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IMPLEMENTATION OF VALUE STREAM MAPPING TO REDUCE WASTE IN WARRANTY CLAIM PROCESS AT COMMERCIAL VEHICLE AUTOMOTIVE COMPANY

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ABSTRACT

In the automotive industry, after-sales service becomes one of the marketing strategies used. The obstacles arose when there was a problem with the products, but the services-related follow-up decisions problem report from customers seems too long because the information delivered by the dealer has not been fulfilled. This research aims to identify waste and implement improvements that can reach the standard after-sales service time set by the company. This study uses the value stream mapping (VSM) method combined with a root cause analysis approach to reduce waste. The problem identification found that the most prolonged decision was the starting system. Then, the dominant waste is a waiting process. The VSM improved processing time efficiency by 34.47% or 33.97 hours (1.4 days). This result proved that the overall reporting time reached 60 hours (2 days) as the company target.

Keywords: Waste, Value Stream Mapping (VSM), Root Cause Analysis, after-sales service, automotive industry

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1. INTRODUCTION

The research was conducted in one of Indonesia's commercial vehicle automotive companies. Given the increasingly fierce competition in the automotive sector, one of the marketing strategies undertaken by this company is to provide the best after-sales service. After-sales service is product support that can keep the product working correctly for a long time (Patton, 2002). The indicators that characterize after-sales service are the ease of finding spare parts, employee service, and handling consumer complaints (Barata, 2003; Kotler, 2005). One of the programs was technical consultation and warranty on damaged parts. The program required customers to send a technical information report to the sole agent through an authorized dealer intermediary as a privilege for submitting a technical information report. The data collection and analysis results related to the number of reports received in the 2020 period showed 56% delay reports (or around 2,026). Those percentage becomes the main problem for management as bad indicators for the after-sales service performance.

The initial problem identification found that the delay is caused due to the information submitted by the dealer has not been sufficient, making it necessary to re-check to complete the data. The results of the Pareto data analysis with approach focus group discussion decided that the damage that caused the length of the decision process in the technical information report was the starting system. Starting system itself is a system that functions as the prime mover or the first step process to start the vehicle's engine. If this system has a problem, the vehicle cannot work. The starting system components include a battery, ignition keys, relays, and starter motors. The results of the calculation show that the time wasted during the battery component inspection process was 62.07 hours from the standard time set by the company for 48 hours (29% exceeding the target), and the starter motor component was 61.39 hours from the standard time set by the company for 48 hours (28% exceeding target).

It is essential to identify furthermore related the cause of the time wasted that lead to the length of the investigation process for problthe em starting system. That root cause triggered improvements to redthe waste. Those improvements will satisfy the customer for after-sales service. It will impact good relations with customers and sustainable business (Ladokun *et al.,* 2013). In the Lean concept, people can minimize waste through 12 techniques, and one of them is Value Stream Mapping (VSM). The VSM is a method used to visualize waste in a complete process. VSM maps the process flow, information flow and, material flow. VSM helps decision-makers identify activities that do not add value by mapping current conditions. That identification will lead to the improvement strategy and visualization in the future state map (Amrina & Fitrahaj, 2018). Furthermore, this study used the Borda method to identify dominant waste combined with VSM (Ferdias *et al.,* 2017; Albanna, 2018). The following section discussed the step-by-step research in detail.

2. METHODS

The research methodology in this research is described in stages starting from the problem identification stage, data collection stage, data processing stage, analysis and discussion stage, and conclusion and suggestion stage. Figure 1 visualizes the research method.

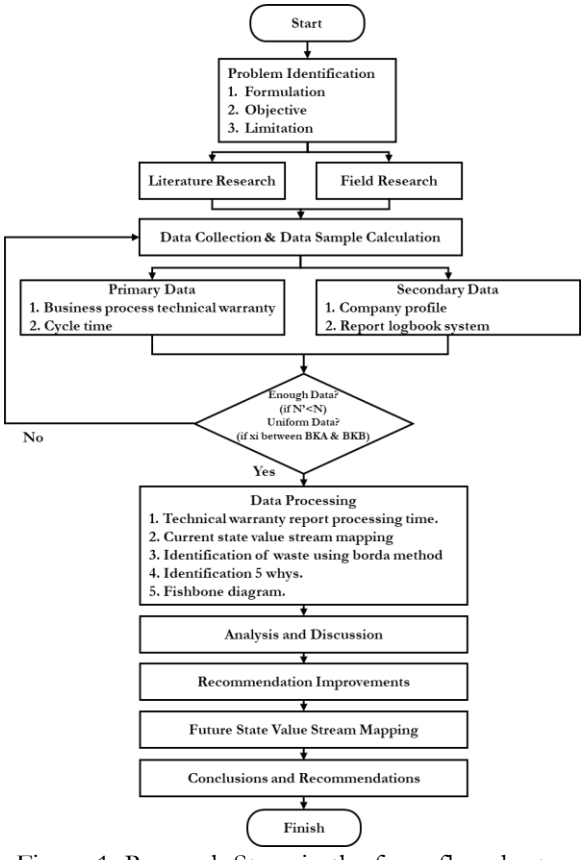

Figure 1. Research Steps in the form flowchart

3. FINDINGS AND DISCUSSION

3.1. Current State Value Stream Mapping

According to Ikatrinasari & Haryanto (2014), Value Stream Mapping consists of six steps: 1) Identification of service family. 2) Creating a current value stream from the organization and customer point of view. 3) Making an ideal future state mapping. 4) Improvement actions to close the gap between current and future conditions. 5) Conducting improvement actions. 6) Making a new current state mapping. Based on actual observation and brainstorming interviews, technical members obtained a description of the process activities. The detailed process is mapped in Table 1.

Current state value stream mapping is made based on data collected in the previous stage. Fig. 2 visualize the current state value stream mapping.

Table 1. Data Activity Process Warranty Claim Starting System

Code	Activities
A	**Acceptance of Customer Complaints**
A.1	The customer informs the dealer of a problem with his vehicle.
A.2	The dealer team (service advisor/field advisor) verify of the complaint problem.
A.3	The dealer team (service advisor/field advisor) provides result information to the customer.
B	**Submission/Information of Customer Complaints to Sole Agent**
B.1	The field advisor fills out vehicle identity tickets in the technical information report application system.
C	**Investigation Vehicle Problem Complaint**
C.1	The field advisor calls the TIR officer to ask questions that need to be checked.
C.2	The mechanic/Field advisor prepares equipment and vehicles to check and measure the starting system.
C.3	The mechanic/field advisor checks the battery and records the results on a notepad.
C.4	The mechanic/field advisor checks the cable circuit and records the results on a notepad.
C.5	The mechanic/field advisor checks the starter motor and records the results on a notepad.
D	**Sending Technical Information Report to Sole Agent**
D.1	The field advisor fills out inspection results in the technical information reports application system.
D.2	Attach evidence of checking/data supporting investigations.
E	**Verifying Technical Information Report**
E.1	TIR officer checks report following the provisions for submitting reports.
E.2	Provide feedback to dealers if there are data/checks that are lacking.
E.3	Change technical information report from submitting to pending.
E.4	The officer waits for an updated feedback report from the dealer.
E.5	TIR officer calls the field advisor to ask for updates on the feedback provided.
E.6	The field advisor carries out data collection/other equipment needed again.
E.7	The field advisor attaches evidence investigation support to the technical information report application system.
E.8	TIR officer checks the report according to the provisions of the report submission.
F	**Decision Making**
F.1	**The decision approved/given solution**
F.1.1	Write the solution to the reported problem
F.1.2	Change the status of the technical information report from pending to approval.
F.2	**Decisions rejected**
F.2.1	Write the reasons for rejection and solutions to the reported problems
F.2.2	Change the status of the technical information report from pending to reject.
G	**Completion of Reports**
G.1	The dealer team (service advisor/field advisor) informs the customer about the technical information report decision results.
G.2	The dealer team follows up on the results of the technical information report with the customer's approval.
G.3	Filed advisor closes the report ticket by changing the status of approving or rejecting to finish.

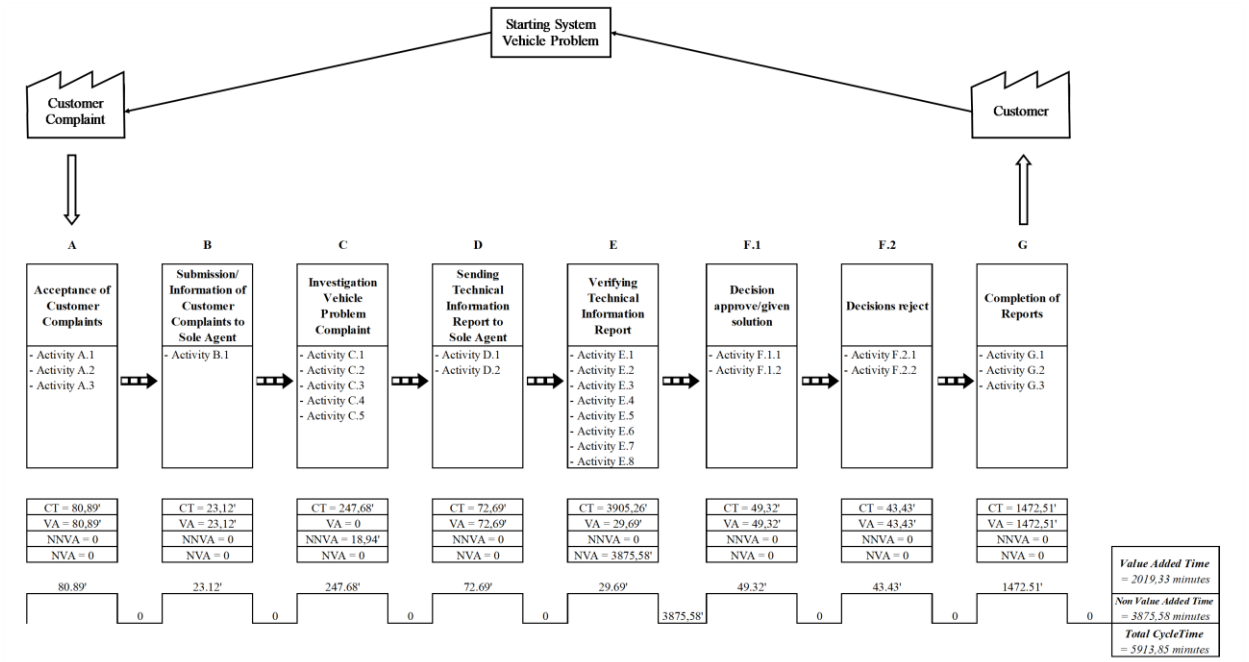

Figure 2. Current State Value Stream Mapping

According to Gaspersz (2006) and Syawalluddin (2012), the non-value-added activity of all activities along the service value stream is a waste. The identification result of non-value-added activities is visualized in Figure 3. Here we differentiate between pure non-value-added (NVA) and necessary but non-value-added (NNVA) activities (Chairany *et al.,* 2018). Furthermore, this research will only focus on pure non-value-added activities.

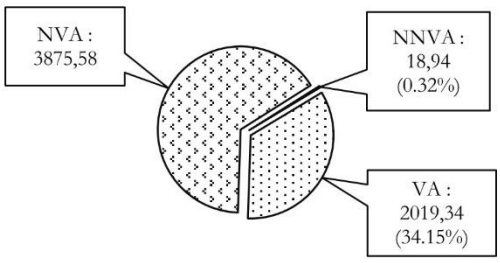

Figure 3. Percentage of Activity Type

3.2. Dominant Waste Analysis

Waste identification can be determined through a weighting method using the Borda method is critical to determine which waste has the highest weight (Kusrini et al., 2019). Figure 4 visualized the ranking of waste from the recapitulation of calculations using the Borda method:

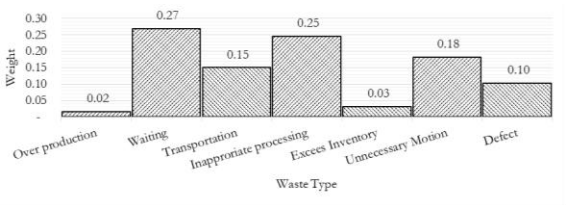

Figure 4. Ranking of Waste Weight

Figure 4 proved that waiting is the highest type of waste with a weight of 0.27, so improving the lead time was significantly increased the efficiency of the warranty claim starting system process. Here we used the Five whys continued by the fishbone diagram to identify the causes of waiting. The Five whys is a method for systematically digging deeper causes of problems (Sari et al., 2021). At the same time, a fishbone diagram is practically used to identify the root cause (Pradipto, 2018). Table 2 and Figure 5 visualize the practical implementation of those tools in this research.

Table 2. The Five Whys

Problem	Long of waiting time data updates
Why?	Handling problems and communication are not complete.
Why?	Inadequate workforce competence/forced.
Why?	Transfer knowledge /transition is not as good as its predecessor.
Why?	The lack of training and the need for time for development in regular training resulted in the creation & updating of TIRs that still exceeded the target & the quality of the information provided was still less specific.
Why?	There is no specific checking reference from the sole agent.

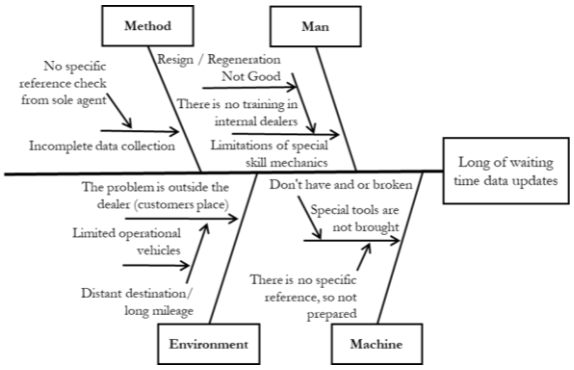

Figure 5. The Fishbone Diagram

The initial problem identification found that the delay is caused due to the information submitted by the dealer has not been sufficient, making it necessary to re-check to complete the data, and the activity causes a long waiting time for data updates. The Five Whys & The Fishbone Diagram results in table 2. and figure 5. show that the root of the problem is no standardization of specific item part checks from the sole agent.

3.3. Improvement

Two improvement ideas are suggested based on the root cause analyzed in the fishbone diagram. The first was making the standard investigation sheet battery and motor starter problem for technical information reports. A focus group discussion (FGD) involving some internal technical members was conducted. Finally, Figure 6 visualized the form of the standard investigation sheet.

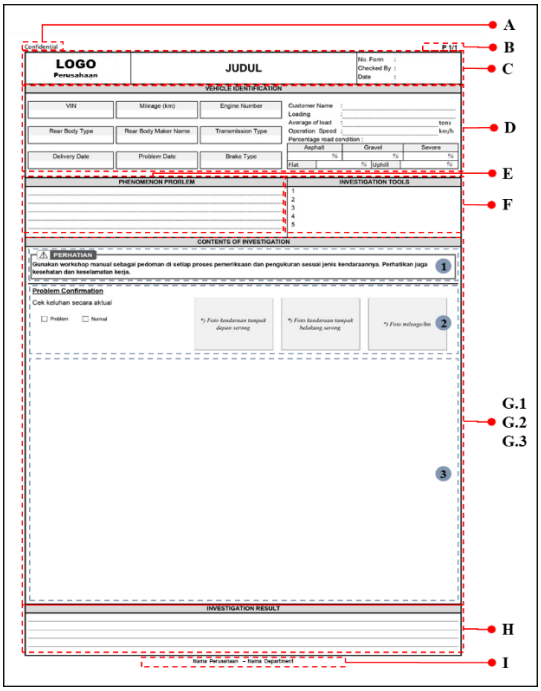

Figure 6. Standardization Template of Investigation Sheet

Figure 6. contains nine essential points :

a. Code A represent the sign of internal use mark.
b. Code B shows about page of investigation sheet.
c. Code C points head of the investigation sheet (company logo, title and sheet identity).
d. Code D indicates the primary data of vehicle information involved.
e. Code E contains phenomenon problems.
f. Code F denote a list of tools used
g. Code G requires investigation content.
h. Code H refer to the conclusions of the investigation.
i. Code I represents the issuing department.

The further discussion found that the form with G3 code requires investigation content according to what is needed to be checked dan according to the problem involved.

3.4. Future State Value Stream Mapping

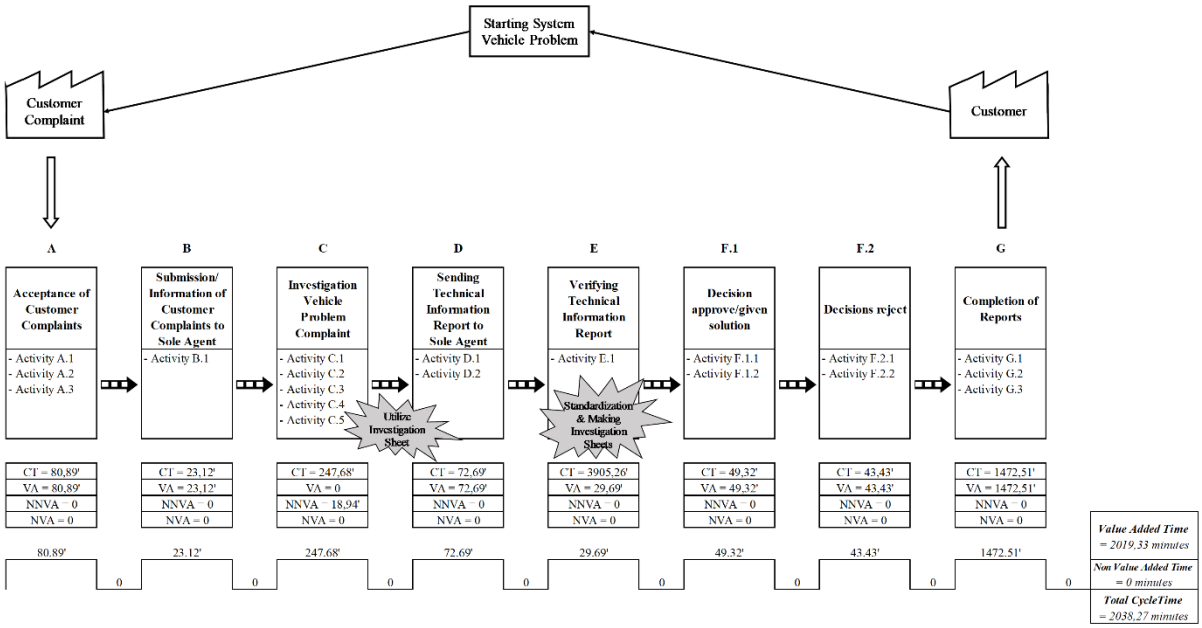

Figure 7. Future State Value Stream Mapping

The final step of this process is to create a future value stream mapping (FVSM). This FVSM is related to the identification of NVA activities (E group activities - "Verifying Technical Information Report"). The focus is to improve the investigation sheet starting system (battery and motor starter). After implementing the improvements, the NVA was eliminated by 3875.58 minutes (65.53%). The total cycle time decreased from 5913.85 minutes to 2038.27 minutes (65.53%). The FVSM is shown in Figure 7.

Before standardizing the investigation sheet, the lead time for the battery was 62.07 hours (2.6 days) and 61.39 hours (2.5 days) for a motor starter. After implementing the improved investigation sheet, the average decision time for the battery was 35.85 hours (1.1 days) and a decrease in time for the starter motor, with an average of 33.84 hours (1.2 days). The following is the time efficiency that occurs:

Efficiency :

$$\frac{Lead\ time\ (before) - lead\ time\ (after)}{Lead\ time\ (before)}\ x\ 100\ \% \qquad (1)$$

Battery :

$$= \frac{62,07\ -\ 35,85}{62,07}\ x\ 100\ \%$$

$$= 42,24\ \%$$

Motor Starter :

$$= \frac{61,39\ -\ 33,84}{61,39}\ x\ 100\ \%$$

$$= 44,88\ \%$$

4. CONCLUSION AND SUGGESTION

The value stream mapping (VSM) method assisted waste identification and improvement in this research. The waste identification process found that the cause of the pending investigation was that there was no standardization in the investigation sheet. Then, the researcher prepared and improved the investigation sheets for starting system. The evaluation results showed a significant acceleration of the decision process for the problem starting system in the

technical information report, which was significant in terms of time, an average of 35.85 hours (1.1 days) for the battery, and an average of 33.84 hours (1.2 days) for the starter motor. The improvement could raise the efficiency by 2.64%.

The researcher suggested periodically adding and updating data on the investigation sheet if several problems still happen in the future. Applying other improvement tools can continuously reduce the service time to the desired time. The further researcher might use other analytical methods to support that improvement.

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