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Electronic Supply Chain Management Model for Monitoring Plant System Performance at PT. XYZ

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Abstract **- PT. XYZ is a company that does business in paper production, one of the revolutions in the field of network distribution based on Internet technology. E-SCM technology has many advantages such as optimizing data recording, and data distribution and facilitating remote monitoring of data systems using WAN Network Topology. Based on the results that have been analyzed, a supply chain management model is needed that can help monitor data systems using WAN network topology distribution that can be accessed by PC Server to the intended International WAN Access.**

Keywords: Distribution, **Monitoring System, Supply Chain Management, WAN**

I. INTRODUCTION

Business competition between companies today getting tighter and stricter every day, along Information Technology Developments have changed the way companies do business, For this reason, companies are required to always be able to change their business strategy and tactics to be better. (Ramadhan, 2019)

The Internet is a global communication forum that connects millions of computer networks via telephone lines. Where the internet is organized by many parties or groups, organizations, or other private institutions. (Jogiyanto, 2005) Many people use the internet to broaden their insight into life. A lot of information is taken from all over the world via the internet.

WAN is a collection of LANs or workgroups that are connected using modem communication tools and internet networks, from or to the head office and branch offices, as well as between branch offices. (Mulyadi, 2014)

According to Pujawan, (2017), a supply chain is a network of companies that work together to create and deliver a product to the end user.

Current industrial developments require the industry to continue to improve supply chain management. Electronic supply chain management (E-SCM) is one of the revolutions in internet-based goods distribution information technology. E-SCM technology has many advantages such as optimizing data recording, data distribution & system monitoring.
Darmawan et al., (2018) conducted research aims to know the process of providing raw materials and improving production quality up to when delivery will be made. So companies need a Supply chain management information system (SCM) which is expected to be able to manage existing needs in the company. Supply chain management (SCM) itself is a supply chain management process starting from the process of procuring raw materials, and production until the finished product reaches the hands of consumers.

Supply Chain Management (SCM) is a system that can coordinate processes of movement of materials, information, and finances in a company. One of the factors that requires costs in marketing the product, namely Logistics management consisting of design products, material procurement, production, control inventory, and storage of goods. Coordination What's happening isn't just inside the company, but also for all outside activities company. The goal is for the management of the need for raw material supplies to become more effective and efficient (Setiawan & Setiyadi, 2017)

Wati et al., (2022) implement a Supply Chain Management Information System (Supply Chain Management) that can make it easier to manage inventory, starting from the ordering process made by suppliers, procurement of goods, and managing goods to customers. This application is designed using XAMPP and the Hypertext Preprocessor (PHP) programming language and uses a MySQL database. This application helps companies/agencies to store any data that is still manual or not yet

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computerized which aims to maximize the performance and profits of the company, suppliers, and customers who can provide satisfaction to the company.

Ika Jaya, (2016) developed a supply chain management information system with multiple stages including: analyzing the business processes running there, analyzing the existing problems in the procurement process as well as considering the impact and constraints of what will happen if the implementation of SCM. The main solutions offered by these systems are their user interfaces that involve suppliers bidding directly through the price system. Notifications, negotiation, and approval are done online, which is expected to make the time of ordering raw materials becomes shorter. Tests on new research on the functional system using black box testing methods.

Information systems and supply chains have a strategic role in managing, measuring, and improving business performance with a sustainable competitive advantage. Mustafid, (2015) designed the basic theoretical concepts of information systems for an enterprise knowledge-based sustainable supply chain. These systems are in the form of a sustainable supply chain information system designed based on enterprise resource knowledge and directed by the objectives and indicators of business performance in a sustainable by taking into account environmental, economic, and societal. Concepts and theoretical basics of this system can be used as a basis for research development and application in the field of information systems and supply chain sustainability. The application of this system can be used to help management manage and optimize enterprise knowledge resources by the potential of the enterprise to improve business performance overall and sustainability.

Saputro et al, (2018) developed an Electronic Supply Chain Management information system that can assist in improving the company's performance to achieve efficiency and effectiveness in its business processes. Software development is done using a waterfall model, where several steps must be done sequentially. On testing software functionality using the black-box method and the white-box method. Based on the results of functionality testing that has been done indicates that this system has met the needs by the specified specifications, and also the results of compatibility testing show that the system can run well on various browsers.

(Hasriani et al, (2018) are to create a WEB application database to speed up the process of information and facilitate the customers in terms of the order or ordering goods hello to the company. The system is expected to simplify and save time during the process of ordering goods is in progress. Recapitulation of Region 60, Cyclomatic Complexity 60, and Independent Path 60 is worth the same conclusion that the application is designed free of logic errors.

Khotantri et al, (2023) designed and built an ordering information system by utilizing a website and using PHP programming, and a MySql database. The results obtained in this study are an information system capable of supporting business organizations and customers in website-based fruit-ordering transaction activities. In addition, the information system built can produce various reports according to needs quickly.

Ramadhan, (2019) analyzed that the supply chain management system requires the existence of an information system that is reliable, accurate, and adequate to assist the system. Currently, the raw material procurement process is hampered due to slow response from supplier’s purchase orders, total delivery errors that occur to suppliers, and difficulty predicting raw materials

PT XYZ, so far in running the company's business, has not had an integrated system that can optimize data recording and distribution, making it easier to monitor data systems remotely using a WAN Network Topology. This research has a goal to be achieved, namely implementing E-Supply Chain Management to monitor the performance of plant systems based on WAN (Wide Area Network) and providing a direct contribution to data system management at PT. XYZ.

II. METHODS

The methodology in this study consists of literature study, process analysis, modeling business, system needs analysis, design system, implementation, testing, and conducting conclusions and suggestions.

PT. XYZ requires an integrated system that can monitor comprehensively. In carrying out this activity, steps or stages are required, namely,

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among others: Conducting monitoring and control, Communicating objectives to a system with E-SCM, Know the monitoring distance to the objectives to be achieved.
In creating an Integrated E-SCM performance system, here are some things to pay attention to: determine what will be measured and monitored to create alignment between the E-SCM strategy and standardized measurements, and apply detailed E-SCM metrics to measure related performance. PT. XYZ requires an integrated system that can monitor comprehensively. In carrying out this activity, steps or stages are needed, namely, among others.

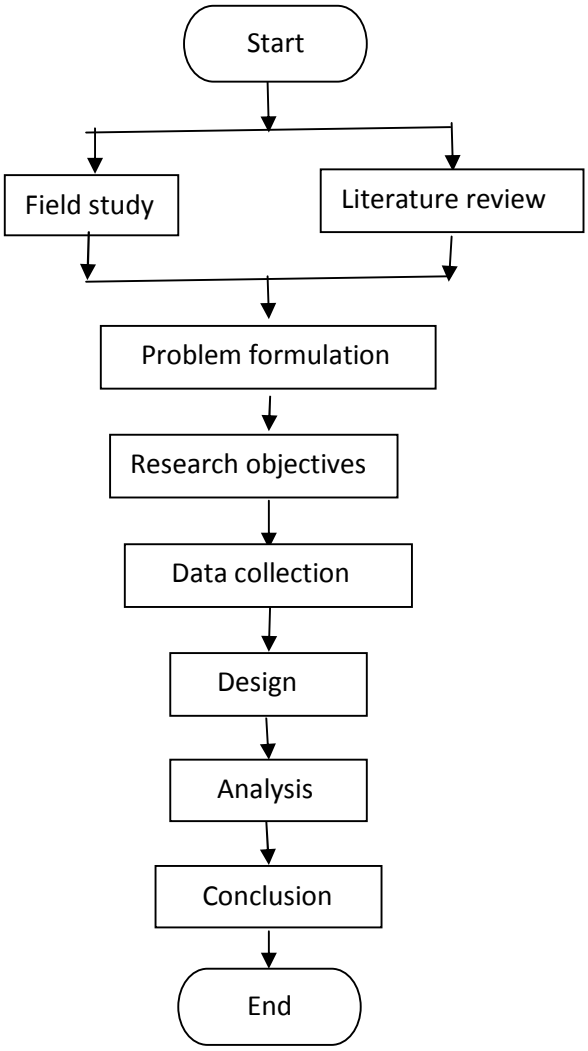

Figure 1 Research Design

The research steps are as follows
1. Start
   Research begins
2. Field study
   research method carried out by collecting data directly at the location or place where the phenomenon being studied occurs.
3. Literature review
   Literature studies related to the problem being researched are used as theoretical references and the basis for solving the problem being researched.
4. Problem formulation
   a very important initial step in research or a scientific project. This process aims to identify and formulate the problem to be studied or solved.
5. Research Objectives
   The purpose of research refers to the reason

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or intention to be achieved in research. This purpose is usually formulated from the beginning of the research and becomes a guideline in determining the direction and methods to be used in the research.

6. Data collection
   a systematic process of gathering information needed for a specific purpose, such as research, analysis, or decision-making. The data collected can be qualitative (descriptive) or quantitative (numerical), depending on the type of information needed.
7. Design
   a creative and systematic process for designing or creating something, be it a product, building, visual display, or other system, to meet a specific need or solve an existing problem.
8. Analysis
   a systematic process of examining or breaking something down into smaller parts to better understand it. In many disciplines, analysis is used to understand data, information, or situations to conclude, make decisions, or find solutions.
9. Conclusion
   part of a discussion or argument that serves to conclude or summarize the core of the topic that has been discussed. Usually, the conclusion is at the end of a writing or discussion to provide a general overview of the results of the analysis or thoughts that have been presented previously
10. End
    Research end

III. RESULT AND DISCUSSION

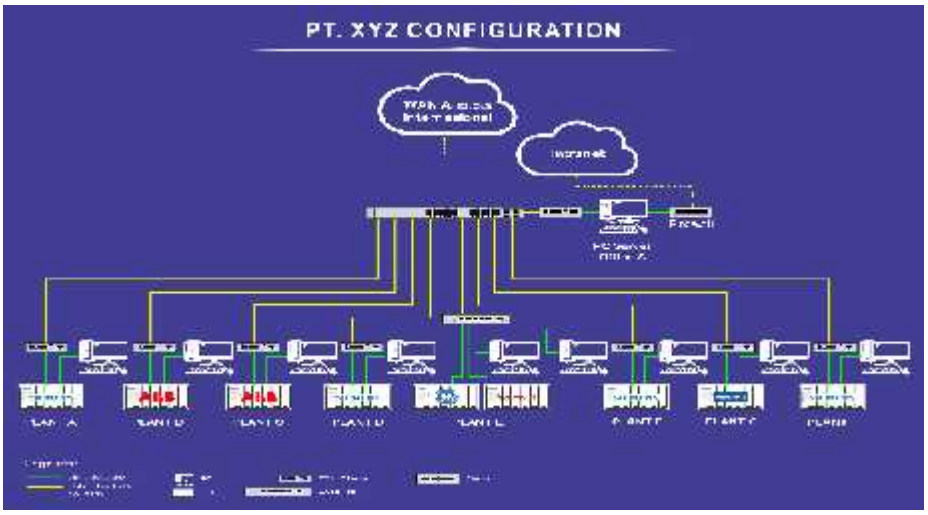

Figure 2 Electronic Supply Chain Management Model for Distribution Network Topology at PT. XYZ

The data monitoring stage is carried out to obtain information about production inventory in each area. If an error occurs in one of the production data, a check must be carried out on the server line in the area that is experiencing a data error. To find out the data, distribute it via a network topology using a WAN that can be accessed by the PC Server to the SCG WAN Access in the intended International. Monitoring is carried out twice a day to ensure the performance of the plant system at PT. XYZ is running well. If a data error occurs during monitoring, a check is carried out on each plant server that is experiencing an error.

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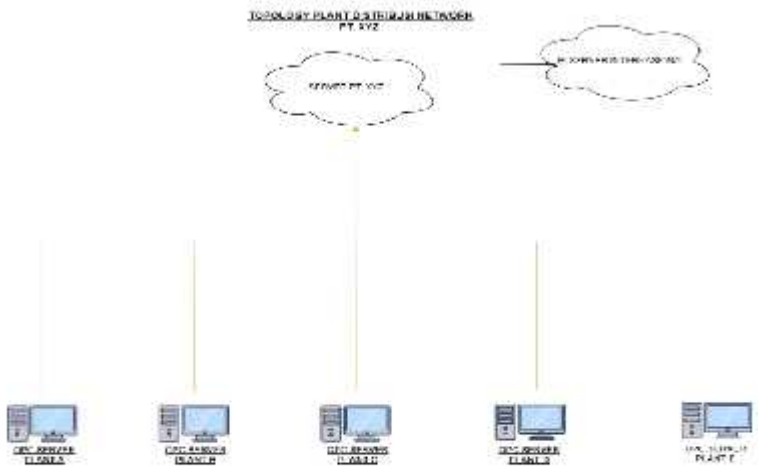

Figure 3 Topology Supply Chain Management for Distribution Network Topology at PT. XYZ

Distribution topology to distribute data from PT. XYZ to the intended International PC Server. Distribution monitoring is done by collecting data from each plant to be combined into the PT. XYZ PC Server which is then distributed to the intended International PC Server. The tool used to connect to the PT. XYZ PC Server is the OPC Server. OPC Server is software that converts the hardware communication protocol used by the PLC into the OPC (Device Connectors) protocol.

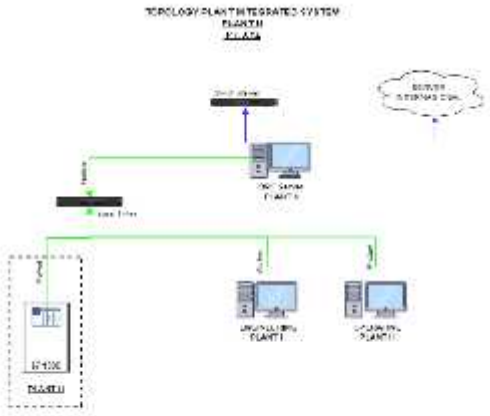

Figure 4 Topology Plant Integrated System at Anaerobic Plant PT. XYZ

The distribution process is carried out from the Engineering PC and Operating PC Server of each plant to the PLC S7-1500 using a profinet cable. Then from the PLC S7-1500, it is communicated via a profinet cable using a Switch Hub tool. Switch Hub is a network device that functions to connect several devices in a local network. The Switch Hub tool is then

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connected to the OPC Server of each plant. The OPC Server can be used to monitor the intended International Server. Distribution monitoring is carried out so that the work is done by the required data such as RPM or motor speed, voltage, amperes, and frequency on the motor engine of the PT. XYZ factory.

Performance management or continuous improvement is one of the fundamental aspects of E-SCM. Therefore, the company PT. XYZ requires an integrated system that can monitor comprehensively. In carrying out this activity, steps or stages are required, namely, among others

a. Conduct monitoring and control
b. Communicate objectives to a system with E-SCM
c. Know the monitoring distance to the objectives to be achieved

In making an Integrated System for E-SCM performance, here are some things to consider

a. Determine what will be measured and monitored to create a match between the E-SCM strategy and standardized measurements.
b. Apply detailed E-SCM metrics to measure related performance.

IV. CONCLUSION

From the discussion that has been done, it can be concluded that the Electronic Supply Chain Management Model for Network Topology Distribution at PT. XYZ can help companies to get solutions in terms of data distribution to PC servers so that they can be accessed using WAN Access at the intended International. The benefits obtained by monitoring the performance of the plant system at PT. XYZ has a significant and positive influence on Supply Chain Management and competitive advantage. The implementation of good Supply Chain Management in manufacturing companies in Gresik will be able to increase the competitive advantage possessed by the company. The implementation of good Supply Chain Management will be able to improve the company's performance, both in terms of financial and operational performance. The increasing competitive advantage of the company will be able to improve the company's performance as well.

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