

Analysis of Lean Manufacturing Implementation on E-Supply Chain Management Performance in Manufacturing Companies

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Abstract:

This study aims to determine the effect of the implementation of the lean manufacturing system on the performance of E-supply chain management. The sample for this study is a company that uses a lean manufacturing system in Cikarang, Bekasi. This research method involves using direct observation in companies regarding the use of lean manufacturing systems from the processes of receiving customer orders, calculating raw material requirements, ordering raw material requirements, production processes, and delivery processes, so that concrete data can be obtained. With this research, it will be determined whether the use of a lean manufacturing system will affect production lead time, reduce the amount of inventory, reduce inventory area, and improve delivery performance. So that from the implementation of lean manufacturing, is there any influence on the performance of E-Supply Chain Management. With E-Supply Chain Management, control and monitoring of Supply Chain Management performance can be done in real time, wherever we are as long as there is an internet network, we can control.

Keywords: lean manufacturing, waste, supply chain management

INTRODUCTION

Effective and efficient manufacturing company strategies are currently needed; in this case, the speed of information, the speed of obtaining data, the speed of conducting analysis, and the speed of making decisions are needed so that company performance can be achieved. In the current condition of the COVID-19 pandemic, where work is asked to continue by fulfilling predetermined health protocols, in this case, the digitalization of the manufacturing system is treated in every work activity, and one of these activities is supply chain management.

One of the manufacturing concepts that companies can use to run effectively and efficiently is the lean manufacturing system. For this reason, proper and efficient inventory handling is required. So that many established companies, such as Toyota Motor Corporation, adopt the Kanban system. The application of the Kanban system

has increased manufacturing efficiency and flexibility according to customer requirements. The Kanban system is a pull system approach that gives authorization to produce at the required rate and at a certain time to fill the portion already consumed by the customer. Part of the lean manufacturing system, the Kanban system emphasizes minimum inventory levels by producing only what is needed. This ensures the supply of the right product at the right time, in the right quantity, and at the right place. The Kanban system becomes practical when you synchronize all manufacturing activities throughout manufacturing with customer requests. Every process in production is controlled by a Kanban system designed to respond to the actual demands of customers.

Under current customer pressure, many companies are required to produce products of high value and provide quality products at competitive prices, as well as good supply chain management performance. They must focus on meeting these needs as a condition for surviving and succeeding in today's market. For this reason, effective control and monitoring are needed, so a management role is needed to carry out e-suspend chain management.

LITERATURE REVIEW

Lean Manufacturing

The lean concept is a concept known as streamlining or efficiency in that lean manufacturing is a systematic approach as a continuous improvement effort to pursue the excellence of the manufacturing industry by forcing waste along the value stream of product operation activities (materials, work in process). output) in order to become a streamlined, efficient operation and be able to increase the added value of goods and services in order to provide value to customers. So that the company can get more resale value from customers, and by getting more resale value from customers, it is hoped that supply chain management will perform even better. Besides being able to identify and minimize waste, it is also able to eliminate non-value-added activities, which include waste activities, with the lean manufacturing concept resulting from the development of the Toyota Production System, which was pioneered in Japan by Taiichi Ohno. The implementation of this concept consists of 5 principles, with the main principle being to determine the value and perspective of consumers (Hanes and Taylor, 2000: 5).

According to Haizer and Rander, lean operations supply what customers want when they want it, without waste, and through continuous improvement. Lean operations are driven by the pull of customer orders. When applied as an overall manufacturing strategy, JIT and lean operations maintain a competitive advantage and result in greater average profits. Here are 3 differences between JIT, TPS, and lean operations: JIT emphasizes problem-solving. TPS emphasizes employee learning and improving the assembly-line environment. Lean operations emphasize customer understanding. Apart from the differences in the three things above, every manufacturing operation is required to complete these three things. The nature of the above is the most basic characteristic and influences many things in the field of operations management, such as eliminating waste, eliminating variability, and accelerating output volume.

Waste

Hines and Taylor (2000) state that waste is the entire activity that occurs within a company or a broader supply chain that does not add value to the product or service provided to the end consumer, so that it can be concluded that waste is the use of all resources that are not maximized according to the needs of the company and including activities that do not provide added value (NVA) in the process of transforming inputs into outputs along the value stream.

In this case, waste can be interpreted as all manufacturing activities or activities that reduce and harm the company's profits in terms of operational costs, starting from receiving orders from customers, ordering raw materials, production processes, and delivery to customers. So currently, companies are required to eliminate waste so that company profits are good and supply chain performance is achieved. There are seven wastes identified by Taiichi Ohno as part of the Toyota Production System (TPS). The seven wastes are: Overproduction, producing more than what consumers need or the initial production is waste. Queue, idleness, storage, and waiting time are wasteful. Transportation, moving goods between factories or work centers and holding more than one control is wasteful. Inventories, unneeded raw materials, work-in-progress, finished goods, and operating supplies that are excess waste and add no value. Movement, movement of equipment or people that does not add value is

waste. Over-processing, working on a product that does not add value is waste. Defective products: returns, warranties, rework, and scrap are waste.

Supply Chain Management

Supply chain management (SCM), which describes supply chain management activities as a whole arrangement starting from the raw material process and ending with consumers to get maximum results, so that a supply chain includes manufacturing companies, suppliers, agents, retailers, and Heizer's final customers. and Render (2015) Supply chain management is an "integrated mechanism that coordinates the entire process, starting from design, distribution of raw materials from suppliers, converting raw materials into products, warehousing, information systems, and payment for goods." Organizations or agencies are involved in planning and distributing goods to customers, as well as providing product return services. According to Martono (2015),

Research on supply chain measurement related to process performance using the SCOR (Supply Chain Operations Reference) method approach has been carried out by previous researchers, with Natalia (2015) explaining that environmentally conscious supply chain management is considering the final and present environmental impacts of all products and processes in order to protect the natural environment. Then Azmiyanti's (2016) research examines the measurement variables used that are customer focused, including metrics for management (cash to cash cycle time), cost (total supply chain management cost), reliability (perfect order fulfillment), and responsiveness (order fulfillment cycle time).

And then Hartati (2017) is motivated by the problems of delays in raw materials, the amount of raw materials that is not in accordance with requests, and delays in product delivery. So that his research focuses on sources regarding the fulfillment of perfect raw materials, supplier reliability in the delivery of raw materials, cycle time for fulfilling raw materials, and handling defective raw materials. To be able to operationalize the supply chain properly so that it can be effective and efficient, it is necessary to measure supply chain performance so that we can understand supply chain management and improve its performance to make it even better. which is of concern in the performance of supply chain management, namely: For supply chain flexibility, companies must be able to adapt so as to be able to respond to changes that occur. The company's speed in responding to consumer and market demand supply chain integration means that all activities both organizational, supplier, production, and consumer must be good. Partnership quality, having reliable work partners, and giving the best.

METHODOLOGY

This research method was carried out by direct observation in the field and by conducting interviews with the management of the manufacturing industry. This type of research is called descriptive research. Quantitative descriptive research (Narbuko, Achmadi 2015: 44) is research that tells about current problem solving based on data analysis and presents, analyzes, and interprets data.

CASE STUDIES

From the research results, PT Sekiso Industri Indonesia is a manufacturing company that produces car components and is a layer 1 supplier for car manufacturers PT TMMIN, PT ADM, PT SIM, and PT MMKI. Every month, there is a release order. Release order This order is the number of car units that will be produced by the four car manufacturers above. By receiving an order from the customer, delivery must be carried out in accordance with the order in terms of quantity, quality, and accuracy, so that the lean manufacturing concept can be carried out and customer satisfaction can be fulfilled. In the manufacturing activity of receiving orders, the company will prepare its operational activities, starting from calculating raw material requirements, calculating capacity, and calculating other resources.

Based on the results of the research, it is explained that order N is an order for December 2021, while order N+1 is a forecast for the following month, namely January 2022. So that from this order the resource requirements can be prepared from upstream to downstream. With the lean manufacturing concept, customer orders will be released daily with the Kanban e-system electronic system, so the JIT concept will play a role. Even though there

have been orders for one-month, daily orders must be a reference for delivery to customers by e-Kanban. This e-Kanban can tell how many qty orders there are, what time they will be picked up or delivered, and what part number will be ordered. Customer orders use e-portal, namely, orders that use a system that can be accessed in real time. The order process activity will then be carried out as an order to produce to order based on the order data. Orders are made D-1 before delivery, so according to the delivery schedule for H delivery, you must be ready to prepare orders according to customer requests. So here it is clear how the flow of handling customer orders, in this case the concept of lean manufacturing, namely "just in time," is implemented.

From the results of data collection and observation to the operations section, emphasizing each process to pay attention to some of the waste or waste generated from its operations, the following are the results of the 7 wastes in the Operations section. Overproduction, because it has used the JIT E-Kanban concept, cannot be found. This can be proven in real terms by the production results, which can be seen on the production results dashboard, so the production department only produces according to orders from the production planning department. Queue, from the waste queue, it is evident that there is still a delay in the supply of components to the production department, so production is waiting for these components. Transportation, in this process, transportation waste is generated in the delivery of components from suppliers. Inventory, in the waste regarding inventory, there are still a number of excess components, as evidenced by the stock remaining above a predetermined standard. For standard FG of 0.5 days, WIP of 1.5 days, and materials or components of 1 day for fast-moving components. Movement, with an audit by the Jisuken section, it is waste because the process movement can be reduced; this can be proven from the results of the kaizen that has been carried out. Excess processes can be reduced with an audit by the Jisuken section for waste because excess processes can be reduced. This can be proven from the results of the kaizen that has been carried out. Defective product, there is still waste in this process, as can be proven from reports of defective products being found both internally and externally.

From the observations obtained, it is clear that supply chain management activities, starting from receiving orders to delivery to customers, are carried out with the concept of e-supply chain management, so that the SCORE method can obtain an overview of the performance of e-supply chain management in the operational section. The purchasing department will place orders with suppliers for raw material needs every month, but for planning daily delivery, the purchasing department will place orders by e-Kanban every day according to customer needs. In this activity, the lean manufacturing concept is carried out, namely only ordering goods from suppliers according to customer needs. From the observation results, it was determined that the rundown data had been submitted by the production planning section to purchase H-3 in accordance with the KPI standards. Production planning has been made in accordance with the JIT concept, namely by making production plans according to customer needs by paying attention to the final plan stock in December 2021 and releasing production orders using the production Kanban system.

For the next stage, the SCORE method is the source for the supplier selection stage and the selection of raw materials according to standards; no data is obtained from the observations of the purchasing manager. At the source stage, delivery data is obtained from the supplier. For this process, it starts with a request order by the PPIC section and the JIT by e-Kanban concept, which orders to suppliers every day at 14.00 WIB to be sent on D+1. For the next stage, the SCORE method is made in this activity, starting with production planning with the KPI being 100% production achievement versus production plan. It was obtained that stock data exceeded the KPI standard stock, namely part number 17752-BZ020. This was done to cover January needs because there was an issue with the supplier for the part material and a problem with its arrival. Furthermore, for quality control, the standard KPI is no negative flow to the customer. There is one PCNG problem flowing out to the customer; the problem is that the components are not installed.

For the next stage of the SCORE method, namely delivery, in this activity there are two activities, namely the delivery schedule and delivery performance. From the observations, information is obtained for the delivery schedule because it uses the milkrun system, which is only responsible for providing parts according to customer needs. Delivery will be picked up by the third party, namely partner logistics. For this activity, it starts with receiving orders by the E-Portal system from customers, which starts 1 day before delivery. In this activity, there are several activities, as follows: The process of downloading orders by E-Portal so that you get a road certificate, quality Kanban. Document preparation process for shopping posts the process of pulling parts Loading and unloading process.

Delivery. The final stage in the SCORE method is return. In this stage, the activity is focused on returning rejects and improving performance quality. For reject return data, a customer claim occurred in December 2021, namely a rejected return because there was a component that was not installed in part number 17752-BZ040-00. Furthermore, the performance quality problem also occurs with NG Flow; in this case, the problem data obtained indicates that the component is not installed.

CONCLUSION

From the observations and data obtained, the lean manufacturing process is implemented with the Kanban system, starting from the process of ordering components from suppliers using the Kanban system to receiving orders from customers using the e-portal system. With this system, the production process and ordering components are in accordance with the Kanban in order. Furthermore, for the performance of e-supply chain management, there are 13 activities that are used as material for assessment; from the SCORE method, it is obtained that there are 6 performance elements of e-supply chain management that have been achieved, and there are 4 performance elements of e-supply chain management that have not been achieved; and for the source process, there are 3 activities for which no data have been obtained.

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