



## Proposed Improvement of Logistic Operations to Increase Service Level Agreement (SLA)

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**ABSTRACT:** In the digital era, e-Commerce or online shopping is a big breakthrough in the world of buying and selling services on the Internet, the success of e-Commerce is inseparable from the success of its shipping services or logistics partners. The level of customer satisfaction must be balanced with the delivery performance since the customer buys until the item received. SEI is a company engaged in delivering package. SEI is one of the delivery services which provide the delivery service end to end from the First mile to the Last mile. Thus, SEI should be able to control the performance of their shipment from pick up until successfully delivered to the customer. The most significant volume of SEI comes from the marketplace (e-Commerce) or sellers. Therefore, the customer satisfaction level also determines the shipping company's performance or they called service level agreement (SLA). SEI recorded to have untargeted SLA within this current 3 months. This research aims to find the problems and the suitable solutions of the shipping company operations that affect service level agreement scored. The methodology used for this research is both qualitative and quantitative data. Data collection is primarily based on an interview with the internal stakeholder of the company to find the root causes of the problem. The root cause analysis evaluation is done by interviewing several stakeholders about the performance and quality of the shipping company. The secondary data comes from historical data from SEI used to know the current and previous performances. The historical data has been taken during 2022. The output of the root cause analysis illustrated in the Cause-Effect

Diagram or usually called Fishbone Diagram. After find the root causes, the suitable solutions for this SLA's problem proposed by DMAIC method. DMAIC is part of Six Sigma method, one of the quality management tools that aimed to manage quality improvement activities throughout an organization/company.

**KEYWORDS:** Delivery Flow Process, Fishbone Diagram, Logistics, Operation Management, Quality Operations.

### INTRODUCTION

The global logistic market is driven by the significant growth, this aggressive change in the global market leads to the increasing consumer demand. Indonesia is an archipelago with around 267 million population spread within 1.9 million km<sup>2</sup> and 17,504 islands.

Transportation and logistics were an essential role in the economy's performance, mainly to ensure distribution coordination. Logistic is a significant part of supply chain management and refers to a robust network of roadways, railways, airways, and seaways engaged in the storage, management, transportation, and delivery of products from the point of origin to the point of termination (Global Logistic Market Report, 2021). The Indonesian middle class has been a major driver of economic growth for the past decades and now represents almost half of all household consumption in Indonesia. Personal disposable income means the amount of money that individuals may spend for consumable goods or infestation after they paid their taxes. Indonesia's personal disposable income (PDI) estimated growth positively from 2018 until 2021. The reason of fluctuations in disposable income in recent years are increases in household needed and personal insurance (Murase, 2016). Along with it, rising internet and smartphone penetration have given the Indonesian population across different socioeconomic classes access to online shops, marketplaces, social media sellers, and mobile apps.

In this digital era, e-Commerce or online shopping is a big breakthrough in the world of buying and selling services on the Internet. The success of e-Commerce is inseparable from the success of its shipping services or logistics partners. The level of customer satisfaction cannot be separated from the delivery performance since the customer buys until the item is received. However, upon this high demand for timeliness and flexibility, where inadequate infrastructure and outdated regulations hold back logistic performance, companies must seek ways to increase their competitiveness through logistic function<sup>1</sup>. Indonesia had the largest e-



commerce market among the Association of Southeast Asian Nations (ASEAN) countries in 2021, with retail e-commerce sales totaling USD 37.3 billion. Indonesia has been growth rapidly in their e-commerce section, with nearly 72.87% in 2021. The growth of e-commerce in Indonesia is attributed to the high internet penetration, high trust in local companies, and demand for a large category of goods due to the pandemic covid era. One of the key success factors and challenges of ecommerce in Indonesia is assuring reliable logistics and infrastructure. Based on the McKinsey report, this success factor comprises quality of infrastructure, quality of logistics service providers, and ease of exporting. Indonesia's logistics infrastructure lags its regional peers, ranking 63rd of 160 globally in 2016, according to the World Bank. In addition, Indonesia's online commerce efforts suffer from both a lack of sufficiently large logistics coverage networks and inconsistent service quality. This can be seen that a continuously growing e-commerce industry, delivery services (express and small parcels) in Indonesia grew by 17% on a compound annual growth rate (CAGR) basis from 2013 – 2017 and is expected to grow further as the industry grows. (Logistic Landscape in Indonesia, 2020).

In order to lead the market of ecommerce in Indonesia, SEI built the significant infrastructure related to the delivery company. SEI is one of the delivery services which provide the delivery service end to end from First mile to the Last mile. To achieve customer's satisfaction, SEI should maintain their service level from the first stage of incoming package until the package already sent to the destination. They had a service level agreement to ensure their customers are satisfied with their services.

Due to enlarge their market, SEI has attached into many e-Commerce in Indonesia. In order to ensure their quality services, SEI already committed with their service agreement. This committed time was made for regular service of Sicepat. To the Jabodetabek’s destination area they will commit for 36 hours of delivery. To the Jawa’s destination area will be 48 hours of delivery and last for Non Jawa they will be committed with 61 hours delivery. If they are not delivered on the time, they will be fined from e-Commerce as a punishment of their agreement. As their agreement with one of the larger e-Commerce in Indonesia, SEI already reported the decreasing service level on pick up.

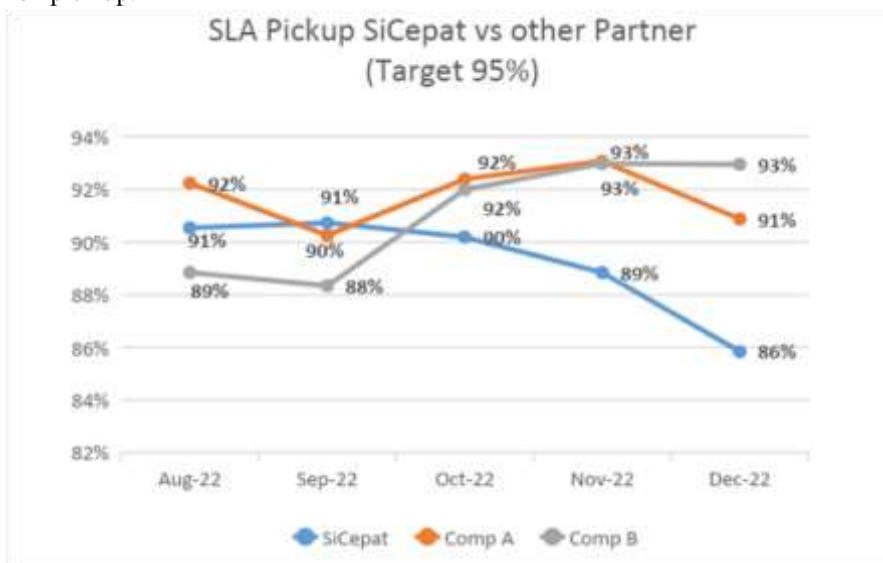


Figure 1. SLA Pickup SEI vs the other Partner

This could be seen on Figure 1. SEI has reported decreasing their service performance agreement (SLA) since October 2022. They were already being the best delivery company in Aug-2022 over all other competition but decreasing their quality service from October 2022 until December 2022. This condition could be an impact to reduce their customer satisfaction and also fines imposition by their e-Commerce partner as their agreement before. SEI Palmerah is the lowest branch by their service level agreement. SEI Palmerah has 6,465 volume packages and 79% scored with 1332 breach packages or unsuccessful picked up packages. This is the worst branch that SEI had by looking their SLA pick up scored. Based on the data, SEI Palmerah should have an improvement for their service level due to avoid the fines that come from e-Commerce partners as the punishment of untargeted service level agreement. This situation also needs to be improved if SEI is still willing to win the market in the delivery services. In this research, the author will be measured deeper to find the root causes by using Cause-Effect Diagram. After analyzing the root causes, we will



continue with the improvement and control stage. This explanation is provided in Six Sigma methodology coming from define, measure, analyze, improve and control.

## THEORITICAL FOUNDATION

### 1. Logistic Theory

Under the era of globalized economy, the intensified competition pushes companies to contract out logistics operations and cut costs in an effort to concentrate on core competences. The logistic industry began to transform from the traditional transportation industry and this is continuing at a rapid rate. Logistic deals with the flow and storage of goods and related information, as defined by the Council of Logistics Management. All the processes of planning, implementing and controlling the efficient, cost-effective flow and storage of raw materials, in-process inventory, finished goods, and related information from point-of-origin to point-of-consumption are for the purpose of conforming to customer requirements. Logistics, previously viewed as a classical function, which involves adversarial relationships among suppliers, customers and transportation providers, is emerging as a key source of competitive advantage and a leading reason for strategic alliance relationship between companies and their logistics providers. According to Ross, logistics can be seen as evolution through four distinct areas: warehousing and transportation management, total cost management, integrated logistic management and supply management.' The development of the logistic industry began by merely providing tactical transportation and warehouses services to more centralized logistic functions aimed at cost control and customer services. The role of logistician then continued to expand from total cost management to the integrated logistic solution providers.

### 2. 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.

Even though most Six Sigma adopts this flow of the process for project management and process improvement projects, 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's step can be utilized as a process redesign step if the original process operates so poorly and is required to be improved and start over (Montgomery & Woodall, 2008).

#### a. 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)

#### b. 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).

c. 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 (Henderson, 2011).

d. 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).

e. 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). To accomplish a successful implementation of Six Sigma in the organizations requires a systematic and disciplined application of several specific tools and techniques (Antony & Kumar, 2007). With that being said, even though culture and managerial play some roles in the organization, the critical success in Six Sigma depends on how the problem solver utilizes the tools (Uluskan, 2016). Table 2. 1 below explains some of Six Sigma tools based on which phase the tools can be utilized

3. Cause and Effect Diagram (Fishbone Diagram)

The Cause-and-Effect diagram was designed by Professor Kaoru Ishikawa in 1943 to sort the potential cause of a problem while organizing potential causes into several categories. The diagram can be utilized for showing key relationships among contributing factors so that the possible causes provide additional insights into process behavior (Doggett, 2005). The diagram is drawn based on possible causes of a problem and categorized into several groups. Major cause category branches can be initially identified using the four Ms, which are material, methods, machines, and manpower. Other than that, the classification can also be tailored depending on the problem. These categories are then subdivided into several primary causes or first hierarchical level and secondary causes or second hierarchical level (Hristoski et al. 2017). The reason that these diagrams are also called Fishbone diagrams is because the final diagram looks like a fish skeleton with a fish head to the right of the diagram and bones branching off behind it to the left

## METHODOLOGY

As this research is using qualitative and quantitative methodology, the qualitative data will be collected through discussion and interviews. The respondents include expert and experienced employees who are directly involved and those whose responsibilities impacted the documentation process. According to Sugiyono (2018: 456) primary data is data that is taken directly by providing data to parties that are directly related. The writer conducted an in-depth interview for preliminary analysis to get the qualitative data This study used the results of interviews with the fellow stakeholder in SEI Palmerah as one of the methods to know the root causes. The interview was conducted in person on 13 November 2022. There were several questions prepared for 9 stakeholders of SEI Palmerah. There are 9 stakeholders such as driver, sorter, branch administration and branch coordinator, that already answer the interview questions. After we define the respondent, we have made an interview session to get a root causes of untargeted service level agreement in SEI Palmerah. Author was conducted interview to internal employee who runs the operational process. The aim of this interview is to get better knowledge and alignment related to the quality of SEI Palmerah especially First Mile process. These few questions are coming for this fellow stakeholder to identify the probability causes that might impact the work process from the internal side. Table I explains that there are 9 questions that were already asked to the operations team; 3 of them were given only for the branch coordinator as the leader.



**Table 1.** Interview Questions

No	Interview Questions	Responden	Purpose
1	Is the time pick up meet on the time?	Branch Coordinator, Branch Administration, Sorter, Driver	To identify the current situations
2	Do you have any suggestion to improve this process?	Branch Coordinator, Branch Administration, Sorter, Driver	To obtained recommendation for improving the process
3	Are every process already meet with SOP that the company have made?	Branch Coordinator, Branch Administration, Sorter, Driver	To identify the current situations
4	Are there any external and internal factor that might be impacted the work process?	Branch Coordinator, Branch Administration, Sorter, Driver	To observe the factor that might be impacted
5	Is there any difficulties when the process picked up happened?	Branch Coordinator, Branch Administration, Sorter, Driver	To identify the current situations
6	In your opinion, why some problem might happened?	Branch Coordinator, Branch Administration, Sorter, Driver	To identify the current situations
7	How is the of our driver?	Branch Coordinator	To observe the performance of the people involved.
8	How is the performance and service of our sorter?	Branch Coordinator	To observe the performance of the people involved.
9	How do you control the First Mile process in this branch work efficiently?	Branch Coordinator	To observe the current control action

According to Sugiyono (2018: 458), secondary data is a source of data obtained indirectly from parties related to research. In this study, the data used was to collect similar research and existing theories with the aim of assisting researchers in resolving and finding root causes and solutions to problems found in the companies studied. The data used can be in the form of journals, books, and reliable sources such as data from the internet. Secondary data is considered easy to obtain because of the existence of the internet which makes it easy to search for theories or journals that have been published publicly.

**ANALYSIS**

After doing several discussion and asking some questions to the stakeholder, we made it into category that could find the reason why this problem could happened. This data analysis with help the author to answer the research questions number one, to find and understand of the root cause of the problem. From this method, author will know the prioritize reason that might be the most urgent thing to do. This is the result of the interview session. The process of analyzing data and determining the most likely causes of defects is a crucial step in identifying and addressing problems within a process. Based on the data collection in the previous chapter and the measure phase, the analyze phase aims to see the potential cause which were identified by looking at all the proses. In this phase the identified causes develop by the Cause and Effect Diagram (Fishbone Diagram).



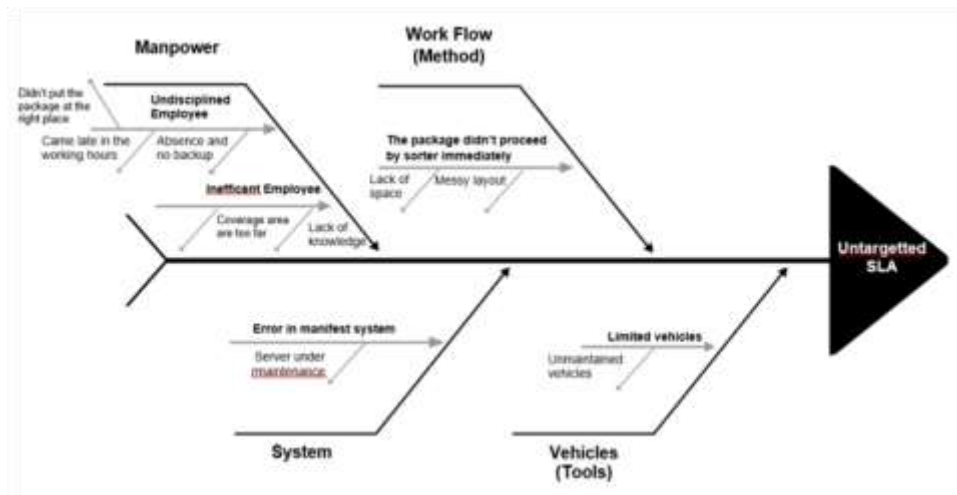


Figure I 1 Fishbone Diagram

Quality of the first mile services is closely related to the stakeholder and the business process. From the interview with a few stakeholders, the author found that the root cause regarding the problem of service level agreement is about the manpower, the work flow, the system and the vehicles as a matter tools for delivering packages. According to the interview result, it can be prioritized that the most urgent root cause of the problem happened in SEI Palmerah are:

1. Lack of the manpower in the branch

Manpower is the important asset for all the First Mile Process. Palmerah’s branch registered to have 5 drivers, 5 sorters, 1 branch administration and 1 branch coordinator. From the data, on average each day there are min. 2 drivers did not attend because of sick or leave absence, 2 sorters did not attend and branch administration with no absence. This data provided the discussion with the few stakeholders of Si Cepat that there were many driver absences and this made lack of process. Currently, SEI Palmerah branch only had 4 drivers who handle a huge package from big seller and also have 4 drivers who divided into two task elements, pick up to the seller and distribute to Line Haul. In fact, there are many drivers got absent or sick leave and it affect lots of pending packages that should pick up. The same condition happened with the sorter, different task but same have lots of package that could not be proceed because of lack of manpower. With 4 sorters and 4 drivers, SEI Palmerah only has 3,000 maximum capabilities in processing the packaging. This also shows on Figure 1.6 in the previous chapter that there are almost 1,500 packages on average not being processed on time. That package was already being assigned to SEI Palmerah but could not proceed because the sorter already got their maximum capability. This could be affected on overload of the package because the package that should be already delivered to Line haul or going out from the branch, but have not proceeded because there is no manpower that could do. Good quality manpower such as time management, people discipline will be impacted to good performance of the process.

2. Messy Layout

The first mile process is closely related to the number of incoming packages from sellers, the total capacity of space and the ability of manpower to handle. SEI Palmerah is already being the lower branch with 79% scored of SLA. Means there was 21% package that ain’t being proceeded on the time. Looking at the capacity of their space, SEI Palmerah only has 3,500 within their volume coming from 6,645 in Dec 2022. They got over the capacity looking by this numbers of capacity. By the capacity of manpower, they only had 4 sorters and 4 drivers with a total capacity 3,000 so they also have a problem with their capacity of manpower. From this fact, the overload could make up for the lack of first mile process because they meet many packages but their branch & manpower are not enough anymore. The low service level agreement is not only caused by the manpower only, but the space of the branch. Once a package is coming, it comes as a bagging package so it consumes more space to forward service and fresh parcels. Currently SEI Palmerah needs more space to handle more packages. The way to place the final package is really necessary in this process. Also, the unused stuff in the branch is one the causes of the messy layout, such as a broken scanner that has already been there for 1 year. This should be already



given back to General Admission or just put it on the other floor. The extra space needed to cover the volume on a daily basis and to speed up the operational time.

3. Lack of Vehicles

In pickup operations, the fleet department of vehicles is one of the important things of this process. This could be as a supporting equipment that must be considered, the seller location is very diverse with access roads in the capital that aren't always smooth making their own challenges. The seller's location with narrow access demands the courier to proactively park his car and walking into the alley not a bit of its volume is also large. So, the good condition of the fleet and the correct determination of the fleet are really needed here. The correct determination of the fleet is really important looking at the coverage of pickup locations and the travel time. So, it can be determined for each fleet a maximum of how many hours, from that it could be analysed how many fleets that they need.

4. Inefficient working process in the branch

First mile process is the first process that must be carried out in the process of package delivery. Time of each process is very important to provide the target service level agreement (SLA). The actual work process by each task element in the First Mile process, starting with the unloading from the vehicle after picking the package from the seller until the final package is already prepared to go out of First Mile Branch. From Table 1.1 about the service level agreement, First Mile process by the agreement only had 6 hours. We could know that all the First Mile processes in the branch actually need 7 hours to complete all the tasks but still have a waiting time within 3 hours. There are almost 10 hours of first mile process and this lack made them couldn't provide the service agreement within 3 hours in the First Mile process. From the time study, in the Figure 4.2, it shown that there are several times that made the sorter waiting for too long. This waiting time is happened when the final package should be load in to the truck and the time when the package already coming from the seller. The causes why the sorter keep their package and choose to wait until the huge package come because they still have many packages to proceed. In the other hand, from the interview the stakeholder said that they haven't any more space for keep their final package. The sorter have not drop the package in the right place so this made messy layouts. Also, they couldn't load into the truck because there were only 1 vehicle that they could use to go to Line Haul.

5. System Issues Problem

The main process that impacts the service level agreement is when the status is updated by the sellers. The status will be triggered and reflected to SEI system that all packages ready to be picked up. System issue cannot be avoided in a logistic company, the courier uses the device to update all of the status of pick up. System issues could happen if there is a bug during the synchronisation from the seller. This condition could cause a dispute and discrepancy. When there is a system issue, the courier has to do manual pickup (with whatsapp) without scanning the seller. This could be a problem, while all the big sellers requested pickup late out from the working hours. This could be made into a huge or pending package that should pick more than before, in the next day.

**SOLUTIONS**

The root causes have been identified and verified, the improvement stage should be made to ensure that the problem does not reoccur again. In order to improve the performance of First Mile process of SEI Palmerah, there are main solution that would improve to the operational, impact faster lead time and customer satisfaction.

Root Causes	Improvement Plan	Objective
Undisciplined manpower	Develop reward system for operational manpower	to reduce and avoid undisciplined manpower
	Regularly conducting performance evaluation	to maintain performance appraisal
	Replace the negligent employee	to reduce and avoid undisciplined manpower
Inefficient working method	Work with the new flow	to work more efficiently
Limited vehicles	Determined more driver & sorter	to provide service level agreement on the time



	Develop more training coming from the Standard Operational Procedure (SOP)	to work more efficiently
	Plan for relay layout space	to work more efficiently
	Determined more fleet	to provide service level agreement on the time
	Maintain the fleet continuously	to provide service level agreement on the time
Error in the manifest system	Take precautions action such as secondary system	to reduce and avoid system problem

**CONCLUSION**

SEI is facing a new challenge due to their aims to win the delivery market in Indonesia. SEI is recorded to have 95% minimum service level but has decreased in these 3 months. The lowest service level of all branches of SEI is scored to SEI Palmerah. This condition can be affected by the fines imposed from e-Commerce’s partner as one of their agreements before. Also, this could affect customer satisfaction. This project aims to know what is the variable that might affect the service level, the root causes of that problem, determine the suitable solutions and make an improvement using qualitative and quantitative methods. In the logistics company the quality of operations is related to the lead time process that achieved the service level agreement with customers, so this project uses interview method and DMAIC analysis to get the objective. First Mile process is the main gate operations from the sellers before to the end customer, maintaining the service level is the key factor to keep the volume stay and not convert to the other competitors. The main problems that impacted the lead time performance in First Mile process were undisciplined manpower, inefficient work process, limited vehicles and error on manifest system. Author already justified the main problems using fishbone analysis and set the prioritized improvement. After concluding the analysis, there are some proposed strategies that can be suitable to solve this problem. To handle undisciplined manpower, the company could start with develop the reward system for their operational. Continue with regularly conducting the performance evaluation and replace the negligent employee after giving them some warning before. Looking at the inefficient working process, they could start with determining the right amount of driver and sorter, having more training for all stakeholders, make a re-layout of the branch, and work with the new flow of the first mile process. For the limited vehicles, they have to maintain their fleet conditions and determined the right amount of their fleet system. And for the error system, they should be prepared for every worst condition that might affect to the system. Such as prepare for secondary system to avoid unpickable package because of their unknown condition.

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*Cite this Article: Annisa Sophie Amalia, Dr. Yuanita Handayati, M.S.M. (2023). Proposed Improvement of Logistic Operations to Increase Service Level Agreement (SLA). International Journal of Current Science Research and Review, 6(2), 1572-1580*