An analysis on the improvement of system for proof of delivery: PT. Gunadhya Rajawali Logistik

Aliya Dharaningtyas ^(a) Adirizal Nizar ^(b)

^(a,b) School of Business and Management, Bandung Institute of Technology, Jakarta, Indonesia

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ABSTRACT

The delivery system for Base Transceiver System (BTS) to strengthen the telecommunication network throughout Indonesia maritime country is needed to speed up the process due to uneven distribution of sufficient telecommunications infrastructure. PT. Gunadhya Rajawali Logistik (GRL) is a third-party logistics company that focuses on transportation and warehouse management and delivery for telecommunication equipment tools. Unfortunately, in delivering BTS installation part throughout Indonesia, PT. GRL received several warning letters and had to pay a penalty from one of the customers, for being late in reporting the delivery proof. This study aims to analyze the root causes of late submission of Soft Copy of Proof of Delivery (SCPOD) to avoid penalty given by the customer and determine suitable solutions to improve the process. The approach used in this study is lean six sigma with the help of Define, Measure, Analyze, Improve, and Control (DMAIC) roadmap. According to the interview with the employees related, the root causes of late submission of SCPOD are irresponsible drivers, indisciplined drivers in carrying out deliveries, and lack of data management in the transportation system. To be able to solve this problem, several proposed solutions can be applied. The proposed solutions to overcome the root causes that should be applied by the company are to hire a document control, retraining the Standard Operating Procedure (SOP) for drivers, utilize transportation management system application, and apply incentive systems for drivers. In the future, it is recommended for PT. GRL to have a minimum standard in recruiting the drivers for example only recruit who possess a minimum of high school education to ease the completion of administrative tasks.

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Introduction

The telecommunication sector is undergoing huge transformation. As the fourth largest country in the world by population, Indonesia is among the fastest developing telecommunications market and according to Forbes in 2019, the telecommunications market is forecast to grow from USD 22.13 billion in 2017 to USD 22.54 billion in 2022.

The digital divide is prevalent in Indonesia, mostly because of the uneven distribution of sufficient telecommunications infrastructure. According to Indonesian Internet Service Provider Association in 2019, there are around 55.7% of people are using internet in Java, whereas only 5.5% of Kalimantan population exposed to the internet. Therefore, the Ministry of Communication and Information create an institution called the Telecommunication and Information Agency or known as (BAKTI), that focus to accelerate national infrastructure especially in remote areas. As a result, cellular operators are triggered to accelerate their 4G and 5G LTE coverage.

Several studies related with improvement in logistics sectors conducted by Sirajuddin, et al. (2016) that using Six Sigma strategy, DMAIC and process integration to analyze the dwelling time in Indonesian national port. The result, the waiting time can be reduced from 6 – 7 days to 3 – 4 days. The other research that purposed to improve efficiency and quality of a refund process is written by Lee et al. (2013). In this study, the researchers employed DMAIC logic roadmap, qualitative method with statistical verification and analyzed by using Failure Mode and Effects Analysis (FMEA) tools. The impact of of lean six sigma method in the study is the

* Corresponding author. ORCID ID: 0000-0002-2187-8395

increment of customer satisfactory by reducing the credit voucher waiting time from 14 days to 14 min and reach almost zero defect on refund process.

To distribute the Base Transceiver Station, the tower that connect access from satellite to mobile broadband, supply chain management plays a critical role. PT. Gunadhya Rajawali Logistik (GRL) is a third-party logistics company that offers a warehouse management system and transportation management system to distribute the telecommunication industry throughout Indonesia. The company is mainly focus on delivering uninstalled tower framework from mobile operator warehouse to place that mostly targeted the remote destination area.

Transportation management process in PT. GRL begins with receiving an order from the customer via email. Then, the person in charge (PIC) of the transportation will analyse the budget and transportation mode utilized to deliver the shipment. Then, warehouse management prepares all the outbound goods as the transporter departs to pick up the cargo. Afterwards, the PIC of transportation monitors the overall process from picking the freight up from the warehouse, shipping process to hand over process. Furthermore, the proof of delivery (POD) will be reported to the customer, and the invoice can be claimed. Unfortunately, the company has received a warning letter from its customer due to the lateness of Soft Copy Proof of Delivery (SCPOD) submission. As a consequence, there were the sum amount of a penalty that the company has to pay. Unfortunately, this matter is in line with PT. GRL's current condition receives a warning letter from its customer due to the lateness of Proof of Delivery (POD) submission. Therefore, to achieve customer satisfaction, PT. Gunadhya Rajawali Logistik is eager to deliver proof of delivery within the time limit given. In this research, the author is going to utilize the six-sigma methodology to improve company performance.

This study aims to analyze the true root cause of late submission SCPOD in order to avoid penalty given by the customer in the future. Later, the objective is to determine suitable solutions and develop an improvement program to the system.

There several limitations in this study, which only conducted in the documentation process department of this company; to the project from the customer that ask the highest penalty due to POD late submission; the SCPOD submission data observed between August to September 2020; only SCPOD in Kalimantan and Jabodetabek, Indonesia are.

Literature Review

Theoretical and Conceptual Background

Lean Six Sigma

Due to the rapid growth of competition in a current business situation, a company is forced to control manufacturing cost, service cost, quality, productivity, and customer satisfaction. Six Sigma is an extension of TQM, which Motorola engineer Bill Smith developed in 1986 to improve quality and reduce defects of the product. Six Sigma is a critical business strategy used to enhance organizations' products and services' productivity and quality. Six Sigma can be defined as an influential philosophy (Jacobs & Chase, 2018) and methods backed by several tools (Cudney, 2011) developed to eliminate defects to produce near-perfect products and services (Uluskan, 2016). According to (Gupta, 2012), Six Sigma is a well-structured method that focuses on reducing variations in production results so that specifications limit at least six standard deviations from the target, measure defects, and improve quality, processes and services produced. Six Sigma is an even more reliable method than its predecessor, TQM, because it results in real savings, expanded sales opportunities, involving upper management, and documenting improvement based on customer satisfaction (Montgomery & Woodall, 2008). Six Sigma is a very beneficial method due to real savings, expanded sales opportunities, involving upper management, and documenting improvement based on customer satisfaction.

According to (Cudney, 2011), Six Sigma consists of several methods and tools. It is crucial to select and implement the most suitable tools appropriately. There is an ideal roadmap for implementing the organization's methods. DMAIC, an acronym for Define, Analyze, Improve, and Control, is a problem-solving flow of procedure commonly used in quality and process improvement. This structure boosts the project owner to think creatively toward the problem and trigger the original product's solution.

Figure 1: The DMAIC Structure and the Objectives (Source: Costello & Molloy, 2008)

Even though most Six Sigma adopts this flow of the process for project management and process improvement project, DMAIC is not necessarily formally bonded in the implementation of Six Sigma and can be utilized regardless of an organization's use of Six Sigma. This structure encourages the organizations' creative thinking to solve the problem and create solutions within the original product, process, or service definition.

DMAIC step can be utilized as process re-design step if the original process operates so poorly and required to be improved and start over (Montgomery & Woodall, 2008).

Define

In this beginning phase, the main objective is to define the opportunities identifying several aspects, initially identify the customers (VOC) and critical-to-quality characteristics (CTQs) that the customer believes the most impact on quality, then establish the cause of the problem and set the limitations, lastly picture the process over time and provide insight to determine the focus of the improvement should be done (Costello & Molloy, 2008; Jacobs & Chase, 2018; Montgomery & Woodall, 2008).

Measure

This phase aims to evaluate and understand the current process situation and determine how to measure the process by collecting data on measures quality, cost, and throughput/cycle time. Data may be collected by examining historical records, but this may not always be satisfactory. The history may be incomplete; record-keeping methods may have changed over time, and, in many cases, the desired information may not have been retained. Consequently, it is often necessary to collect current data through an observational study, or it may be done by sampling from the relevant data streams (Montgomery & Woodall, 2008).

Analyze

The primary purpose of the analysis step is to obtain the reasons behind variation based on the preliminary phase's processed data. After the baseline of the process is established and gathered all the customer's priority, it is the part where the organization begins to solve their problem by identifying the potential causes and then determining the root causes of defects and their impact (Hendeson, 2011).

Improve

After obtaining the root cause, the organization needs to be as creative as possible in solving the problem by improving the current process. Here in the Improve phase, the solutions should be chosen to address the root cause and be validated to ensure the solutions solve the problem (Cudney, 2011)

Control

In the control phase, the goal is to ensure that the key variables remain within the required ranges under the modified process by focusing on maintaining the initial phase (Cudney, 2011).

Conceptual Framework

The main concept used in this research is by using the Lean Six Sigma methodology. The conceptual framework of this research is shown below.

Figure 2: The DMAIC Structure and the Objectives

Initially, this project begins with observing the background of the company focusing on the operational workflow. Then, identifying the company's problems by interviewing several employees and identifying which problem is feasible to be solved. After determining the problem, a literature study regarding the industry, theories, and cases, current technology, and innovation from books, journals, and articles are conducted concurrently with processing the historical data collected from the company.

Furthermore, a problem-solving flow of procedure that commonly utilizes a quality and process improvement called DMAIC (Define, Measure, Analyze, Improve, and Control) is used in this research. Initially, it is essential to understand the focused improvement process's flowchart and determine the relevant element. Then, measure the current condition and see through the trend. Afterward, analyze the true root causes using a fishbone diagram and confirm the analysis by interviewing the relevant customers. Finally, the solution and improvement can be crafted and create a control plan to ensure that the improvement matters.

Empirical Review and Hypotheses Development

Lean Six Sigma is a method that can be adopted in various organizations across the globe. Although in the beginning of establishment this method was focus on manufacturing sector, Raju (2016) reviewed lean six sigma from several literature and report and it can be concluded that this method is one of the best strategies for organizational excellence and has spread to various industries including service sectors including logistics.

One of demonstration of lean six sigma method in logistic sector that purposed to improve efficiency and quality of a refund process is written by Lee et al. (2013). In this study, the researchers employed DMAIC logic roadmap, qualitative method with statistical verification and analyzed by using Failure Mode and Effects Analysis (FMEA) tools. The impact of of lean six sigma method in the study is the increment of customer satisfactory by reducing the credit voucher waiting time form 14 days to 14 min and reach almost zero defect on refund process.

In conclusion, based on several previous studies mentioned above, Lean Six Sigma strategy and DMAIC road map is proven to be a proper method to applied in logistics sectors especially in time efficiency improvement problem.

Research and Methodology

This research is conduct by using qualitative analysis and interview as primary data and statistical verification obtained from company's data. The interview will be addressed to PT. GRL employees that are participated in the POD workflow to find out the factors that affecting the late submission of SCPOD. The quantitative data is historical SCPOD submission data for 2 months from August to September 2020.

Then, the framework used is DMAIC (Define – Measure – Analyze – Improve- Control) roadmap and the tools used are SIPOC (Supplier, Input, Process, Output and Customers) to determine the flow of the process, pareto chart and control chart in the statistical measurement, fishbone chart to analyze the root cause and benefit/effort matrix to decide which solution should be prioritized.

Empirical Data Analysis

Normality

Established in 2017, PT. Gunadhya Rajawali Logistik is a third-party logistics company that focuses on transportation management and warehouse delivery for telecommunication equipment needs throughout Indonesia. Unfortunately, in delivering goods throughout Indonesia, PT. GRL received a warning letter and a penalty from one of them for being late in reporting the delivery proof. This study aims to analyze the root cause of late submission SCPOD to avoid penalty given by the customer and determine suitable solutions to improve the process.

This study aims to analyze the actual root cause of late submission SCPOD in order to avoid penalty given by the customer in the future. Later, the objective is to determine suitable solutions and develop an improvement program to the system.

Define

The initial phase of the Lean Six Sigma methodology to solve a problem is to define the problem in details to make things clearer to ease the decision making for the next step. In this case of PT SAN, the first thing first is to identify submission of Proof of Delivery (POD) process in the company. Furthermore, the SIPOC (Supplier, Inputs, Processes, Outputs and Customer) tool is going to be used to have a better understanding of what customer's need.

Figure 1: Proof of Delivery Work Flow in PT. GRL

The activities begin when the shipment arrives at the destination. Then, the driver handover the shipment to the receiver. Afterward, the driver takes a photo of the shipment and vehicle as evidence of delivery featuring geo tagging to ensure the photo is taken at the destination. After all, goods are safely stored in the customer's warehouse. The driver fills the Proof of Delivery form containing the date of delivery, the project's identity, delivery execution, and signature from both driver, transporter, and receiver.

Furthermore, the driver scans the POD and send the results and photos to the documentation officer and PIC transportation as proof that the shipment has arrived at its destination. Meanwhile, the vendor sends a hard copy one through a delivery service to the Head Office of PT. GRL in Jakarta. Then, the soft copy is inputted into the respective database by the PIC Transportation and Document

Officer. Due to the large number of deliveries and PODs that enter each day, for the recap process, the Documentation Officer retrieves the incoming POD data from the Transportation PIC. Then they reconcile the data to ensure that no POD is not submitted.

Later, the documentation officer checks the completeness of the POD. If all the POD is complete, the documentation officer will submit it to the customer via email. Conversely, the documentation officer asks the driver to complete or correct the form if there is incomplete data. The receiver must sign the completed form and then go through the same next steps.

Then, the customer will check the completeness and correctness of the POD. If something is incomplete or an error, the POD will be returned to the documentation officer to be corrected and completed. If the driver causes the error, then the next step is repeated from filling in or completing the form and asking for a signature until it is chipped to the customer. If the SCPOD is approved, then the next step is to take the approved data to the database documentation officer and submit the HCPOD to the billing officer for invoice disbursement.

Table 1: Leadtime of SCPOD Submission based on Destination Area

Destination Area	Leadtime of SCPOD Submission
Jakarta, Bogor, Depok, Tangerang and Bekasi (Jabodetabek)	1 day
East Java	2 days
Kalimantan	3 days

Furthermore, a diagram used to identify all relevant elements of a project, defining the scope and categorizing the project flow and mapping process in a sequence (Gutierrez-Gutierrez, Leeuw, & Dubbers, 2016), called SIPOC (Supplier, Input, Process, Output and Customers) is utilized to this case.

Table 2: SIPOC Diagram

Supplier	Input	Process	Output	Customer
Driver, Driver Vendor	Form Proof of Delivery	Fill in the form completely Take shipment proof picture Send SCPOD through email Send HCPOD though expedition.	Soft Copy of a Complete POD Hard copy of POD	Documentation Officer
Documentation Officer	SCPOD from Driver	Check the Completeness Submit through email	Approval of SCPOD	PT. GRL Customer

Measure

All data of the of the POD process is acquired and plot into the chart in order to get clear description of the issues. Based on the calculation of the late submission of SCPOD submitted from September to October 2020, there are 142 late documents submitted around the Jabodetabek area, 83 documents from East Java, and 323 documents from Kalimantan. A Pareto chart is used to order defects from the highest frequency of occurrence to the lowest frequency so that the more significant ranked problem can be prioritized to be improved. The principle follows the 80/20 rule, which means that 80% of the consequences originate from 20% of the causes (Hossen, Ahmad, & Ali, 2017). From Figure 4, it can be concluded that 58.9% of late submission occurred in Kalimantan and followed by the Jabodetabek area with 25,9%. Therefore, following the 80 – 20 rules of the Pareto, Kalimantan, and Jabodetabek area should be prioritized to be improved.

Figure 2: Pareto Chart of Late SCPOD Submission based on Area Destination

Figure 3: Control Chart of Late SCPOD Submission in Jabodetabek Area

Figure 4: Control Chart of Late SCPOD Submission in Kalimantan Area

The control chart in Figure 5 and 6 above depicts the day required to submit SCPOD from the Jabodetabek and Kalimantan area from August to September. As is observed, the diagram enumerates fluctuation even there are several data are located outside the UCL and LCL. This situation can be translated that there is a special-cause variation or unexpected variation resulted from unusual occurrences. The average number of submissions in Jabodetabek area is 5.28 days when in Kalimantan is 6.53 days, whereas the desired lead time of one day has not been fully achieved. It takes longer time to submit SCPOD in Kalimantan due to the distance from shipment destination to the driver's office, it takes at least 4 hours to a day to travel.

Analyze

Based on the all data collected in the measure phase, in the analyze phase the potential cause is identified, develop the cause and effect analyses, verify the relationship and quantify to the relation to conclude the true root causes.

Data Interpretation

The interview began with the question to all respondents who work for PT. GRL, on the current situation of submission process Proof of Delivery system in the company. After conducting interview to interviewees, a qualitative analysis was conducted to identify the perspective of the respondent by transcript the conversation, coding to find the important words that direct to answer research questions and grouping the interview results into several categories (Creswell, 2014). The table 3 below, the root causes of late SCPOD submission can be analyzed.

Table 3: Data Interpretation

Goals	Super Category	Category	Sub-Category	Code
Root Cause of SCPOD Late Submission	Internal	Documentation Officer	Behaviour	DO not update approval status
				DO forget to submit SCPOD
		Driver	Behaviour	The driver delay to send SCPOD
				Driver fill form incompletely
				Driver takes photo without geotagging
	External	Database System	Lack of Knowledge	Driver does not understand how to scan document
				Difficult to manage data
		Application		Fail to generate verification code
		Environment		No Signal

Internal Root Cause Analysis

Internal root causes mean that the root cause come from within the company which are the employees who are working directly in submission of SCPOD at PT. GRL and database management system used in the company.

Documentation Officer

Documentation officer plays critical role in this problem as they are responsible for check the completeness of SCPOD, submit to the customer and update the approval status. However, as stated by Respondent 1 *"There is one of our team players who only focuses on submitting documents and is still lacking in terms of SCPOD records that have come and been submitted. The execution was done, but he did not update the approval status."*. Since one of documentation officer did not update the submission and approval status, it is difficult to track which SCPOD that already submitted and which one were left unsubmitted.

Driver

Driver is the spearhead in the transportation management as they determine the performance of the company. Unfortunately, in PT. GRL, some of respondent express disappointment on the driver behaviour. As being said by Respondent 1 *"For the driver, they are typical field people who when the work is done, or when the goods arrive at their destination, they like to go straight away without finishing the form."*. This statement is supported by one representative of drivers' vendor or Respondent 4 that stated *"Sometimes drivers like to rush to get work done as soon as possible without filling the form properly."*. Driver fails to fill POD form, and something is missing from the form that triggers the rejection of SCPOD.

Then, the factor that causes delay in submitting SCPOD is when one of the requirements that has to attached in the soft copy file is photo of vehicle featuring geotagging to ensure that the shipment is delivered to the destination. However, as stated by Respondent 2, *"If the photo is taken without geotagging, the problem is from the driver who forget to turn on the GPS and has already returned from the delivery site"*.

In the POD submission process flow, after the vendor driver scans the POD and sends the softcopy to the documentation officer and transportation PIC, the driver has to send the HCPOD via the expedition immediately. When the scan results could not be read clearly by the PIC transportation and documentation officer, they have to wait for the HCPOD to arrive in Jakarta. As a result, the SCPOD is submitted late, as stated by Respondent 2 *"So asking for documents is more difficult because the driver doesn't necessarily understand all about filling out forms and scanning documents."*

Database System

Database management at PT. GRL is less effective because everyone working on the same project has its database so that from one process to another, each PIC must reconcile the data. This problem is expressed by respondent 2, as he/she stated that *"It is difficult to manage all the data since all PIC (operational, SCPOD, billing) has its own excel and every time we have to match the data, there is some project that is left behind or forgotten"*. The need of a neat database management system is also stated by the first respondent as he/she said *"Why must there be data collection on incoming documents? That way we know the exact date the document was submitted so we can know whether the lead time was fulfilled or not"*.

External Root Cause Analysis

External root causes are possible causal factors that affect from outside the company to fulfill the lead time of SCPOD submission. The factors are categorized into 2 group, which are caused by the application developed by the customer and the environmental issues.

Application

e-POD is an application developed by a customer of PT. GRL to be able to upload SCPOD directly from the driver to PIC Transportation. When uploading SCPOD, instead of the receiver's signature, a verification via SMS is sent to the HP receiver. However, in the application of e-POD on-site, the receiver cannot receive the verification code, so that the use of e-supply is rarely used. This fact is supported by Respondent 1 as he/she stated that *"Actually, one of our customers has an application to submit SCPOD, however most of the time, there are no signal in the remote area and the receiver almost 90% didn't get the verification code"*. This application actually a breakthrough solution to shorten the submission of SCPOD, however since the application needs to be fixed in sending a verification code, it somehow become the problem for PT. GRL to keep up with the required lead time.

Environment

To fulfill the integrated telecommunication infrastructure that is evenly distributed in all districts in Indonesia, PT. GRL takes part in sending the Base Transceiver Station (BTS) tower to places where the signal has not been touched. This is supported by one of Respondent 4 or one of the drivers stated that *"In some locations deep in the forest, sometimes there is no signal, so uploading POD can only be done when you arrive in the city. Sometimes the distance from the forest to the city can be all day long"* and agreed by the Respondent 1, as he/she stated that *"most of the time, there are no signal in the remote area"*.

Root Cause Analysis

The next step is to find out the root causes by using a cause and effect diagram. This diagram is constructed based on the answer from the previous interview conducted in the company's operational department. In this research, the causes will be grouped into 5, which are Documentation Officer, Driver, Application, Database System, and Environment.

Figure 5: Cause-and-Effect Diagram (edited using canva.com)

From the interview, the root cause of SCPOD late submission is categorized into five, which are documentation officer's performance, driver's performance, database management system, application and environment.

Documentation officer plays critical role to this problem, since it is their responsibility to make sure that the SCPOD is submitted within the time limit. Documentation officer does not update approval status to the system can be caused by the lack performance of the employee, or high work load since they have to manage lot of incoming SCPOD. While, for documentation officer forget to submit SCPOD can caused by manual database management system used in PT. GRL.

The problem with the driver can be divided into two groups, which are caused by lack of behavior of the driver, which can be reflected from the driver delay to send SCPOD, fills the POD incompletely and taking photo without turning on the GPS so that the photo does not featuring geotagging. Secondly, lack of knowledge of the driver which can be seen from the driver does not understand and also fill the SCPOD incompletely.

Then, currently PT. GRL manage and maintain their data manually, it means that everyone has their own data. As a result, a need to reconcile data in every step and high probability to left POD unsubmitted. The last factor is environment, which contains signal and destination of shipment located in remote area. Unfortunately, these external factors are the causes that out of control of PT. GRL.

Result and Discussion

Improve

Once the true root cause has been verified, improvements need to be made to ensure the problem does not reoccur again. In this research, writer propose 3 categories of solutions based on the objective of the improvement.

Table 4: Propose Solutions

No.	Root Causes	Solution Category	Proposed Solution
1.	Lack of Driver's Performance	Proposed Solution to Improve Driver's Performance	Utilize application for driver Utilize application for driver Retraining SOPs Hire a Driver's Assistant
2.	Indiscipline Documentation Officer and Driver	Proposed Solution to Discipline the Employee	Regularly conducting performance evaluation Develop training program Develop an Incentive System for Driver Replace the negligent employee

3.	Lack of Database and Process Management	Hire a document control to synchronize data Utilize Transport Management System (TMS)

However, out of several solutions, some of them should be prioritized. To decide which one should be favoured, a benefit/effort matrix is utilized. The matrix is structured based on the benefits generated by the proposed solution compared to involved in doing it.

Figure 6: Benefit/Effort Matrix to Proposed Solutions (edited using canva.com)

The matrix in the Figure 8 above is structured based on the benefits generated by the proposed solution compared to the effort involved in doing it. Of the several proposed solutions offered, some are included in areas with high benefits and low effort, meaning that the application of these solutions must be prioritized to solve the POD problem at PT. GRL. The solutions are retraining SOPs, developing a reward and punishment system, hiring a document control, utilizing TMS, and improving the Proof of Delivery Process.

Proposed Solutions to Improve Driver's Performance

Retraining SOP

The root cause of problems in submitting PODs is errors and inconsistencies in the driver's work with SOPs, retraining to refresh all the requirements, and proper procedure to conduct a transportation project. The goals should be clearly stated and include specific outcomes.

Retraining of driver SOPs requires little effort because the investment required is minimal, can be done in the shortest time possible, and is expected to have a high impact so that there are no repeated driver errors. Therefore, this solution should be prioritized by the company.

Proposed Solutions to Discipline The Employees

Develop an Incentive System for Driver

This system was created to provide a particular attractive reward for outstanding drivers to feel appreciated for their hard work and motivate other drivers to work more challenging and smarter. The types of incentives that can be given to drivers will be intangible

incentive, which is promotion to be the trainer for another driver especially underperformance one. This kind of reward can boost the confidence of the drivers, therefore, this solution should be prioritized by the company.

Proposed Solutions to Improve Database Management

Hire a document control to synchronize data

Recruit a documentation officer that responded to compile all project data, remind other PICs and drivers to collect the required documents, and present to the operational manager about the POD submission and the reasons, so that the cause can be found and improved.

Utilize Transport Management System (TMS)

Transport Management System is a dedicated platform focused on the streamline of the shipping process from planning, executing, and optimizing the transportation system's shipment process. This software is mainly used to provide:

- i. Economic root planning
- ii. Select the optimal mode of shipment and the best carrier, based on cost, efficiency, and distance
- iii. Trace and track drivers and vehicles
- iv. Information regarding trade and tariff
- v. Potential delays due to customs or other trade regulations

One of the most useful features for solving problems that PT. GRL is currently facing traces and tracks to provide location evidence to the customer and provide integrated communication with drivers and generate proof of delivery to solve soft copy POD submission lateness. The POD generated from this software can be a temporary SCPOD collected if the SCPOD factors causing the delay.

Benefit – Ease Matrix is utilized to select which proposed solutions to be prioritized in solving the actual root causes. The matrix 7 below is structured based on the benefits generated by the proposed solution compared to the effort involved in doing it. Of the several proposed solutions offered, some are included in areas with high benefits and low effort, meaning that the application of these solutions must be prioritized to solve the POD problem at PT. GRL. The solutions are retraining SOPs, developing a reward and punishment system, hiring a document control, utilizing TMS, and improving the Proof of Delivery Process.

Control

After the true root cause has been verified, and several solutions have been approved, the next step is to arrange a way to control the solution to be implemented not to happen again. Table 5 is depict the control method, who will be responsible for its implementation, and the corrective actions that must be done if there are no changes from the proposed solution prioritized.

Table 5: Control Plan for Proposed Solution

Proposed Solution	Control Factor	Target Performance	Control Methods	Responsibility	Corrective Action
Hire a document control	Information Accuracy	100% data is updated, accurate and valid	Monitoring	Operation Manager	Evaluation of Document Control Performance
Retraining SOP	Accuracy of Driver filling POD form	Driver fill the POD form completely	Monitoring	Operation Manager	Reward and Punishment System
TMS	Time of POD Submission	According to Lead Time	Tracking progress	Operation Manager	Impact training for users
	Convenience of Application	No complaint from the user	Survey, questionnaire		
Incentive for Driver	Time of POD Submission	According to Lead Time	Tracking progress	HR	Review System

Conclusions

This study objective is to analyze the root cause of Soft Copy Proof of Delivery (SCPOD) late submission and to improve the process using Lean Six Sigma strategy and following DMAIC roadmap. After conducting statistical measurement to show overall performances and interviewing several related employees, it can be found that the factors that affect the delay of SCPOD submission are lack of driver's performance, indiscipline documentation officer and driver, difficult to maintain database, underdeveloped

application, no signal, and destination located in remote area. Therefore, to be able to solve this problem, there are several proposed solutions that can be applied. Firstly, is to hire a document control, retraining SOPs for drivers, use transportation management system applications, and apply incentive systems for drivers.

In this research, the implementation has not been done due to lack of time of research. Therefore, it is better to regularly review the control chart and compare before and after data plot to measure how well the process after implementing the solutions. For further company's overall improvement, it is recommended to make lean six sigma becomes a culture of Continuous improvement (Kai Zen) in the company, more often practices application of lean six sigma in the problem-solving cases are required. A more structured program in using this tool will increase the performance of overall of the company.

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