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THE DESIGN OF THE CUSTOMES CLEARANCE PROCESS IMPROVEMENTS USING VALUE STREAM MAPPING, CRITICAL PATH METHOD AND BENCHMARKING

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan metodologi penerapan prinsip lean manufacturing di industri jasa Courier Express. Bea Cukai adalah proses utama dalam industri kurir ekspres dan tujuannya di sini adalah untuk menerapkan prinsip lean untuk menghilangkan proses yang tidak memiliki nilai tambah dan parameter umum antara proses dan optimalisasi sumber daya manusia atau alokasi pekerja. Value Stream Mapping (VSM) digunakan untuk mengidentifikasi berbagai waste pada kondisi saat ini dan Critical Path Method (CPM) mengidentifikasi jalur kritis pada proses yang berlangsung saat ini.

ABSTRACT

This research aims to develop a methodology for applying the principles of lean manufacturing in the service industry Courier Express. Customs is the main process in the industry express courier and the objective here is to apply lean principles to eliminate processes that have no added value and common parameters between the processes and optimization of resources humans or the allocation of workers. Value Stream Mapping (VSM) is used to identify a variety of waste on the current conditions and the Critical Path Method (CPM) identify the critical path in the process that takes place at this time. Model simulation of the Current Value Stream Mapping and Future State Mapping developed by using lean principles in the model simulation. The design of the repair process scheduling is done by analyzing the critical path process of Customs Clearance, with a critical path analysis we can determine the most process priority and most influential against the thorough repairs. A fusion method of Value stream mapping and Cricital Path Method supported by the method of benchmarking to finding best practice that has been done in the industry and doing the improvement so that the simulation generate a future state map with with the new critical path with faster acceleration time of customs clearance process from a total of 936 minutes before improvement and only required 389.6 minutes after improvements.

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1. Introduction

Indonesia's position is still lagging behind several Southeast Asian countries. The World Bank states that Indonesia's logistics performance is measured by the components of the logistics performance index (LPI). Supply chain indonesia (SCI) recommends improving the national logistics sector in order to boost the Logistics Performance Index (LPI) which was ranked 63 out of 160 countries in 2016. Based on the 2016 LPI report published by the world bank, Indonesia's LPI dropped from 53rd rank with a score of 3.08 in 2014 to 63 with a score of 2.98 in 2016. Of the six dimensions of LPI Indonesia 2016, three dimensions, namely competence and quality of logistics services, tracking, tracing, and timeliness have scores above 3, while the other three dimensions are customs, infrastructure, and International shipments have a score below 3. The process of customs mechanisms or often referred to as customs clearance and international shipping is included in three dimensions that are of major concern in addition to infrastructure factors. In an increasingly competitive global economy, the survival of an industry, both manufacturing and service industries, is highly dependent on how the industry can serve customer needs quickly and produce quality products and services. Every industry is challenged to improve its performance to respond quickly and accurately to changes that occur in the market. However, some products and services are often unable to compete with their competitors due to low service levels due to ineffective and inefficient operating processes. Including the international express delivery service industry, apart from being part of the contributors to the high and low ranking of LPI which is part of the international customs and shipping mechanism, there are also competitive challenges among international express delivery service companies. To answer the challenges of increasingly competitive business competition, an express delivery service company needs to develop and formulate appropriate strategies and operating systems that can be adapted to business needs so that they can provide effective and efficient services.

2. Methodology

This lean manufacturing method can also be implemented in companies engaged in the service industry. Value Stream Mapping (VSM) is one of the many tools, working methods and concepts in the Lean environment (Liker 2004, Bicheno 2004), which will support the process of redesigning

manufacturing systems (Marchwinski, 2004), identification, removal of waste in industrial production (Brunt 2000, and Abdulmalek and Rajgopal, 2007), productivity improvements in industrial processes. (McManus and Millard, 2002), and product development and (Emiliani and Stec, 2004).

Value stream mapping (VSM) is one of the important tools in a lean planning process through data and micro-level analysis of material and information flow through various levels of systematic manufacturing setups (Vinodh, Arvind and Somanaathan, 2010). In this study, the author uses the VSM method to identify the current workflow process or before and after improvements are made. Furthermore, the author uses the critical path method (CPM) to identify the critical path on the process map of the current state which is mapped using the VSM method. From several previous research studies, none have combined the use of VSM and CPM methods. The VSM method discusses more about improving conditions before and after by identifying waste, added value and non-value added activities. While CPM is mostly used for accelerating the process of a project by identifying the critical path and making improvements to the critical path. The author also adds the benchmarking method as a method for process improvement on the current condition map by adopting the best processes that occur in competing companies. The critical path identification process uses CPM on the workflow map of the current state which will be the object for the benchmarking process. So it is hoped that process improvements using the benchmarking method can have a significant effect on the current process. Ultimately the combination of these three methods will result in continuous process improvement which will result in more forthcoming work process maps with new critical paths.

3. Result and Discussion

a) Analysis of Critical Path Method for Current State Mapping

The critical path method is used to identify the current path of the process. The results of the identification of the critical path in Figure 4.3 serve as a reference in determining the process for which the benchmarking process will be carried out where if the critical path or the longest path can be improved, it will have implications for the acceleration process of the existing process. The results

of data processing produce a critical path calculation in the current process which can be seen in Figure 4.3. below this :

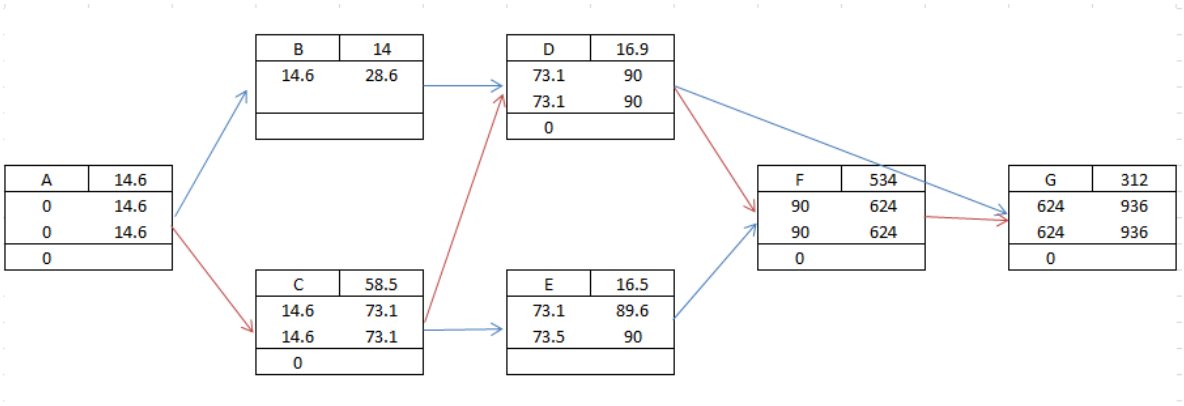

Figure 4.3 : The result of the calculation of the critical path for the current process

From the results of calculations using CPM, the critical path of the current process is obtained, namely: A-C-D-F-G with a total processing time of 936 minutes.

b) Analysis of Improvement Results after the Benchmarking process

Below the table after benchmarking with the two competitors :

Code	Aktivitas	Sebelum	Sesudah	Durasi (menit)
A	Data Cleansing	-	C	14.6
X	Download & submit Paperwork	-	E	30.9
C	Create and Submit Manifest	A	D	58.5
E	Submit Data	D	F,G	16.5
F	Pemeriksaan Fisik	D,E,	G	200
G	Proses Pengeluaran Barang	F		100

Table 3.1 Table of the Customs process sequence after implementation of benchmarking results

Based on the benchmarking results of the customs clearance process in table 3.1, it is found that the sequence of processes that can be combined and parallelized is the process of downloading paperwork and submitting paperwork. Following are the results of data processing using the Critical Path Method, different critical paths were found after the document download process or paperwork download and paperwork submission processes were combined into one, assuming the download and upload times were combined, a new critical path would be obtained as follows:

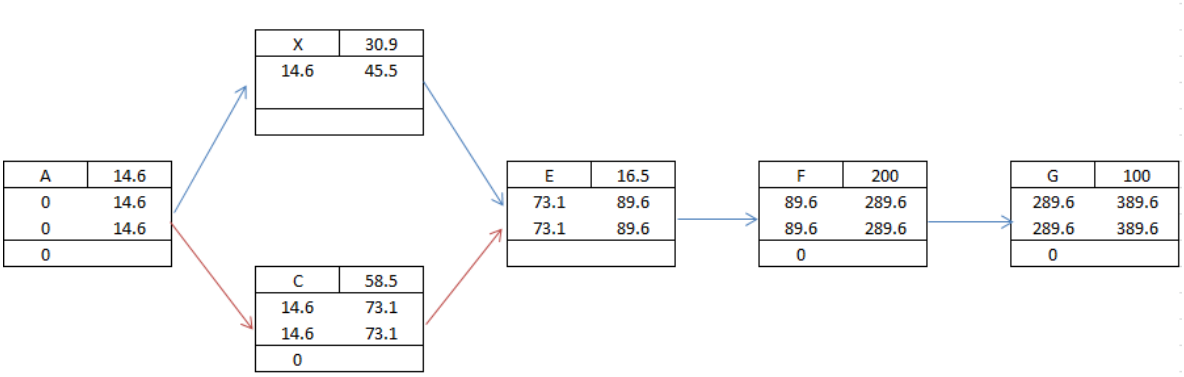

Figure 3.1 : Critical path calculation results for with the latest duration after the implementation of benchmarking results

With the implementation of the simulation results after repairs using the benchmarking approach method, obtained a new process flow and the duration of improvements to the process that most contributed to the delay in the customs clearance process, there was a significant change in the total duration of the process, namely from 936 minutes to 389.6 minutes, there was a change in the speed of the process. by 240% faster than the previous process.

c) Applying Future State Mapping

After carrying out the improvement process by adopting the results of the best practice analysis carried out, a process that is proven to be more robust than the previously applied process is obtained. The following is the future state map after the repair process is carried out:

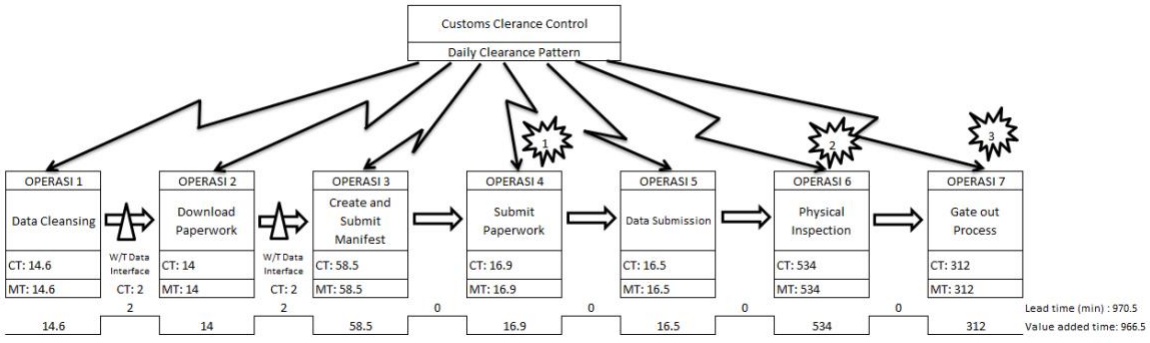

Figure 3.2 Kaizen burst parts to be removed and repaired

The image above shows the process stream that has been made changes and improvements. According to the benchmarking results, changes were made to the operation process 4, where we parallel the process with the operation process 2, the operation process 4 does not need to wait for the operation process 3 to finish first to start so that a new critical path is obtained according to Figure 4.4. While the results of the implementation of operational process improvements 6 and 7 showed a significantly decreased process duration.

Next, we describe the design of the future state map resulting from the calculation and analysis of the change and improvement process using the combination of value stream mapping, critical path method and benchmarking methods.

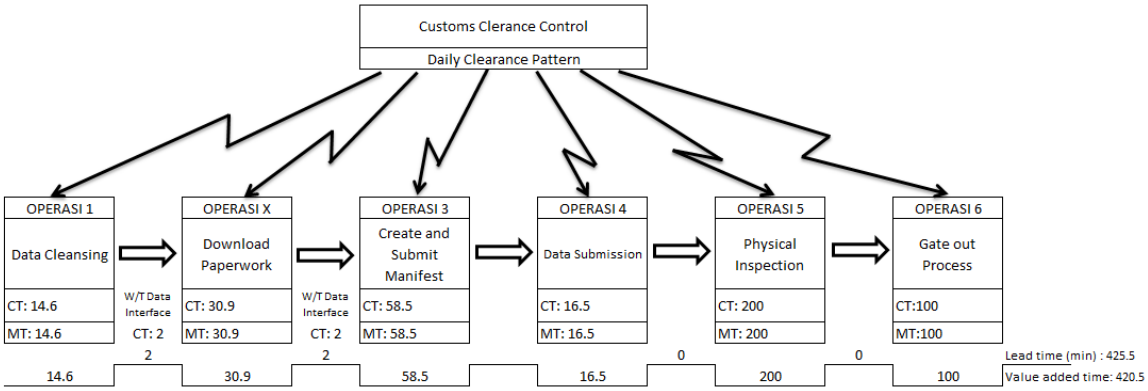

Figure 3.3 Future State Map

The Future State Map image shows the number of operating stages changed from seven processes to six operating processes. In addition, the total duration of time used to carry out the customs clearance process changed to be faster, namely the acceleration of the total customs clearance process time from 970.5 minutes before the repair was made to 425.5 minutes after the repair was made. The percentage of improvement produced is very significant, which is 228%.

4. Conclusion

The stages in the design of the customs process that refers to lean manufacturing in general consist of designing a current state map based on actual conditions, analyzing data, determining the selected repair process, describing a future plan, analyzing existing conditions, and implementing future

plans. . A case study on the customs process at DHL Express Indonesia resulted in the following conclusions:

a) The improvement of the work process flow at one of the express delivery service companies in this study was carried out using the Value Stream Mapping (VSM) method, the Critical Path Method (CPM), and Benchmarking was carried out internally.
b) The critical path identification process is carried out using the critical path method (CPM) to determine the priority of process improvements, namely process improvements that are included in the critical path.
c) The benchmarking process is carried out as a form of finding the process flow which is the best process carried out by the two largest express delivery service companies that are competitors. In general, this benchmarking aims to identify the best processes carried out by competitors, whether they are the same as those carried out by DHL or not. Implicitly the benchmarking process is carried out specifically on the process of checking goods and releasing goods, both of which are Pareto processes that contribute to delays in the customs clearance process.
d) The research focuses on the overall flow process of consignment note types, because The level of achievement of the KPI is greatly influenced by the speed of the customs clearance process for Consignmet Note shipments, where this type of shipment is the Pareto type of service processed by DHL Express Indonesia.
e) Performance measurement of the improvement design process is as follows:
    a. Combining the process of submitting paperwork with the process of downloading paperwork where according to the sequence of processes, the two processes enter into a non-critical process network flow so as to produce a new critical path.
    b. The implementation of a simulation of improvements to the process of checking and releasing goods following the best process benchmarking results resulted in an acceleration of the goods inspection process from 534 minutes to 200 minutes and an acceleration of the process of releasing goods from 312 minutes to 100 minutes.

c. XThe combination of the above improvements resulted in a new critical path by accelerating the total customs clearance process time from 970.5 minutes to 425.5 minutes. The percentage of improvement produced is very significant, namely 288%.

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