

ANALYSIS OF THE CAUSES OF DELIVERY DELAYS: A CASE STUDY OF PT SERYU CARGO

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Abstract: PT Seryu Cargo has become a vendor for several e-commerce platforms and even market leaders among courier companies in Indonesia. PT Seryu Cargo must be able to provide the best service to meet customer needs, including timely delivery of goods to their destinations, as this can affect customer satisfaction. Identifies the factors causing delays in delivery of goods between PT Seryu Cargo and J&T for the Jakarta to Sumatra route in 2022. The data analysis technique used by the author is the fishbone diagram. The author has the following shipment data: 1) The total number of shipment in 2022 was 614 shipment, with total 244 shipment experiencing a delay, resulting in delay percentage of 40%. 2) Upon analyzing the root cause, it was found that there are four problematic variables with an average problematic factor 38%. These four problematic variables are: Man, Machines, Methods, and Facilities. 3) Significant issues were discovered in this study, with several factors contributing to the delays

Keywords: *Customer satisfaction, Cargo, Delays, Seryu cargo, Fishbone diagram*

1. Introduction

PT Serikat Hantar Expedisi (Seryu Cargo) was established in September 2020 with a focus on both B2C (Business to Customer) and B2B (Business to Business) operations. Seryu Cargo introduced innovative technology to the cargo industry, including a tracking system that allows customers to easily monitor the location of their shipments without needing to contact customer service.

Seryu Cargo serves as a vendor or subcontractor for several major courier companies in Indonesia, including J&T. The company primarily specializes in the transportation of packages from hub to hub using ground transportation or trucking. Over time, PT Seryu Cargo has acquired several critical routes from J&T. For instance, in 2022, they handled 614 deliveries from the Jakarta hub to Lampung and Pekanbaru hubs.

The use of ground transportation from Jakarta to Sumatra poses the potential for delivery delays. These delays can be attributed to various factors, including fleet breakdowns, road damage, and ferry crossing queues. As we know, the road infrastructure on the island of Sumatra is not entirely reliable, and there are areas that do not meet the standards of a national highway.

2. Literature review

(Siahaya, 2013) found that transportation is the movement or transfer of products from one location to another using modes of transport. (Siahaya, 2013) also shown that distribution as a process involving the storage of finished goods from manufacturers to consumers or users when needed. (Mahardika et al., 2022) Consumer satisfaction is a person's feelings of pleasure or disappointment that arise after comparing the performance (results) of the product that is thought to the expected performance (expectations). This is supported by Waguespack in Pramana (2016), saying that service quality cannot be separated because it can increase competitive advantage in gaining consumers.(Impact et al., 2022). According to Usman et al. (2019), queuing is an occurrence which can be found in daily activities, for example, waiting in line in front of a ticket counter for a train or cinema ticket, queuing in toll entrance, banks, supermarket cashiers, and other situations that can often be experienced (Irenita et al., 2022)

(Siahaya, 2013) found that cargo, or freight, encompasses all types of goods that can be transported from one place to another using modes of transportation. (John M. Echols & Hassan Shadily, 2011) has shown that delay is defined as a postponement, a setback, or a slow response. Therefore, it can be concluded that delay results from a slow response, potentially causing activities to be postponed and creating a chain reaction. Global trade activities rely heavily on international transportation that connects goods, people and countries to drive business growth and regional prosperity(Purwoko et al., 2022) This is supported by Waguespack in Pramana (2016), saying that service quality cannot be separated because it can increase competitive advantage in gaining consumers.(Impact et al., 2022) . Service quality is an advantage that a company has (Carvalho, Saldanha, and Amaral 2020). v: "Tangibles, Empathy, Reliability, Responsiveness, Assurance".(Cahyanto et al., 2021)

Human resources represent a dynamic condition derived from human beings with the cognitive and creative abilities that play a strategic role in supporting organizational performance.(Sedarmayanti, 2009) found that indicators for human resources include knowledge, skills, abilities, health, and behavior. On the other hand, (Mulyadi, n.d.) has shown that logistics costs encompass the total expenses incurred in the entire logistics process, with indicators such as affordability, stability, competitiveness, assurance, and flexibility.

The Fishbone Diagram, also known as Ishikawa Diagram, is a concept of cause-and-effect analysis developed by Dr. Kaoru Ishikawa to describe a problem and its causes within a fishbone framework. Fishbone Diagrams are also known as Ishikawa diagrams, named after a Japanese statistical quality control expert who discovered and developed this diagram in the 1960s. Dr. Kaoru Ishikawa first used this diagram for quality management at Kawasaki company, which is subsequently recognized as one of the pioneers in the development of modern management processes.

In the reference to (Watson, 2004) cited by (Ilie G & Ciocoiu CN., 2010) found that the fishbone diagram is defined as a tool that depicts a systematic approach to understanding

various effects or consequences and the causes that lead to or contribute to these effects. Due to its function, this diagram is commonly referred to as a cause-and-effect diagram

(Ilie G & Ciocoiu CN., 2010) cited from "Basic Tools for Process Improvement" (2009) has shown that the fishbone diagram fundamentally illustrates a suggestive model of the relationship between an event (effect) and the various causes of that event. The structure of the diagram assists users in thinking systematically. Some of the advantages of constructing a fishbone diagram include helping to consider the root causes of issues with a structured approach, encouraging group participation, enhancing the group members' understanding of the problem analysis process, and identifying areas where data should be collected for further research.

(Scarvada et al., 2004) has shown that, the fundamental concept of the fishbone diagram places the core problem on the right-hand side of the diagram or at the head of its fishbone structure. The causes of the problem are depicted on the fins and spine. Commonly used categories for the causes of the problem, which often serve as a starting point, include materials, machines and equipment, manpower, methods, and measurement. These six causes of issues are often abbreviated as the 6M

The fishbone diagram is commonly used in the stage of identifying problems and determining the causes of those problems. In addition to its use in problem identification and cause determination, the fishbone diagram can also be employed in the process of change. The Fishbone Diagram is a cause-and-effect diagram that can be used to identify potential performance problems. The fishbone diagram provides a structure for group discussions about the potential causes of these problems. The primary goal of the fishbone diagram is to visually depict the relationships between the effect and all the influencing factors

The Fishbone Diagram is an analytical tool that provides a systematic way to examine the effects and causes that lead to or contribute to those effects. Due to its function, it can be referred to as a cause-and-effect diagram (Watson, 2004). The fundamental function of the fishbone diagram is to identify and organize the potential causes that may arise from a specific effect and then separate their root causes

The Fishbone Diagram actually offers many advantages for the business world. Apart from addressing quality issues that are a critical concern for companies, it can help solve classic problems in various industries, including: 1) Production process delays. 2) High product defect rates. 3) Frequent production machine problems. 4) Unstable production line output leading to production plan disruptions. 5) Productivity falling short of targets. 6) Recurring customer complaints.

By using the Fishbone Diagram to identify and analyze the root causes of these issues, businesses can make informed decisions and implement effective solutions to improve their operations and customer satisfaction. Indeed, the Fishbone Diagram can be used for a variety of purposes, including: 1) Assisting in identifying the root causes of a problem. 2) Generating ideas for problem solutions. 3) Aiding in further investigation or fact-finding. 4) Identifying actions to achieve desired outcomes. 5) Creating a comprehensive and organized overview of

an issue. 6) Encouraging innovative thinking. This versatile tool is valuable in problem-solving and decision-making processes across different fields and industries

3. Research Method

This research began with the shipment data of Seryu Cargo in the year 2022 on the route from Jakarta to several cities in the island of Sumatra, particularly the cities of Pekanbaru and Bandar Lampung.

Table 1

Shipment Data for the Year 2022

Number	Month	Shipment	Delay	Percentage
1	January	36	17	47%
2	February	47	25	53%
3	March	72	23	32%
4	April	72	30	42%
5	May	46	19	41%
6	June	58	33	57%
7	July	75	39	52%
8	August	55	15	27%
9	September	38	1	3%
10	October	34	2	6%
11	November	41	24	59%
12	December	40	16	40%
Total		614	244	40%
Average				38%

Source: Data from PT Seryu Cargo, 2022

According to the data obtained, in the year 2022, Seryu Cargo received a total of 614 shipments from Jakarta to the island of Sumatra. The average delay rate was 38%. The smallest delay occurred in September, with only one delay out of 38 shipments.

The causes of these delays vary, starting from issues with the fleet, queues at the Merak port crossing, road damage, and drivers not adequately anticipating their conditions and vehicles. Additionally, unprofessionalism is exemplified by fleet/vehicle breakdowns, requiring a replacement vehicle to arrive.

The author also utilized a fishbone diagram as a method to identify the causes of these delays. The fishbone diagram, often referred to as a cause-and-effect diagram, was introduced by Ishikawa in 1990 in his book "Introduction to Quality Control." In this framework, there are four main categories of causes for these delivery delays: 1) Man, 2) Machine, 3) Method, and

4) Facilities.

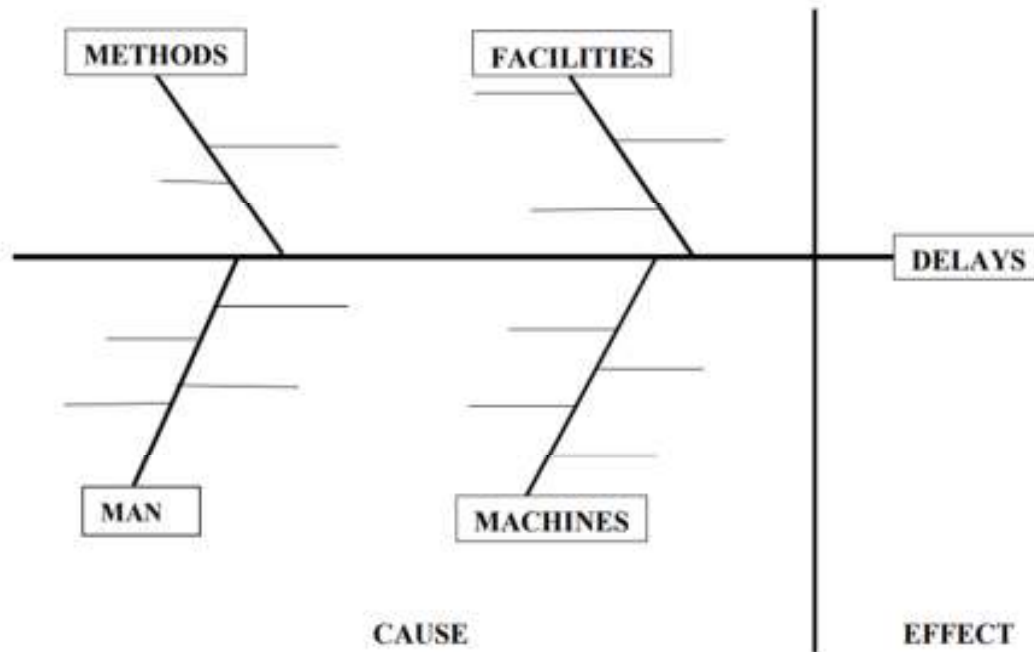


Figure 1. Fishbone Diagram

Source: Ishikawa (2004)

A.) Man

After analyzing the events that occurred at PT Seryu Cargo regarding delivery delays, it was determined that human resource issues were one of the causes. Many drivers did not take the optimal routes, and there were also instances of driver fatigue. To reduce accidents and delivery delays, it was mandatory to have two drivers for each trip. Drivers also needed to meet the Service Level Agreement (SLA) targets agreed upon by PT Seryu Cargo and J&T.

Another finding at PT Seryu Cargo was that not all drivers understood or were aware of the SLA itself. Insufficient communication from the on-site coordinators at PT Seryu Cargo to the drivers regarding the SLA led to delivery delays. It's worth noting that PT Seryu Cargo has partners or vendors to help with the limited fleet they own, and this lack of communication also caused delays in deliveries because PT Seryu Cargo didn't provide the required travel times to its partners or vendors.

Additionally, from an internal perspective, PT Seryu Cargo was found to be a cause of the delays. Late disbursement of travel allowances or operational funds to the drivers, especially in

the early hours, was a common issue. This delay prevented the drivers from departing promptly to their destinations and resulted in delivery delays.

B.) Machines

One of the challenges in the trucking industry is ensuring that the vehicles or fleet are in the best condition. Vehicles in poor condition can lead to delivery delays. For example, there are still fleet units that should have undergone routine servicing but are still used for deliveries. This minor issue is also a cause of the delays experienced by PT Seryu Cargo.

It was also found that many drivers do not perform vehicle checks before embarking on their journeys, which leads to delays when they have to pull over on the roadside to make repairs or simply check for issues during the delivery. Common problems encountered include engine overheating, worn-out brake pads, and nearly bald tires, increasing the risk of accidents.

Another challenge is the congestion at the port, which is caused by limitations in ship availability at certain times. For instance, not all docks are operational, resulting in long queues of trucks, as the port prioritizes the crossing of buses, private vehicles, and essential goods transport trucks. During the rainy season, especially in November and December, strong winds often lead to delays in ship travel, indirectly lengthening the queue. This is because sailing is not advisable due to adverse weather conditions.

C.) Methods

The method employed by PT Seryu Cargo, which contributes to delivery delays, is sending travel allowances to drivers after they have completed loading, and the driver can show the Waybill as proof that the fleet has been genuinely loaded. This practice hinders the drivers from optimizing the predetermined SLA timeframe as they must wait for the admin to send the travel allowance, especially during the early hours. Even though there is a shift system for the admin, it has proven to be ineffective. This method is used because some drivers may falsely claim that their fleet has been loaded when, in fact, it hasn't, and the travel allowance has already been transferred to the driver's account.

Furthermore, the occasional instability of the internet speed and the time-consuming process of transferring funds to the drivers present additional challenges that result in delivery delays.

D.) Facilities

The results of the analysis at PT Seryu Cargo regarding the available facilities indicate that the laptops being used are not operating at their full potential due to inadequate specifications for the required tasks. This is one of the causes of delivery delays because these laptops are used for entering travel allowance amounts by the admin, which are then transferred to the drivers who will carry out the deliveries.

Another issue identified is the unstable internet speed at the PT Seryu Cargo office. This constraint often occurs, especially during the early hours, and it results in delivery delays, causing the SLA targets not to be met.

In addition to using the fishbone diagram theory, the author also used the analysis theory of 5W+1H. This theory is often utilized by researchers to understand the causes and solutions to the root problems faced by the researcher. In the context of what occurred at PT Seryu Cargo, it can be explained as follows:

- 1.) What. What triggers the occurrence of delays?
- 2.) Why. Why is this action necessary or happening?
- 3.) Where. Where is the plan implemented?
- 4.) Who. Who is carrying out the activities?
- 5.) When. When will this action be implemented?
- 6.) How. How will the plan be executed?

Here is an example of the application of the 5W+1H method.

Table 2

Implementation 5W+1H

Kind of Specification	5W+1H	Description	Action
Main purpose	What	What is the main target of improvement or quality improvement	Formulate targets according to customer needs.
Reasons for Usability	Why	Why is an action plan needed? Explanation of the usefulness of the action plan carried out	Internal discussion and meeting to minimize the delay
Location	Where	Where will this action plan be implemented? Does this activity have to be done there?	Change the sequence or sequence of activities or combine activities that can be carried out together.
Sequences	When	Where the action plan activity would be best to implement	Educate field coordinator and the driver
Man	Who	Who will work on the action plan activity? Why should that person be appointed to do the activity?	Management appoint the employee for being project manager

Method	How	How to work on the action plan activity? Is the method given now the best method	Simplify existing action plan activities.
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Source: From the Author

4. Results and Discussion

The topic raised by the author in this case is how the slowness of delivery can affect customer satisfaction, in this case PT J&T as its customer. The author brainstormed managers and supervisors to get data on the causes of this delay.

Table 3

Brainstorming Result

No	Question	Respond A	Respond B	Conclusion
1	What factors cause delays in delivery	Drivers, Vehicles, Systems and Facilities	Man, Machine, Methods, Facilities	Man, Machine, Methods, Facilities
2	If it is due to the driver factor (Man), what things might affect it?	Drivers do not understand SLAs, vendors do not back up drivers, admin personnel who are late in sending road money to drivers	The driver does not understand the situation of Sumatran roads, does not go through the highway	The driver does not understand SLA, there is no backup, does not understand the situation, does not go through the highway
3	If due to vehicle factors (machine), what things might affect it?	Poor fleet conditions, ship queues during the holiday season	The driver did not do the initial check	The vehicle is already unfit, the car lacks maintenance, the car is overloaded. Tire burst.
4	If due to the Methods factor, what things might affect it?	The process or SOP for receiving road money takes time	Drivers often lie about the load	SOP for money transfer and drivers who frequently lie about the cargo load.

5	If due to environmental factors (Facilities), what things might affect it?	Limited internet speed	Computer or PC that is inadequate to run the system	internet speed and computer specification inadequate
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Source: From the Author

Criteria Severity, Occurrence and Detection from the results of Brainstorming

Table 4

Criteria valuation Severity

Level	Result	Description
1	No consequences	Late time < 15 minutes
2	Light cosequences	Late time 16 - 30 minutes
3	Mild consequences	Late time 31 - 60 minutes
4	Minor consequences	Late time 1 - 2 hours
5	Moderate consequences	Late time 2 - 4 hours
6	Significant consequences	Late time 4 - 6 hours
7	Major consequences	Late time 6 - 10 hours
8	Extreme consequences	Late time 10 - 14 hours
9	Serious consequences	Late time 14 - 24 hours
10	Dangerous consequences	Late time < 24 hours

Source: From the Author

Table 5

Criteria valuation Occurrence

Level	Criteria	Total
1	Never happened	0 within 1 year
3	Infrequently	1 time within 1 year
5	Frequently	2-3 times within 1 year
7	Very often	4-5 times within 1 year
10	Highly	6 times or more within 1 year

Source: From the Author

Table 6

Criteria valuation Detection

Level	Criteria	Cause
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1	Easy	The cause of the delay can be analyzed directly by the team
3	Detected	The cause of the delay can be detected by asking directly to the driver
5	Moderate	The cause of the delay can be detected by further tracing.
7	Hard to detect	The cause of the delay can be detected in more than 24 hours.
10	Undetectable	Unable to detect the cause factor of delay

Source: From the Author

From the data obtained from the results of Brainstorming in table 3, it can be seen that there are several kinds of causes of delay which is Man, Machine, Method, and Facilities factors. And can be identified as follows:

Table 7

Factors that leading to the Occurrence of shipping delay

No	Factor	Cause
1	Man	Inexperienced driver, exhausted driver, no backup driver, chase the target, not understand SLAs, lack of operational admin personnel
2	Machine	The vehicle is already unfit, the car lacks of maintenance, the car is overloaded. Tire burst.
3	Methods	SOP for money transfer that are too long, waiting time for money transfer is too long
4	Facilities	Internet speed, and lack of computers specification. Queues of ships and damaged roads

Source: From the Author

From table 7 can be identified using fishbone diagrams the causes of shipping delays

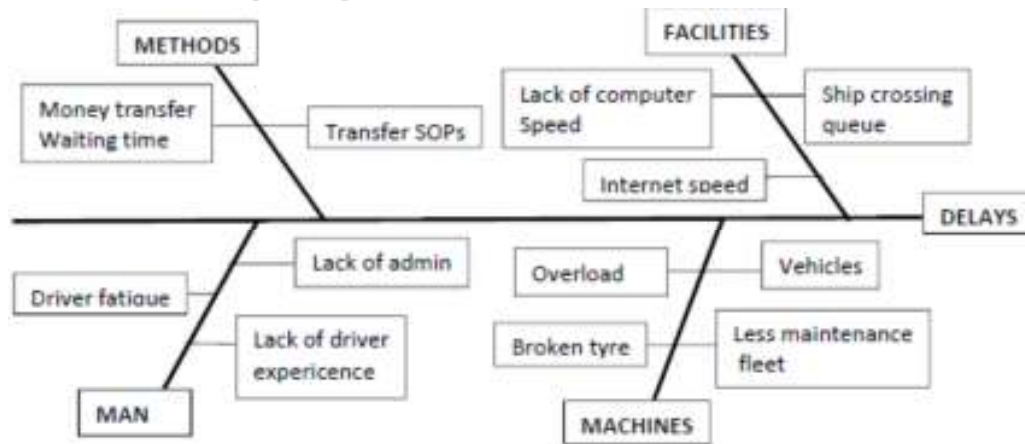


Figure 2. Fishbone Diagram after identified table 7

Source: From the Author

Furthermore, to determine the priority scale for improvement, we use RPN (Risk Priority Number) as a reference.

Table 8

Calculating RPN (Risk Priority Number)

Factor	Failure	Description	Severity	Occurrence	Detection	RPN
Man	Driver fatigue	Because travel without rest	6	10	2	120
	Don't understand SLAs	Drivers do not understand the agreed SLA	7	7	5	245
	Lack of admin power	Long process of paper manifest	4	5	5	100
	Lack of experience	Drivers have not experienced	6	5	8	240
Machine	Broken Tyre	Driver did not do the initial check	4	1	10	40
	Unfit vehicle	Unfit fleet conditions for long distance travel	7	5	5	175

Methods	Overload	Load that is over capacity than allowed	3	3	2	18
	Less maintenance fleet	Frequent minor damage and affect travel	9	7	1	63
	Money transfer waiting time	Driver waiting for money transfer	6	7	5	210
	Transfer SOPs	Complicated transfer procedures	2	3	1	6
	Lack of computer specifications	inadequate computer	5	7	5	175
Facilities	Internet speed	Limited internet speed makes work less than optimal	7	5	8	280
	Ship crossing queue	Holiday time and rainy season there are often queues at crossings	9	10	5	450

Source: From the Author

After obtaining the RPN values for each assessment of the causes of delays, the higher the RPN value, the higher the priority in solving the problem. As per the table 4.6 above, in the case of "Man" the focus is on the issue of drivers not understanding the Service Level Agreement (SLA) between Seryu Cargo and J&T with an RPN value of 245. This will certainly be the top priority for improvement. In the case of "Machine" the issue of unfit vehicles for travel is a priority with an RPN value of 175. In the case of waiting for money transfer in the "Method" it has a high RPN value of 210. Meanwhile, in the case of ship crossing queues in "Facilities" it is the case with the highest RPN value, which is 450. This will be the primary priority for Seryu Cargo to anticipate ship crossing queues to ensure that the SLA can be met.

Table 9
In the case of PT Seryu Cargo

No.	Factor	Failure	What	Why	How	Where	Who	When
		Mode	Causes of Potential Delays	Why is Delay	Correction Actions	Location	Executor	Target
1	Man	Don't Understand SLA	Because the driver does not understand the SLA, the driver will act on their own, not willing to follow the supervisor's instructions	The driver does not understand the SLA and act their own	Seryu Cargo should be open with information to its subcontract or or driver	Warehouse	Driver or subcontract or	Second priority
2	Machine	Vehicle not in suitable condition	Because the vehicle is unfit to drive, there is a significant potential for trouble on the road	Limitation of the owned fleet	Requesting the operational department to provide a fleet that healthy and well maintained.	Warehouse	Subcontract or and operational department	Fourth priority

3	Methods	Waiting time for road allowance	The driver ran out of time to receive road money from the cashier	Standard Operating Procedure for transferring road money that is too long	Improving the allowance transfers system	Office	The Cashier	Third priority
4	Facilities	Crossing queue	Because of the uncertain queue, the potential for delays becomes greater	Queues during the holiday season and in strong winds	Anticipating queues during the holiday season	Ferry port	Operational Department	First Priority

Source: From the Author

From table 9, we can show who and how each division involved can prevent delays in delivery.

5. Conclusion

The conclusion we can convey is how each division, especially the operational and cashier departments, can minimize the factors causing delays in delivery. For instance, in the operational department, it is crucial to be strict with vendors or drivers who do not adhere to the existing Service Level Agreements (SLA). To anticipate ship crossing queues, drivers can seek information on the internet regarding up-to-date weather and port conditions. This way, potential ship queues can be predicted in advance. Meanwhile, the cashier department can increase promptness in transferring travel funds to the drivers.

6. Implications

To fill customer demand for comfort, companies must also provide facilities that can be used directly by customers so that they feel satisfied. Because facilities are an important part of life, companies must manage them so that facilities can function properly. (Cahya Fajriani et al., 2020)

This research has significant implications for the company because it can drive improvements in various interconnected sectors or divisions. By using analytical tools such as

the Fishbone Diagram, the company can identify the root causes of problems, develop more effective solutions, and enhance overall performance. Improvements in one division can have a positive impact on other divisions, creating synergy across various parts of the company. Therefore, this research can assist the company in becoming more efficient, reducing problems, and enhancing overall outcomes

A) Internal implications.

The improvements in various internal sectors will undoubtedly enhance the company's performance. The better and faster the service, the higher the level of customer satisfaction will also increase. Internal improvements will lead to higher efficiency and effectiveness in the company.

B) External implications

The positive impact on customers is a reduction in delivery delays, with schedules aligning with the agreed SLAs. Customer trust can increase, and there's hope for securing contracts for services in other cities.

7. Research limitations

This research has several limitations, such as only investigating delays that occurred in contracts in the cities of Pekanbaru and Bandar Lampung. Therefore, the results may not yet reflect global or overall occurrences in the agreed contracts. In addition to contracting with J&T, PT Seryu Cargo also has contracts with several other companies operating in the transportation services sector

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