Identification of Information Distortion on Data Flow Diagram (DFD) and Corrective Plans Using a Management Information System Prototype in the Cemara Mas Tanggulangin Cigarette Company

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Objectives: Information systems and technologies are some of the key tools available to managers to achieve higher levels of productivity in business operations, especially when combined with changes in business practices and management behaviours. An information system is also one of the most important parts of the company in improving productivity, both in obtaining and using information mainly for the internal interests of the company. Information systems can technically be defined as a set of interconnected components, to collect (obtain), process, store, and distribute information to support decision making, coordination, and oversight. Information systems can also help analyse the company. Finding: The Cemara Mas Cigarette Company Tanggulangin is still using manual data entry system for distributing information or company data. According to the author, the data entry manual system is prone to loss of data or information, causing distortion of information, recording errors, damage, and the difficulty of data back-up at times when there are production inspections. One way for companies to compete with their competitors is to use an effective information system.

Key words: *Tobacco company, operational management, deep interview, management information system, qualitative, Data Flow Diagram (DFD).*

Introduction

Today's technology is growing so rapidly that it makes such an enormous influence in every aspect of life, including in the world of work in every agency, where the use of computer-based information technology can produce the information that people need in their activities. A company that has not fully utilised information technology should immediately implement a new system to replace the old one. Adapting to technology both in terms of use and development is something that a company or agency do to alleviate work activities in each field, especially in the field of information. The world's current business is not as usual as before, and the company will spend funds on an applied technology system. The Company continues to improve operating efficiency with the aim of achieving higher profitability and making progress in all areas devoted to human interest in general.

Information systems and technologies are some of the key tools available to managers to achieve higher levels of productivity in business operations, especially when combined with changes in business practices and management behaviours. An information system is also one important part of the company in increasing productivity, both in obtaining and using information, especially for the internal interest of the company. Based on the above notions, it is seen that the purpose of the establishment of management information system, is so that the organisation has useful information in making management decisions, both of which include routine decisions and strategic decisions. To achieve the objectives that have been planned by the company, it needed a means of communication for the purposes of decision-making and policy formulation. Manufacturing companies are always engaged in the sales business, as well as tobacco companies, which is one form of manufacturing companies (Hidayat *et al.*, 2019; Tjahjadi, Shanty dan Soewarno, 2019). Numerous strategies are formulated and implemented by companies to increase their sales. In order to avoid distortion of information to obtain accurate and valid information, the company needs to formulate an information system, especially information systems for production activities which are always changing. If suppliers use the Make To Order (MTO) strategy, timeliness in information will be a critically important measure of production performance, for example, measured by time. Whereas if the supplier uses the Make To Stock (MTS) strategy, the information obtained will make the production work at the effective point, as the resultant product is stored in the warehouse first, then sent to the customer, for example, gauging the availability of inventories. All activities will be well organised in the company's business processes. Implementation of the production process includes make to order and make to stock, where the use of production process method depends on the needs of a company and the demand from consumers.

The Cemara Mas Cigarette Company Tanggulangin is a company engaged in manufacturing cigarette products. The company requires effective information systems processing, where

policies and decisions taken based on information obtained will have an effect on the survival of the company. Information systems on production activities at the Cemara Mas Cigarette Company Tanggulangin have not been applied effectively, so that now the company still uses manual data entry system in distributing information or company data. Manual data entry system is prone to loss of data or information, causing distortion of information, recording errors, damage, and difficulty to back up data, when at any time an examination of the production will be conducted. One way for companies to compete with their competitors is to use an effective information system. The change from the manual system to the computerised system is not only about technological change, but also behavioural and organisational change (Bodnard dan Hopwood, 2004).

Rockart (1995) and Irwansyah (2003) state that information technology is the fourth resource after human resources, money resources, and machine resources that are used by managers to form and operate the company. To facilitate and accelerate the process of information delivery so that information can be distributed evenly, and the information is not lost in the middle of production activities, the authors use the Data Flow Diagram (DFD) method. This method can be used to identify distortions of information resulting from the loss of some information from production activities. Along with export activities that have been done by the Cigarette Company Cemara Mas Tanggulangin, the company should implement an effective information system to support the company's operational activities so that the company has the potential to develop. This research will focus on information system analysis of production activities. The problems faced by companies related to production activities is the problem of manual entry data entry system, where the information obtained cannot be distributed evenly and sometimes the information is lost or incorrectly recorded, so that the company needs improvement from the system of corporate information flow. Because if the company does not implement an effective information system, then the company will lose a lot of money (Irwansyah, 2003).

In relation to this, the authors want to apply the method of Data Flow Diagram (DFD) where this method can be used to identify the distortion of information and describe the system as a network of functional processes connected to each other with the data flow. This method also aims to communicate the design of the system to the users or program makers, especially for users who do not know how to use the system of a company, wherein making data and information flow systems can be distributed evenly. One example of the case of money experienced by the Cigarette Company Cemara Mas Tanggulangin is the delay of information of the selling price update between the sales and marketing, so the price of products sold has not been renewed, so that the average selling price is 28% lower than the price that should be achieved in the market. This is a major consideration for the researchers, and why this company needs improvements in management information systems and implements computerisation of production activities undertaken by the divisions that play an important

role in them.

From the explanation, the writer will conduct special research on production activities starting from raw material procurement to finished goods (output) at the Cemara Mas Cigarette Company Tanggulangin, by taking the research topic entitled Identification of Distortion of Information in Data Flow Diagram (DFD) and Design Improvement Using Prototype Management Information System at the Cemara Mas Cigarette Company Tanggulangin.

Problem Formulation

Based on the background that has been described above, then the problem formulation can be made as follows:

1. How is the application of manual data entry system to production activity at the Cemara Mas Cigarette Company Tanggulangin?
2. How can Data Flow Diagram identify the distortion of information on production activities of the Cemara Mas Cigarette Company Tanggulangin?
3. How is the implementation of management information system prototype as a proposed improvement of the information system, so that the flow of data and information can be distributed equally?

Research Purposes

Based on the formulation of the problems mentioned above, the purpose of research can be made as follows:

1. Knowing the application of manual data entry system on the company's production activities
2. Knowing the distortion of information with Data Flow Diagram method on company production activities
3. Making improvements in information systems in the form of prototype production activities of the company.

Literature Review

Production Activities

Production activities that take place within a company are usually called operations management. According to Fogarty (1989) in Prasetya & Lukiastuti (2009), operations

management is a continuous (continuous) process and effective use of management functions to integrate resources efficiently in order to achieve goals. The main elements in the definition are namely:

1. Continuous, meaning production operations management is not an independent activity. Management decisions are not a momentary act, but sustainable actions.
2. Effective, which means all work must be done properly and as well as possible, and achieve results as expected.
3. Management function, which means that production management operations require extensive knowledge, including planning, organising, actuating and controlling. In practice, various resources are integrated to produce goods and services.
4. Efficient, meaning that production and operational managers are required to have the ability to work efficiently in order to optimise the use of resources and minimise waste.
5. Purpose, meaning the production and operation management activities shall have the objective to produce a product as planned. In other words, the production activity of a company is a continuous process whereby the process starts from raw materials to become finished goods. In the production process, there will be a process of change of form (transformation) of the input entered both physically and non-physically into output in the form of finished goods. In order for the production process to function effectively, it needs to be associated with a support system that is able to give direction, evaluate performance and make adjustments to the ever-changing industry environment. Production activities that exist in manufacturing companies usually consist of product planning (procurement management), production control, and inventory control (Lukiastuti dan Prasetya, 2009).

Procurement Management

Procurement management or so-called procurement management is the process of management in an effort to obtain goods or services that are part of the chain of a particular production system. According to Pujawan & Mahendrawati (2010), the definition of procurement is all activities and efforts to supplement and fulfill the needs of goods and services, based on prevailing regulations by creating something that had not yet existed to exist, including the effort to retain something that already exists within the boundaries. Procurement of goods in every day is also called purchase and is the starting point of production activities (Pujawan dan Mahendrawati, 2010).

In a manufacturing company, the goods to be purchased by the procurement department can generally be classified into:

1. Raw materials and components for production needs

2. Capital equipment such as machinery and other long-term equipment
3. Machine parts, office stationery, and so on which are usually called maintenance, and repair and operating (MRO) supplies. Procurement activities are basically administrative activities and do not have much strategic content. In many companies, this view is reflected in the low qualifications of the leadership and procurement staff. Procurement managers are also usually not involved in corporate strategic decisions.

Tasks of the Procurement Section

The procurement department certainly has tasks that they must carry out such as buying goods or services. However, when viewed from the objective of the procurement task, that is to provide goods or services with a cheap price, quality, and delivered on time, it is not limited only to routine purchasing activities. In general, Pujawan (2010) discloses that the tasks performed by the procurement department include: Designing appropriate relationships with suppliers, selecting suppliers, selecting and implementing the suitable technology, maintaining required item data and supplier data, and to conduct the purchase process.

Understanding Inventory

The definition of inventory is goods that are in a storage location or are being manufactured and prepared, to complete a successful operation in the production process and distribution process to the consumer. The decisive factor is the smoothness of it's production, hence the need for an adequate supply, because of the impetus to have the inventory, which does not mean the company provides as much as possible. Indeed, having a high inventory, for example for finished goods, will envisage the possibility of the company not being able to meet the demand of it's customers. Besides, it will cause too much investment in inventory, and also the possibility of the damaged material becomes larger, because that is the need to balance between the loss of having the inventory, and the benefits to be gained.

1. Some notions of inventory are as follows: Inventory is an activity to determine the level and composition of parts, raw materials and products of production, so as to protect the smoothness of production, and sales and expenditure need the company to run effectively and efficiently (Ristono, 2009).
2. Inventory is a number of goods stored to support the smoothness of production and distribution activities. Inventories can also be tangible items stored in a waiting state or not yet completed (Hadiguna, 2009).
3. Inventory is an activity that includes goods owned by the company with the intention to be sold in a certain period of business (Rangkuti, 2000).
4. Inventory, in general, is one type of current assets that are large enough in a company (Sartono, 2010).

From some of the opinions of experts above, it can be said that inventory is part of the assets (wealth) of the company to be used in the production process, that can be raw materials, intermediate goods, and finished goods.

Inventory Function

Inventories arise due to the out of sync of demand with the provision of existing finished goods and time spent in processing raw materials into ready-to-sell goods. To maintain the balance of demand with the supply of finished goods requires an inventory.

1. The factor of time concerns the length of production and distribution process before the finished goods go to the consumer.
2. The time uncertainty factor coming from the supplier causes the company to require an inventory, so as not to hamper the production process and the delay of delivery to the consumer.
3. Factors of the uncertainty of use from within the company are caused by errors in demand forecasting, engine damage, delay in operation, defects, and various other conditions.
4. The economic factor is the desire of the company to get a low-cost alternative in producing or buying items by determining the most economical amount.

Inventory Classification

Handling capital in inventory makes it easier for companies to streamline production processes and to anticipate volatile demand.

1. If according to it's function, this matter is expressed by Prawirosentono, as follows:
a. Batch Stock/Lot Size Inventory; Batch Stock/Lot Size Inventory i.e. inventory held because the company made materials or goods in an amount larger than the amount required at that time because it is transported in bulk (large scale).
b. Fluctuation Stock; Fluctuation stock i.e. inventory held to face fluctuations in consumer demand that cannot be foreseen. In this case, the company makes the inventory to meet consumer demand, if the level of demand indicates irregular circumstances and large demand fluctuations (Prawirosentono, 2009).
c. Anticipation Stock; Anticipation Stock is an inventory held to deal with fluctuations in predicted demand based on seasonal patterns contained in one year and to face increased use, sales or demand.
2. By Type and Position of Goods according to Assauri, viewed from the type, there are 4 kinds of supplies in general, namely:
a. Inventory of raw materials, that is the inventory of tangible goods used in the production process, goods that can be obtained from natural sources and purchased from suppliers or

companies that produce raw materials.

b. Component parts, i.e. inventories comprising components received from other companies, which can be directly assembled with other components, without going through the previous production process.

c. Work in process, i.e. supplies that come out of each section in a form, but still need the process to become finished goods. However, it is possible that half-finished goods for a factory are the finished goods of other factories.

d. Finished goods, i.e. inventory of goods that have been processed in the factory and ready to be sold to consumers. Costs covering the manufacture of the product to completion consisting of the cost of raw materials, direct wages, and overhead associated with the product.

e. Supply materials : supplies are goods needed to support production, but will not be part of the final product produced by the company (Assauri, 1999).

Factors Affecting the Raw Material Inventory

The supply of sufficient raw materials to facilitate the production process and finished goods can guarantee the effectiveness of production activities. If the goods are not available then the company loses the opportunity to seize the market and the company cannot supply the goods at the optimum level. Companies need to direct sufficient raw material inventory control, starting from storage, securing and bringing raw materials to the production process until the finished product is made (Hidayat dan Muktiadji, 2006). Factors that determine the size of the raw material inventory are:

1. Production budget
2. The purchase price of raw materials
3. The cost of storing raw materials in the warehouse (carrying cost) in relation to the extra costs incurred as a result of stockout costs
4. The accuracy of standard manufacture of raw material usage
5. The accuracy of the supplier (seller of raw materials) in delivering the raw materials ordered
6. The amount of raw material each time a message (Nafarin, 2014).

Factors Affecting the Amount of Finished Material Inventory

The delivery of finished goods to several customers plays an important role in managing the supply of logistics. Many manufacturing facilities carry large quantities of finished goods inventory on the supply chain to meet the demands of multiple customers (buyers) at fixed time intervals in the time system for delivery. To synchronise production with customer demand and coordinate the ordering of raw materials with the production schedule, both a

raw materials and finished goods inventory in a manufacturing company, need to be made. The level of a finished goods inventory also serves as an indicator of a product's demand. In the finished goods inventory model, demand can be known and can also change. Finished goods are some of the most important forms of inventory in the form of production scheduling. The amount of inventory depends on several factors, among others: Lead Time, frequency of use of materials for a period, the number of funds available, and material endurance (Sarac dan Yildirim, 2006).

Business Process

A simple definition of a process is a series of systematic steps to achieve the desired goal. A deeper understanding of the process by Arfiyanto (2008) is a set of successive jobs, resulting in value added that uses organisational resources to produce a product or service. The process is a transformation from input to output, where inputs can be resources or requirements, whereas output can be a product or a result. The resulting output can be a value added and can be an input for the next process. Business process management systems allow people to manage processes with their technological collections; generally, the technology used to support this business process is a wider business process using humans and systems (Arfiyanto, 2008).

Input Definition

In a factory or manufacturing, there are inputs in which the input is the material used to make the finished product. In the manufacturing process used as input, are not only raw materials but also equipment, energy, clock, labour and other resources contained in the factory or manufacturing (Karabegović *et al.*, 2020).

Process Definition

In production activities other than input, there is what is called a process that will become a hook for something to be processed into finished goods (final product). A process is defined as a means, method and technique of how actual resources (labour, machinery, materials, and funds) are altered to obtain a result (Assauri, 1999).

1. Processing consists of 4 parts:
a. Basic processing is a process that basically just changes from raw material form to shape as desired.
b. Secondary processing, is a process that changes the basic processing products to the final product.
c. To enhance physical properties a particular treatment is given to the product with the aim

of improving the physical properties of the material.

d. Finishing is a final process for the product in accordance with the specifications that have been determined before ready to be marketed.

2. Assembly operation is a process of combining parts that need to be put together, and this process is done after or following the process. The assembly process is the second major type of manufacturing operation.

3. Material handling and storage: A means of transporting and storing materials between processing and assembly operations should be provided.

4. Testing and inspection : testing is generally regarded as part of the quality control and the purpose of this inspection is to determine whether the product is manufactured to meet design standards and specifications established

Definition of Output

Control is a supervisory activity on the processing, assembly, and management so that the manufacturing process does not deviate from what is planned (the process can be effective). The last production process of the factory or manufacturing is output. An output is the output of the process that has been either in the form of data or form of information that has been processed. In the manufacturing process, the resulting output can be a finished product and waste.

Distortion of Information

Distortion of information is a source of constraints in creating an efficient supply chain because it can be interpreted as a situation where misunderstandings occur in receiving information. Often information about consumer demand for a product is relative over time, but orders from stores to distributors and from dealers to factories are much more volatile than the demand patterns of those consumers (Pujawan dan Mahendrawati, 2010). Distortion of this information is common inside the company, whereas if the error information that occurs in an external company, it is commonly called by the name of the bullwhip effect. The bullwhip effect is defined as the fluctuation of the increase in orders that often occur as orders move through the supply chain resulting in rising costs such as inventory, transportation, shipping, and receiving. According to Pujawan and Mahendrawati (2010), the Bullwhip Effect is also called a phenomenon where there is an increase in instability or fluctuation of orders in the upstream supply chain and the upstream increase is greater, but in reality, demand in retail tends to be stable.

Data and Information Concepts

Data and information are a major resource conceptually, both of which are generally mutually

different. Data consists of facts and figures from various sources in the real world concerning human entities, objects, events and others that can be internal or external. Relative data has no meaning to the user, while the meaning of information is data that has been processed so that it has meaning for the user. According to Kenneth C Laudon (2007) data is a stream of raw facts that cannot be used without being processed first. It can be understood that the data is an input for the information system, while information is the output or the result of the information system process (Modaresnezhad *et al.*, 2020). Input in the form of raw data is processed in such a way by the information system into output in the form of information that will be used by decision-makers. Here is a systematic understanding of experts, namely:

1. Jogiyanto (2005): system is a network of procedures that are interconnected, gathered to perform an activity to solve a particular target.
2. Kenneth C Laudon (2007): system is a group of integrated elements to achieve a certain goal. The system will continue to change about the real-world events that will affect the course of a company's operating activities.
3. Zulkifli (2003): system are elements that are interconnected to form a unity or organisation.

From the above definition, we can know the benefits of the system are to unite or integrate all the elements that exist in a scope, where the components cannot stand alone. Components or subsystems must be mutually integrated and interconnected to form a unity so that goals and objectives of the system can be achieved.

System Criteria

A system has certain characteristics or properties that have components, system boundaries, environment outside the system, connectors, inputs, outputs, processing and targets (Jogiyanto, 2017). Among them as follows: System components, Boundary system, Environment outside the system, system, Input system, Output system, Processing system, Target System.

Classification System

The classification of the system according to Jerry Fitz, Gerald (2002), are seen from several angles, among them are: abstract system, physical system, natural system, manmade system, certain system, indeterminate system, closed system, open system.

Definition of Information

Jogiyanto (2005) "information is the result of processing data in a form that is more useful

and more meaningful to the recipient, which describes real events that are useful for decision-makers" (Jogiyanto, 2008). Meanwhile, according to Zulkfli (2003) "information is data that has been processed in a certain way in accordance with the required form". From some opinions above, the authors conclude that the information is a concrete evidence of data processing that is useful for the holder.

Information Characteristics

There are a few characteristics of information that need to be known (Jogiyanto, 2008). The characteristics of information are as follows: (1) Right or wrong; (2) New; (3) Additional; (4) Corrective; and (5) Intensifier.

Quality of Information

An information system must be able to collect data and transform it into information that has certain qualities (Jogiyanto, 2008). The usefulness of the information should be evaluated in relation to the purpose it serves, namely decision-making.

1. Usefulness of decision, is a function of the decision to be made, the method of decision-making and the ability to take decisions to process information.
2. Understanding (understandability), making the user aware of the importance of an information that is understandable is usually presented in a form that allows the user of the information to understand it. The information available before the information gave the ability to influence decision-making is called timelines. Predictive value and feedback value improve the decision-making ability to estimate, confirm or correct it's goals or desires. The quality of the above information also explains that reliable money information has certain conditions namely:

a. Validity: existing information reflects the actual event or object.
b. Accuracy: information generated according to the event or object being represented.
c. Completeness: The degree to which information informs the related event.
d. Verifiability: information can be obtained by using independent measurement methods.

Understanding Information Systems

Information systems can technically be defined as a set of interconnected components: collect (obtain), process, store, and distribute information to support decision-making, coordination, and oversight; information systems can also help an enterprise analyse other firms. The design of information systems is the development of new systems of existing old systems, where problems that occur in the old system are expected to be resolved in the new system. The five components of the Information System are as follows:

1. Hardware and Software that serves as a machine.
2. People and procedures that are human and machine use.
3. Data is a bridge between humans and machines for a process of data processing.

The benefits of an information system are:
1. An information system's first benefit is to present information to support decision-making.
2. The information system is to present information to support daily operations.
3. Information systems have the last benefit of presenting information pertaining to stewardship.

Understanding Data flow diagram (DFD)

Due to the many methods available, there is no definite provision in the use of methods to identify whether the distortion of the information is true or not. It is usual that when describing a contextual system, a Data flow diagram that will first appear is the interaction between the system and the entities that exist outside. A data flow diagram (DFD) is a diagram that uses notations to describe the flow of system data, whose use is helpful to understand the system logically, structured and clearly. DFD is a diagram that logically explains the interaction between processes, the flow of data from a process to the next process and relationships with outsiders. Each process in the data flow diagram can be broken down into a process with a smaller and detailed scope, depending on the needs of the analysis. This DFD is often referred to as the Bubble Chart, bubble diagram, or workflow diagram. DFD is designed to denote a fragmented system into a smaller sub-system section and to underline the data flow between the two items mentioned above.

Benefits of DFD

According to Al-Bahra bin Ladjamudin (2005) in his book entitled Analysis and Design of Information Systems as for the benefits of Data flow diagrams (DFD) are:

1. Data flow diagram (DFD) is a modelling tool that allows systems professionals to describe the system as a network of functional processes connected to each other by the data flow, either manually or computerised.
2. This data flow diagram (DFD) is one of the most commonly used modelling tools, especially when the system functions are more important and complex than the data manipulated by the system.
3. Data flow diagram (DFD) is a system design tool oriented to the data flow with the concept of decomposition and can be used for depiction analysis and system design easily communicated by professional systems to users and program makers (Ladjamudin, 2005).

Model of Management Information System Development (Model Prototype)

Ulrich and Eppinger (2002) define prototypes as product estimates along one or more dimensions of importance. This is a form that reflects the needs of customers closely related to the company. The prototype model is an improvement of software engineering using prototyping techniques. The management information system prototype is the top management meeting place, the vendor, the customer, and the team members to communicate about the feedback of a product produced by the company and for the consumer. The prototype paradigm begins by collecting the kinds of needs used by the company.

Benefits of the existence of a Model Information System Development Form:

Prototype

The prototype allows system developers and customers to create a model of software that will be developed by this model (Ulrich dan Eppinger, 2002).

Steps in Creating Prototype Models

In developing a system of planning, the programming model is very important because the information system will facilitate the coordination between system developers with customers. In connection with the prototype below, will be described some steps of making a prototype according to Jogiyanto (2005) namely:

1. Identify needs
2. Develop prototype
3. Determining whether the prototype is acceptable or not
4. Conduct an operational system through a programming system by a programmer based on agreed system modelling
5. Testing the operational system
6. Testing the operating system whether it is acceptable or should be repaired, or worse, should start all over again.

Research Methods

Research Approach

Research is a form of submission or offering an idea or thought to find a systematic, methodological and comprehensive answer to a problem with the intention, permission, etc. to the parties concerned. Research conducted by researchers belong to the type of descriptive

qualitative research method. Descriptive qualitative research is a research method based on postpositivism philosophy that is usually used to examine the natural objective conditions in which researchers act as a key instrument. Qualitative research techniques also include translating and explaining a meaning, rather than searching for a frequency of a phenomenon in the social world. Qualitative research is used as a first step in making quantitative research. Qualitative research is used at the time of data collection and at the time of data analysis. At the time of data collection, techniques used an individual deep interview with the informants (Sugiyono, 2012).

Limitations of Research

Benefits imposed limits on the scope of this research is that the study runs effectively and on target so as not to get out of the intent and purpose of the implementation of research. The limitations of this study are:

1. The research is done in the production of the Cemara Mas Cigarette Company Tanggulangin because in this process most experienced changes in information and less effective data distribution must be considered.
2. Historical data used is data and previous documentation on production activities in implementing a manual data entry system and with the use of a data flow diagram method. Data retrieval is done by interviewing with the head of the sales department, production department head and parties related to production section at the Cemara Mas Cigarette Company Tanggulangin.
3. The tool used is trying to apply the method of the data flow diagram as a means for distributing evenly to all parts of production activities, where this information system still used by the company is the manual information system data entry, so that distortion of information often happened.

Types and Data Sources

There are two types of sources of data from this study. Here is the understanding and application of data sources in this study, namely:

1. Primary data: Primary data is the main data in the form of explanations given by the internal company, both orally and in writing, as well as a direct observation of production activities undertaken in the factory that became the object of research.
2. Secondary Data: Secondary data is a complementary data obtained from literature study results obtained from written sources such as literature studies, articles, and literature related to the formulation of research problems.

Data Collection Procedures

In qualitative research, data collection techniques are needed to obtain data in a study. Without knowing the techniques of data collection then the researchers will not get data in accordance with what is expected.

1. Preliminary survey: At this stage, the first researcher contacts via phone the research subject that is the Cigarette Company Cemara Mas Tanggulangin and visits the next day.
2. Literature study: In the next stage, researchers look for the underlying theoretical foundation and support in overcoming the problems found in the subject of research.
3. Library Studies: In the next stage, researchers look for the underlying and supporting theoretical foundation in overcoming the problems found in the subject of research.

Analysis Technique

The data analysis (evidence) consists of testing, categorising, or re-combining evidence to refer to the initial proportion of the study. Further a conclusion is drawn based on the combination of evidence collected from the problems to be answered.

Research Stages

Stages of appropriate research in solving research problems are needed to achieve good research results.

1. Conducting a preliminary survey to obtain a clear vision and flow on the issues raised by the author.
2. Conducting analysis of business management processes that have been implemented by the company.
3. Analysing manual data entry system that has been applied by the Cigarette Company Cemara Mas Tanggulangin
4. Formulate problems that occur in the company.
5. Determining the research objectives based on the formulation of the problem.
6. Conducting field studies to collect important data needed, including business process data, production data and documentation data about production activities.
7. Conduct literature study. This study is to obtain information relating to research materials and can be used as a reference and support in solving problems that have been identified.
8. Identification of each process on production activities with manual data entry system that has been run by the company so far.
9. Selection of data flow diagrams (DFD) tools to design the flow of information on effective production activities.

10. Analysing the role of information systems in production activities that initially form manual data entry, which will be replaced by using the selected tools that is the data flow diagram as a form of the effectiveness of information flow on production activities.

11. Making suggestions for improvement to streamline production activities based on the results of the analysis conducted using the system prototype of management information system.

12. Giving conclusions and suggestions on the results of research conducted.

Result and Discussion

A General Description of the Company

The Cigarette Company Cemara Mas Tanggulangin is a company engaged in the manufacturing of cigarettes. A fuller picture of the Cigarette Company Mas Tanggulangin will be explained as follows:

Brief Company History

The Cemara Cigarette Company Mas Tanggulangin was originally a home industry established in 1984 in Rendengan Village, Tanggulangin District and initiated by "Tiga Serangkai". The "Triumvirate" is H. Moch. Amir, Drs. Manaf Asmoro S., and Drs. Kuncoro who are each responsible for handling research and production, marketing, and financial records according to their respective capabilities. The Cemara Mas Cigarette Company Tanggulangin has a vision, namely "To be a leading domestic cigarette industry company, profitable and with a dominant role".

Production

Production materials used by the Cemara Mas Cigarette Company Tanggulangin are grouped into 2 (two) groups, namely the main raw materials and auxiliary raw materials.

Data Analysis (Application of Data Entry Manual)

Implementation of information systems at the Cigarette Company Mas Tanggulangin is still using manual data entry. The use of simple and simple data entry manuals is one of the reasons for it's use by companies. In general, recording and managing data manually is only suitable for managing small amounts of data and the expected information on the data is monotonic and not repetitive. Manual data entry has a weakness that can disrupt the information and it's flow. The disadvantages of using manual data entry are data duplication, data dissemination, and data inconsistency. Information that cannot be distributed evenly, and

sometimes information may be lost or incorrect in the recording, may result in ineffective production activity. The various weaknesses can be corrected by the change of information system from manual data entry into the data flow diagram method. Data flow diagram method can be used to identify the distortion of information in this research, and information data can be spread evenly so that it can be known by each part of the company.

Information Flow and Production Activity Data of the Cemara Mas Cigarette Company

It is a common practice that companies attempt to describe a system of contextual data flow diagrams using manual data entry. The process of the depiction of the system will show the interaction between the system and the external entity that contains the existence of direct contact and communication. There is this opportunity that introduced the conceptual approach by using data flow diagrams (Data Flow Diagram - DFD). DFD is designed to denote a fragmented system into a smaller sub-system and to underline the data flow between the system and the external entity. This diagram is then developed to see more detail so it can see the models contained therein. The Cemara Mas Cigarette Company uses manual data entry and visible distortion of information causing ineffectiveness to arise in it's production activities.

Conclusions and Suggestions

Based on the results of the analysis and discussion of this study, the following conclusions can be drawn:

1. Manual registration system (manual data entry) is applied to the Cemara Mas Tanggulangin Cigarette Company which is a manufacturing company in the process of sales, production, and distribution. A simple manual recording system is highly applicable for all employees of all educational backgrounds, but unfortunately, the record system is ineffective because manual data entry provides a gap in human error. In addition, it can also cause distortion of information that is information that must go through many posts before arriving at the destination, which may cause information to decrease or change, especially if the coordination system is weak. In the Cigarette Company Cemara Mas Tanggulangin, coordination between the sections is very limited, especially regarding the dissemination of information. This makes the company less responsive in overcoming a problem, especially related to the process of sales and production. Recording results with manual data entry is also likely to be easily lost, so it will be difficult in the preparation of information databases and reporting processes that are periodic in terms of sales and production.
2. The information flow mapping on Cemara Mas Tanggulangin Cigarette Company uses the method of data flow diagram level (DFD) which is intended to describe the

information process flowing from one part to another. The flow of information poured in the data flow level diagram can identify the distortion of information because it can compare the existing data flow conditions and ideal data flow in the company. Comparison between level 0 diagram and level 1 diagram can identify some distortion information as follows:

a. Distortion of information on the order part of the raw material inventory is not sufficient for the production process and fluctuations in order quantity. Insufficient supply of raw materials can be attributed to the lack of information on the availability of raw materials in the raw material supply warehouse. Other factors that may affect it are fluctuations in raw material prices and fluctuations in order quantity.

b. Distortion of information on the procurement of raw materials in terms of raw material prices and raw material inventory conditions for further product manufacturing process. The sales department should store the data of the equipment and distribute it equally in other parts, especially the marketing part that will do the same thing.

c. Distortion of information on the part of production information that is lead time (order fulfillment time) is backed up due to unknown information by the sales department of the production section in terms of product order confirmation.

3. Proposed improvements to achieve ideal enterprise information flow and data flow is to replace the manual data entry system (manual data entry) with a computerised and coordinated system. An engineering prototype model is made to be able to accommodate the flow of data and information sales, production, and distribution. Prototype models that contain certain information can be accessed by the corresponding section and the director as a form of real-time reporting.

REFERENCES

Arfiyanto, F. N. (2008) *Peningkatan proses bisnis pada unit Hatchery di PT. X dengan menggunakan metode model-based and integrated process improvement*. Universitas Indonesia.

Assauri, S. (1999) *Manajemen Perusahaan*. Diedit oleh Edisi Revisi. Jakarta: LPFE UI.

Bodnard, G. dan Hopwood, W. S. (2004) *Accounting Information System*. New Jersey: Pearson Education, Inc.

Hadiguna, R. A. (2009) *Manajemen Pabrik: pendekatan sistem untuk efisiensi dan efektivitas*. Jakarta: Bumi Aksara.

Hidayat, L. dan Muktiadji, N. (2006) "Sistem pengendalian Persediaan Bahan Baku Dalam Menunjang Efektifitas Sistem Produksi," *Jurnal Ilmiah Ranggagading (JIR)*, 6.

Hidayat, W. *et al.* (2019) "Variables affecting the book value of manufacturing companies: The case of Indonesia," *International Journal of Economics and Business Administration*. International Strategic Management Association, 7(1), hal. 76–84. Tersedia pada: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85062274853&partnerID=40&md5=dfd46441d6e2b3efb06d35fa1dc87a3b.

Irwansyah (2003) *Evaluasi Pemakai Atas Kecocokan Tugas Teknologi yang Mempengaruhi Kinerja Individu*. Universitas Gadjah Mada.

Jogiyanto, H. M. (2008) *Metodologi Penelitian Sistem Informasi*. Yogyakarta: Andi Offset.

Jogiyanto, H. M. (2017) *Analisis dan Desain (Sistem Informasi Pendekatan Terstruktur Teori dan Praktek Aplikasi Bisnis)*. Yogyakarta: Penerbit Andi.

Karabegović, I. *et al.* (2020) "Implementation of Industry 4.0 and Industrial Robots in the Manufacturing Processes," in, hal. 3–14. doi: 10.1007/978-3-030-18072-0_1.

Ladjamudin, A.-B. Bin (2005) *Analisis dan Desain Sistem Informasi*. Yogyakarta: Graha Ilmu.

Lukiastuti, F. dan Prasetya, H. (2009) *Manajemen Operasi Edisi Pertama*. 1 ed. Yogyakarta: MedPress.

Modaresnezhad, M. *et al.* (2020) "Information Technology (IT) enabled crowdsourcing: A conceptual framework," *Information Processing & Management*, 57(2), hal. 102135. doi: 10.1016/j.ipm.2019.102135.

Nafarin, M. (2014) "Penganggaran." Universitas Terbuka.

Prawirosentono, S. (2009) *Manajemen Operasi (Operation Management): Analisis & Studi Kasus*. Jakarta: Bumi Aksara.

Pujawan, I. N. dan Mahendrawati (2010) *Supply Chain Management*. Surabaya: Guna Widya.

Rangkuti (2000) *Business Plan: Teknik Membuat perencanaan Bisnis & Analisa Kasus*. Jakarta: Gramedia.

Ristono, A. (2009) *Manajemen Persediaan*. Yogyakarta: Graha Ilmu.

Sarac, A. dan Yildirim, H. (2006) "Semi-continuous emulsion copolymerization of vinyl acetate and butyl acrylate using a new protective colloid. Part 1. Effect of different emulsifiers," *Polymers for advanced technologies*. Wiley Online Library, 17(11-12), hal. 855–859.

Sartono (2010) *Manajemen Keuangan Teori dan Aplikasi*. 4 ed. Yogyakarta: BPFE.

Sugiyono, S. (2012) *Metode penelitian kuantitatif kualitatif dan R&B*. Bandung: Alfabeta.

Tjahjadi, B., Shanty, H. M. dan Soewarno, N. (2019) "Innovation, Process Capital and Financial Performance: Mediating Role of Marketing Performance (Evidence from Manufacturing Industry in Indonesia)," *Humanities & Social Sciences Reviews*, 7(1), hal. 278–290. doi: 10.18510/hssr.2019.7132.

Ulrich, K. T. dan Eppinger, S. D. (2002) *Produk Design & Development*. Boston: McGraw-Hill.