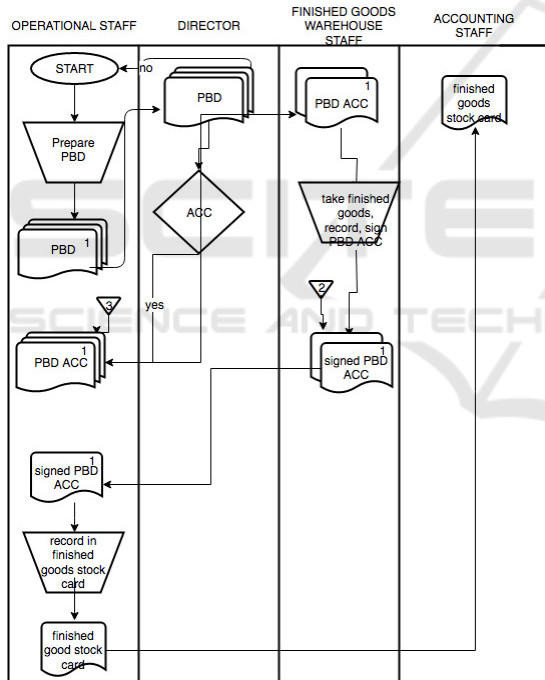


Figure 5: Procedure for Demanding Finished Goods Inventory

**4.2 PT XYZ's Raw Material and Finished Goods Inventory Control Procedure in Accordance with ISO 9001: 2015**

Before designing SIA for raw materials and finished goods inventory at PT XYZ, we must first pay attention to ISO 9001: 2015 clause 8.5.1 relating to inventory control because this clause discusses "control of production and service provision". The

organization must implement production and service provision under controlled conditions, where controlled conditions must include, as applicable:

- Availability of defining documented information (product and service characteristics, results achieved): For this condition, PT XYZ already has a list of products with packaging, documented criteria, and raw materials used also have details for each product produced. Thus, the SIA that will be designed will be made a database of the amount of raw materials used, the products produced and the results to be achieved, all of which can be seen from the Daily Production List (DPH) document. For product characteristics without preservatives and halal, details of suppliers that have passed the criteria are listed in the system and orders can be made.
- Availability and use of monitoring in accordance with the measurement of resources: PT XYZ has carried out appropriate monitoring and measurement of its resources properly, but they were still less effectively and efficiently. Valid resources for measurement are three things that must be considered, namely measuring instruments, inspectors and the environment. First, the measuring instrument, the company already has a prescription and the target of production for each production, it's just still manual so that there is a high probability of an error. In AIS, a supplier database will be designed in which the supplier that has passed the criteria for halal products and BPOM certified and its products without preservatives are registered in the system. In addition, product prescription databases are also made to ensure that the products released from the raw material warehouse and the results achieved are in accordance with existing measurements. The second thing is the inspector. The division of work that is still unclear makes mistakes more common. So, in this study a flowchart will be made that shows the workflow and data for each part so that the division of work is clearer. Third thing, environment. The company already has an environment that is suitable for everything needed by inventory and production, such as dry warehouses, cold warehouses and factories. It's just that there are no restrictions on the access of unauthorized parties to enter.
- Implementation of monitoring and measurement activities at the appropriate stage to verify that the criteria for controlling processes or output, and acceptance criteria for products and services, have been fulfilled: To meet these conditions, the

AIS will have access restrictions in accordance with the authority which each part has at each stage.

- The use of infrastructure and environment that is suitable for the operations of existing processes: PT XYZ is divided into 4 buildings in the company. Building 1 is the office where the director, operation, accounting, and marketing work. Building 2 is a factory where the production department works. Building 3 is a Cooling Warehouse. Building 4 is a Dry Warehouse / Spice Warehouse. With the existence of these 4 buildings, each part is given different authority according to the existing processes. Those who can only enter each building are those who have the authority and of course those who have access to the AIS system that will be created only those who have authorization.
- Appointment of competent people, including the required qualifications: The selection of employees in this company is of course through a separate procedure in which each employee has been given training according to their respective positions. For the use of SIA, of course the person appointed is who is able to use the computer well and get certain trainings. In addition, for product quality, the company also has a nutritionist who monitors every product produced.
- Periodic validation and re-validation, for the ability to achieve planned results from processes and service provision, where the output produced cannot be verified by monitoring or measurement: Stock taking activities are always carried out by the company once every three months. For stock taking activities, the running process is still efficient and effective to be carried out for the next few years, considering the amount of costs that will be used if the stock operation uses an RFID or barcode system. Therefore, SIA is not designed for stock taking activities. Stock taking activities will follow the existing path where after the Accounting Staff and Operation Staff perform stock taking accompanied by the Warehouse officers, then the inventory report is processed by Accounting staff to see the difference with the existing inventory. Then, Accounting staff makes a letter of application for outgoing goods or incoming goods so that the Operation staff create forms for goods in or out. Furthermore, it will follow the flow of goods demand in and out without having to take or enter goods into the warehouse.

- Implementation of measures to prevent human error: To fulfill this condition, an inventory accounting information system is needed. With SIA Inventory is expected to reduce the presence of human error.
- Implementation of expenditure, shipping and post-shipping activities: To meet these conditions, SIA inventories will be designed to document expenditure activities and post-shipment activities.

## 5 RESULTS

Figure 6 shows the procedure for ordering raw materials to suppliers that are in accordance with ISO 9001: 2015:

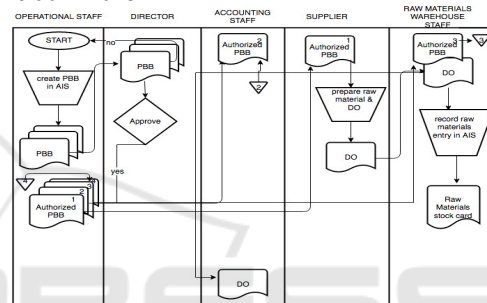


Figure 6: Procedure for Ordering Raw Materials to Suppliers that are in accordance with ISO 9001:2015

Figure 7 shows the procedure for Demanding raw materials for production that are in accordance with ISO 9001: 2015:

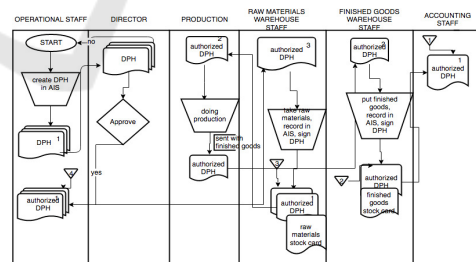


Figure 7: Procedure for Demanding Raw Materials for Production That are in Accordance with ISO 9001:2015

Figure 8 shows the Procedure for Demanding Finished Goods for Production in accordance with ISO 9001: 2015:

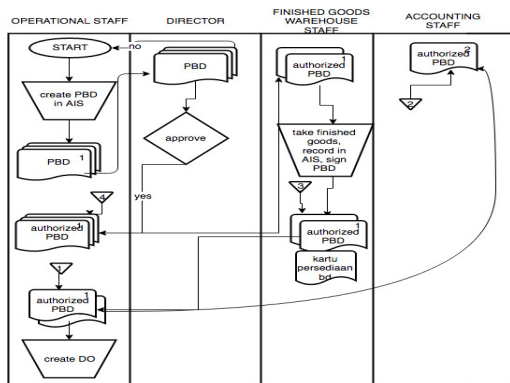


Figure 8: Procedure for Demanding Finished Goods for Production in accordance with ISO 9001: 2015

Figure 9 the Procedure for Demanding Return of finished goods according to ISO 9001:2015:

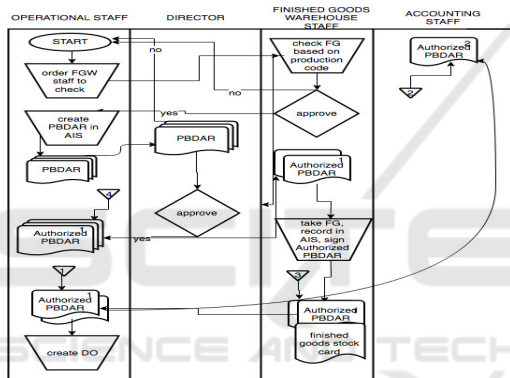


Figure 9: Procedure for Demanding Return of finished goods according to ISO 9001:2015

- Design of PT XYZ's Raw Material Inventory and Merchandise

In the scope definition phase, the analysis was conducted to identify problems and opportunities at PT XYZ. Based on the results of discussions with the Director and operational staff, the author summarizes the problems faced by the company using the PIECES framework (Performance, Information, Economics, Control, Efficiency, Service).

At the stage of problem analysis, misinformation regarding the supply of raw materials and finished goods is actually caused by a manual recording system and the separation of work that is still not appropriate. Therefore, the design of an accounting information system that is in accordance with ISO 9001: 2015 must be able to store data accurately, eliminate the system of recording manually and provide proper separation

on its part in the company to be able to access and input data in the system.

Table 1: PIECES framework

<i>Performance</i>	Calculation of raw material and finished goods inventory automatically
<i>Information</i>	<ol style="list-style-type: none"> <li>(1) Information regarding the amount of raw materials and finished goods inventory is inaccurate</li> <li>(2) Information regarding the total rupiah of raw material and finished goods supplies is inaccurate</li> <li>(3) Data is inflexible – it is not easy to meet new information needs from stored data</li> </ol>
<i>Economics</i>	<ol style="list-style-type: none"> <li>(1) Costs arising from the difference in the calculation of raw material and finished goods inventories</li> <li>(2) Cost arising from error in the estimation of the repurchase of raw materials which causes a purchase not to fixed supplier</li> </ol>
<i>Control</i>	<ol style="list-style-type: none"> <li>(1) The absence of accurate information about the supply of raw materials and finished goods can trigger errors in decision making</li> <li>(2) Avoid fraud in the supply of raw materials and finished goods</li> </ol>
<i>Efficiency</i>	<ol style="list-style-type: none"> <li>(1) Without a system, it takes a lot of people in charge and documentation to produce accurate information about the supply of raw materials and merchandise</li> <li>(2) Without a system, costs arise from the existence of a difference in inventory value</li> <li>(3) Without a system, costs arise from the existence of errors in decision making.</li> </ol>
<i>Service</i>	Accounting information systems are expected to be compatible so that they can help all parts of the company.

In the Needs Analysis Phase, Functional Decomposition Diagrams (FDD) are designed to describe the required components contained in the system and sub-systems separately.

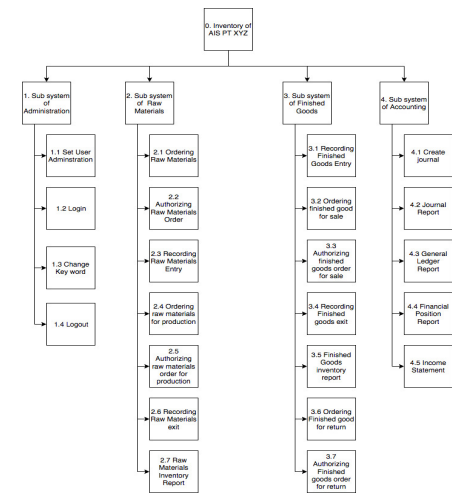


Figure 10: FDD of Inventory AIS PT XYZ

The logical design phase translates business requirements into a system model. The system model consists of logical data models that describe business process requirements, data and information needs, and interface needs.

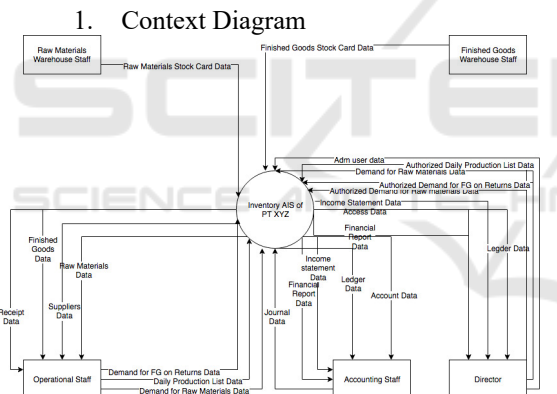


Figure 11: Context Diagram of Inventory

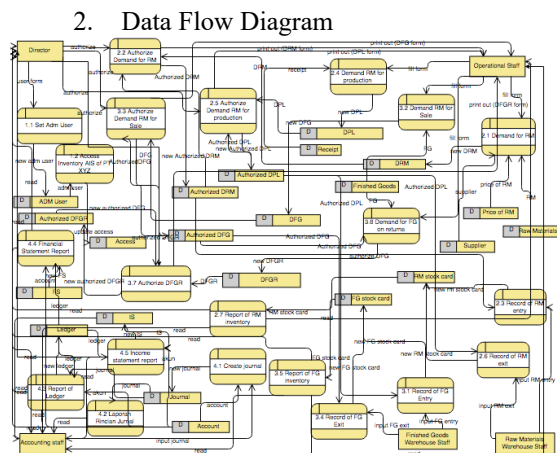


Figure 12: DFD of Inventory AIS PT XYZ

### 3. Entity Relationship Diagram (ERD)

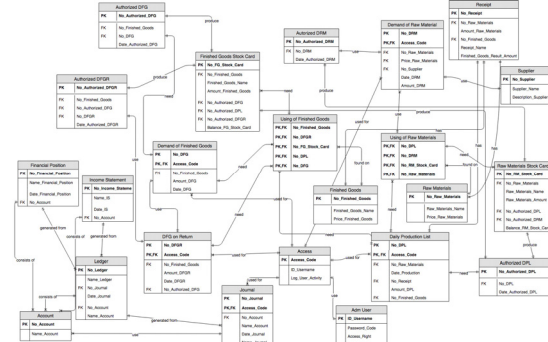


Figure 13: ERD of Inventory AIS PT XYZ

## 6 CONCLUSIONS

The design of the inventory accounting information system was made as one of the solutions to the problems faced by PT XYZ in the company's inventory control. In PIECES analysis, the development of accounting information systems is expected to overcome various problems, especially those related to information. Information about the supply of raw materials and finished goods is expected to be more accurate and the data more flexible, in order to become easily obtained after the system is developed.

The inventory accounting information system that have been designed certainly requires resources for its operation. The system also requires a lot of data that must be entered in accordance with the section and its authorization, namely, the Operational Staffs, Raw Material Warehouse Staffs, Trade Warehouse Staffs, Accounting Staffs, and Director.

The tool for documentation of system requirements consists of FDD, DFD and ERD which illustrates the need for inventory recording systems to be developed for PT XYZ. However, of course this does not rule out the possibility that other parties or other similar companies use the results of documentation of system requirements in this final work. The system design can be changed according to the user needs of the system and business processes that exist in the system user organization.

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