

Research Article

The Lowering Distribution Expenses in Thirt Party Logistics (3PL) via Collaborative Consolidation Utilizing the Quality Control Circle Approach

Ramadan, Dolly; Eka Lestiani, Melia; Kusdanu Waskito, Saptono

University Logistics and Bissness International, Bandung, Indonesia

Correspondence should be addressed to *Corresponding Author: 211230004@std.ulbi.ac.id; meliaeka@ulbi.ac.id; Saptono@ulbi.ac.id

ABSTRACT

PT ABC is assessing its distribution costs in the jabodetabek region in light of rising expenses. Currently, PT ABC product line has been streamlined to one variation. To enhance the efficiency of distribution, a shift is occurring from a dedicated contract partnership with PT "A" to a consolidation collaboration with PT "B", utilizing Third Party Logistics (3PL). The Third Party Logistics provider (3PL) charges fees based on each carton, in contrast to PT "A" which previously accounted for warehouse rental and transportation expenses. Employing the Quality Control Circle (QCC) approach, the most cost-effective distribution expenses have been calculated. Over the past four months, the average distribution cost for PT "A" utilizing Third Party Logistics (3PL) stands at IDR 50,000 (Fifty Thousand Rupiah) for each carton. In comparison, the transportation charges at PT "B" amount to IDR 26,500 (Twenty Six Thousand Five Hundred Rupiah) per carton. According to these figures, PT "B" provides fixed pricing, irrespective of shipment volume. The advantages of this consolidation approach include a set shipping timeline and a defined minimum order size.

Keywords: Distribution; Distribution Costs; Logistics; Third Party Logistics

1. INTRODUCTION

Product distribution is generally referred to as logistics. It is defined as the process of planning and providing information regarding the storage process to deliver a good. Product distribution begins in stages, starting from storage locations such as factories, distribution warehouses, to customers. The main goal of planning the distribution of goods is how management can optimize the amount of resources available to distribute goods to their destination. The resources referred to are in the form of optimizing time, optimizing transportation costs, optimizing travel distance, or optimizing labor, and the modes of transportation involved in product distribution.

ABC Company has a factory in the Bandung area. Their product sales area for the Jabodetabek, Karawang, and Cilegon areas is conducted directly by the Company, while areas outside of that collaborate with Distributor Companies for the sales of PT ABC products. PT ABC sells directly in Jabodetabek, Karawang, and Cilegon. They collaborate with Third Party Logistics (3PL) to carry out deliveries to Customers. Companies that use Third Party Logistics (3PL) services expect a more efficient and cost-effective process than conducting the process in their own business (Batarliene & Jarasuniene, 2017). The objectives of the logistics process are formulated based on the 7R principles in Logistics: Right Product, Right Place, Right Price, Right Customer, Right Condition, Right Time, and Right Quantity (Lynch, 2001). If any of these principles are misjudged, the Company may lose customers, reduce competitive advantage, and market share.

During our collaboration with the Third Party Logistics (3PL) provider, we evaluated their performance and costs throughout the partnership. The performance of the Third Party Logistics (3PL) provider during the collaboration was very good, while in terms of costs, we experienced an increase in distribution costs due to changes in some products from chilled storage to dry storage. As a result, only one type of chilled product remains with the Third Party Logistics (3PL). We evaluated the storage and shipping costs for this single type of product, where there was a 25% increase in distribution costs per carton from the product price. Therefore, we are seeking a partnership with a Third Party Logistics (3PL) provider that offers different terms than

before. Third Party Logistics PT A requires us to rent on a Dedicated basis (contract), while Third Party Logistics PT B, which is new, offers a Consolidation scheme where the goods we will send will be stored in PT B's warehouse, and later the deliveries for PT ABC's customers will be combined with PT B's customers for joint shipping. Consolidation of shipments is the process of collecting several shipments from various vendors for multiple recipients, packaged in a single shipment (Lazuardi, 2010). This analysis uses the Quality Control Circle (QCC) method to assess how much the distribution costs have decreased from before.

Before we collaborate with the new Third Party Logistics provider, we calculate to compare the fixed rental costs (Dedicated) with Consolidation. We want to determine if these costs will decrease from the previous distribution costs. Therefore, we use the Quality Control Circle (QCC) method to inform management that we can reduce these distribution costs. The goal of this research is for PT ABC to lower distribution costs to remain competitive with the selling prices of the products.

The Quality Control Circle (QCC) is a collective effort by a group of employees to monitor quality by meeting regularly to identify, analyze, and take action to solve problems in the workplace. The main objective of this quality control is to discuss existing issues within the company and provide solutions to management to resolve these problems. Discussions relate to work aspects such as products, costs, time, inventory, safety, health, and security (Sutarti, 2019).

2. MATERIALS AND METHODS

The study took place at PT ABC situated in Bandung. Its objective is to evaluate the expenses associated with collaboration with Third Party Logistics PT "A" (3PL) via a long-term agreement with Third Party Logistics PT "B" (3PL), employing a Consolidation framework along with the Quality Control Circle (QCC) approach in 2024. Third Party Logistics (3PL) utilizing a Consolidation framework entails that costs are determined by the quantity of goods sent to clients, while expenses for warehouse and vehicle rentals are not imposed. The information utilized consists of billing details sent to PT ABC for warehouse and vehicle rental fees from PT "A" covering the period from September 2024 to December 2024, in comparison to the consolidation pricing proposal presented by PT "B" to PT ABC in October 2024.

Describing the essence of Kaizen, particularly in the context of business, "Kaizen signifies an ongoing enhancement that engages every manager and worker" (Imai, 2014). This term is a broad idea that includes most traditional Japanese methodologies that have recently gained global recognition (Ardiansyah, 2013). One can view Kaizen as a notion that "incorporates" various distinctive techniques like Six Sigma, Robotics, Quality Control Circle (QCC), Kanban, Quality Improvement, Just In Time (JIT), and Zero Defects (Heizar and Render, 2005).

Through the application of the Kaizen principle, we implement the Quality Control Circle (QCC), often referred to as a quality control team. This is a compact group made up of multiple employees who collaborate to aid in the company's enhancement by recognizing and addressing issues within their tasks and surroundings to elevate quality.

There are 8 steps to solve problems in QCC.

1. Clarify the Problem.
2. Breakdown the Problem
3. Set the Target.
4. Analyze the Root Cause.
5. Develop Countermeasures.
6. Implement Countermeasure.
7. Monitor Result and Process.
8. Standardize and Share Success.

3. RESULTS AND DISCUSSIONS

Step 1: Clarify the Problem

The determination of the theme is carried out by identifying the issues present in the warehouse and logistics department. These issues are explored in depth so that we can identify several problems for which we will seek solutions, through problem identification. The issues faced by the Supply Chain department are derived from employees in the field and reports provided by management. Problem identification uses QCDSME. QCDSME is one of the analytical methods used to identify existing problems, where the aspects analyzed will focus on the core issues according to the needs of the QCDSME values (Quality-Cost-Delivery-Safety-Morale-Environment). This identification of problems exists in the warehouse and logistics department (Juwandi & Kamsin (2020)). From the theme determination matrix that has been created, it has been concluded that the issue to be resolved is the high

logistics costs.

Table 1. Thema determination matrix

: 3 poin.
 : 2 poin.
 : 1 poin.
 : 0 poin.

Top Down		Item Evaluasi		Necessity					Actual Circle Capabilities			Overall Evaluation
				Impact	Urgency	Problem	Cost	Input from the boss	Total Participation	Activity Time	Team Capabilities	
High Logistics Costs		1	High Logistics Costs	3	3	3	3	3	3	3	3	24
Eksternal	Product damage in Handling and shipping	2	Product damage in Handling and shipping	3	2	2	1	1	1	1	1	12
	Long unloading Lead time	3	Long unloading Lead time	3	3	2	2	2	2	2	2	18
	Low return product scrap	4	Low return product scrap	3	2	1	1	1	2	2	3	15
Bottom Up		5	Not Support Workers	3	1	1	1	1	2	2	1	12
Difficulty in taking fresh milk		6	Difficulty in obtaining fresh milk	3	1	1	2	1	2	2	2	14
Eksternal	Sales Order is not Effisien	7	Sales Order is not Effisien	3	3	3	3	3	3	2	3	23
	Lack of Fleet Efficiency	8	Lack of Fleet Efficiency	3	3	3	3	3	3	2	3	23

Step 2: Breakdown the Problem

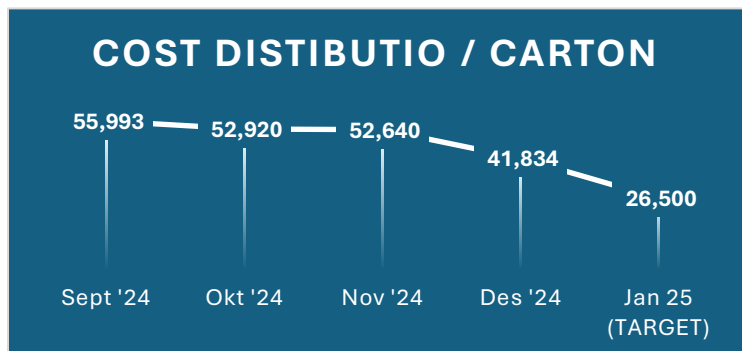
Based on the distribution cost data per carton from September to December, the average distribution cost per carton is 50,000, thus setting a target for reducing the distribution cost per carton in January to 26,500.

Table 2. Activity Plan and Actual

Planning Schedule and Actual

Month		September				Oktober				November				Desember				Januari				Februari			
Step		W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Thema	Plan																								
	Act																								
Target	Plan																								
	Act																								
Analysis of existing	Plan																								
	Act																								
Causal Analysis	Plan																								
	Act																								
Improvement Plan	Plan																								
	Act																								
Improvement	Plan																								
	Act																								
Standardization	Plan																								
	Act																								
Review and Improve	Plan																								
	Act																								

Figure 1. Targe

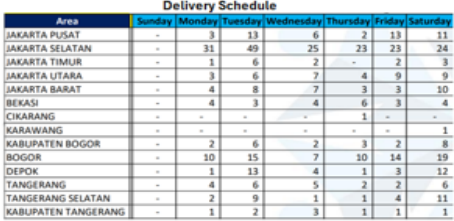
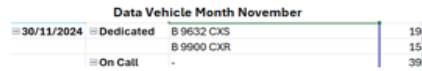


Step 3: Set the Target

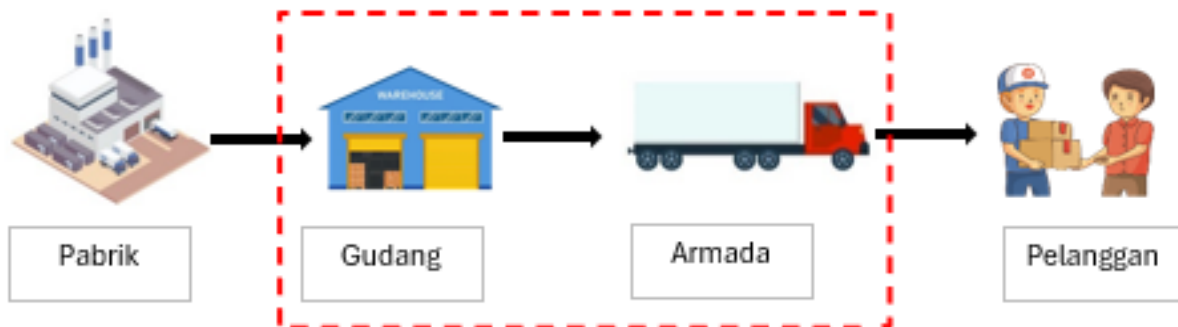
The current condition of the cooperation with Third Party Logistics (3PL) PT A involves costs incurred by PT ABC, which are warehouse and vehicle contracts. The billing for these costs comes from warehouse rental and vehicle rental. The goods distributed by PT ABC at PT A consist of only one type of item. Therefore, during delivery, the volume in the vehicle is small. This will impact the shipping costs. When the quantity of goods being delivered is low, it results in high costs. This can be seen from the flow of the cooperation process.

Table 3. Analysis of Current Conditions

Table 3. Analysis of Current Conditions

No	Factor	Observation Object	Standart	Actual	Ilustrasi	Data
1	Material	Finished products	Undamaged condition	Undamaged condition		No Problem
		Order PO	Minimum Order	No Minimum		
		Cut Off PO	H-1 From Delivery	H-1 From Delivery		No Problem
2	Methode	Schedule Delivery	Area Schedule	Not Area Schedule	  	Problem
3	Man	Working Hours	Operational Working Hours	Exceeding Operating Hours		Problem
4	Mechine	Unit	Unit Vehicle Dedicated	additional OnCall		Problem

Meanwhile, the current condition shows that the number of orders received is less than optimal during delivery, and the vehicle efficiency during delivery can be seen from Table 2 Analysis of Current Conditions.

Figure 2. Workflow Process**Table 3.** Summary of Distribution Costs for PT ABC

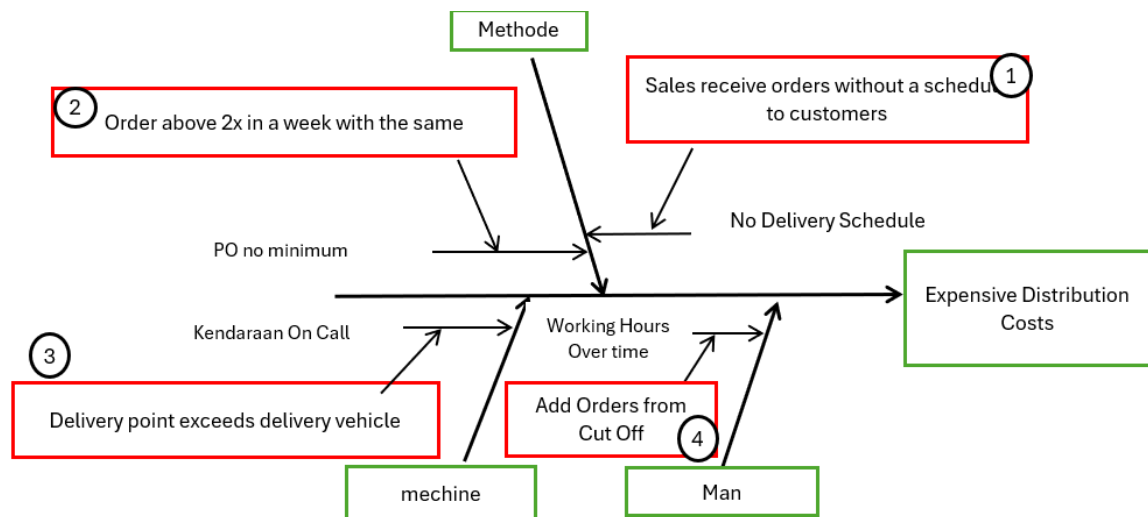
Description	Sept '24	Okt '24	Nov '24	Des '24
Qty Carton	1,899	2,160	2,519	3,015
Cost Distribution	106,331,167	114,308,000	132,600,200	126,130,200
Cost Distribution per Carton	55,993	52,920	52,640	41,834

Source : PT ABC (Processed data)

Step 4: Analyze the Root Cause

This diagram is created through brainstorming to identify the causes of each category or main factor, which is then referred to as the 4M + 1E (man, material, machine, method, environment of work) (Wignjosoebtoto 2006). From the fishbone diagram, the causes of high distribution costs are identified. They are caused by factors of Method, Man, and Tools.

Figure 3. Fishbone Diagram



- Method Factor: Sales receive orders without a schedule from customers and orders exceeding 2 times a week with the same customer.
- Tool Factor: Delivery points exceed the rented vehicles.
- Man Factor: Additional orders from the cut-off.

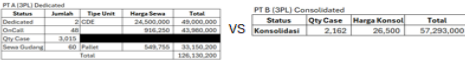
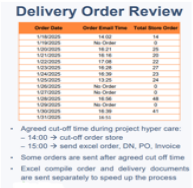
Step 5: Develop Countermeasures

Where the issues identified from the cause-and-effect analysis will be forwarded for the mitigation planning of those findings using the 5W+1H method (What, Why, Where, Who, When, How).

Table 4. 5W+1H

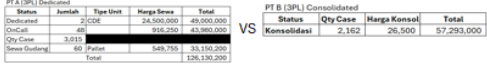
No	What Issue	What Solution	Why Reason	How Activity Details	Where Place	When Time	Who PIC	How Much Cost
1	Sales receive orders without a schedule to customers	Sales Informs customers that the delivery will be scheduled for the delivery area	So that deliveries to customers to these areas are maximized and the volume of goods increases	- Meeting with the sales team to change vendors and to propose schedules to customers. - Meeting with the proposed sales team with a simulated delivery schedule from sales history to customers	Head Office	09 Okt 24 17 Des 24	Head Warehouse & Logistics	No Cost
2	Order above 2x in a week with the same customer	Customers to customize the delivery schedule that we have created	Regular deliveries with small volumes result in large shipping costs	- meeting with the sales team so that we propose with our delivery schedule so that it can be informed to customers - Discussion of the realization of shipments due to increased volume.	Head Office	09 Okt 24 05 feb 25	Head Warehouse & Logistics	No Cost
3	Delivery point exceeds delivery vehicle	Shipping using Consolidated	The leased fleet exceeds the covered area which results in additional costs by renting another fleet but with a small volume	- meeting with the sales team informed that there was a change in third party logistics (3PL) cooperation using Consolidated Shipping - The use of third party logistics (3PL) is new starting in January - meeting with sales to inform that there will be a cut off order H-1 at 14.00 will be sent tomorrow while after 14.00 the order will be processed on the following day.	Head Office	09 Okt 24 13 Jan 25	Head Warehouse & Logistics	No Cost
4	Add Orders from Cut Off	Make an agreement if there are additional orders will be sent on D+2, not H-1	It is an overtime cost that increases while the sales volume does not increase means that	- Cut off orders start at the time of third party logistics (3PL) turnover.	Head Office	17 Des 24 13 Jan 25	Head Warehouse & Logistics	No Cost

Step 6: Implement Countermeasures

No	Issue	Solution	Result
1	Sales receive orders without a schedule to customers	Sales Informs customers that the delivery will be scheduled for the delivery area	
2	Order above 2x in a week with the same customer	Customers to customize the delivery schedule that we have created	
3	Delivery point exceeds delivery vehicle	Shipping using Consolidated	
4	Add Orders from Cut Off	Make an agreement if there are additional orders will be sent on D+2, not H-1	

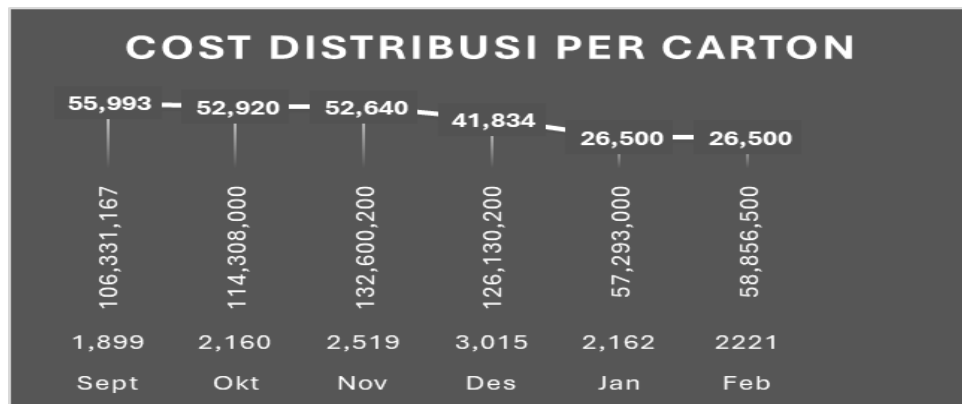
The results obtained in the mitigation report show the changes achieved by PT ABC.

Table 5. Mitigation

No	Issue	Solution	Result
1	Sales receive orders without a schedule to customers	Sales Informs customers that the delivery will be scheduled for the delivery area	
2	Order above 2x in a week with the same customer	Customers to customize the delivery schedule that we have created	
3	Delivery point exceeds delivery vehicle	Shipping using Consolidated	
4	Add Orders from Cut Off	Make an agreement if there are additional orders will be sent on D+2, not H-1	

Step 7: Monitor Results and Process

After the transfer of the Third Party Logistics (3PL) vendor from PT A to PT B, there is a decrease in distribution costs as shown in the following report;

**Figure 4.** Improvement Result**Step 8: Standardize and Share Success.**

Standardization is necessary to prevent the recurrence of the same issues in the future and to enhance the existing Standard Operating Procedures (SOP). Once the standards are implemented, the Supply Chain team monitors the execution until there is a change in the standards again.

4. CONCLUSION

Based on the analysis results using the Quality Control Circle (QCC) method, the costs associated with Third Party Logistics (3PL) PT "A", in collaboration with a dedicated contract with PT "B" through consolidation, have resulted in a decrease in distribution costs. Previously, the average cost was Rp. 50,000 per carton for PT "A", while PT "B" reduced the cost by Rp. 26,500. The price obtained from Third Party Logistics (3PL) PT "A" includes storage volume and vehicle costs. Meanwhile, the costs at PT "B" include the shipping cost per carton, which already encompasses storage fees, handling fees, and shipping costs. Therefore, the objective of transferring third-party logistics (3PL) aligns with the company's goal of reducing distribution costs.

REFERENCES

- [1] Ardiansyah, E. (2013). Quality Control Using the Kaizen Approach. *Management Journal*
- [2] Batarliene, N., & Jarasuniene, A. (2017). "3PL" Service Improvement Opportunities in Transport Companies. *Procedia Engineering* 187, 67-76.
- [3] C, Linch., Developing a Strategy for Outsourcing. *Logistic Management and Distribution Report*. 2001. Volume 40, Issue 6
- [4] Heizer, J., & Barry, R. (2005). *Operations Management*. Jakarta. Salemba Empat.
- [5] Imai, Masaaki. (2014) *Kaizen: The Key to Japan's Success in Competition*. Translated by Dra. Mariani Gandamihardja. Jakarta: PPM.
- [6] Juwandi, J., & Kamsin, D. (2020). The Influence of Compensation, Job Characteristics, and Job Satisfaction on Employee Performance in the Quality Assurance and Quality Control Department at PT. Yasunaga Indonesia in Serang Regency. *JMB: Journal of Management and Business*, 9(1), 1-9. <http://dx.doi.org/10.31000/jmb.v9i1.1976>.
- [7] Lazuardi, S.D. (2010). Analysis of the Mechanism and Performance of Container Consolidation. Thesis. Undergraduate Program. Sepuluh Nopember Institute of Technology, Surabaya. (Unpublished)
- [8] Sutarti. (2019). Quality Control to Reduce Raw Material Quantity and Increase Profit Using the Quality Control Circle (QCC) Method in Leather Bag Production at the Leather Craft Center in Magetan EDUSCOTECH. 1(1). 52-62. <https://journal.udn.ac.id/index.php/eduscotech/article/view/9>.
- [9] Wignjosoebtoto, Sritimo. (2006). *Introduction to Engineering & Industrial Management*, Guna Widya, Surabaya.