PalArch's Journal of Archaeology of Egypt / Egyptology

APPLICATION OF SCOR MODEL IN PT. XYZ AS ONE OF THE INDONESIA'S MANUFACTURERS OF MOTORCYCLE LUBRICANTS

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ABSTRACT

The research aims to analyze and evaluate the performance of supply chain management of a manufacturer of motorcycle lubricants, i.e. PT. XYZ*. The method used is a descriptive method. The analysis used in this research is version 11 of the Supply Chain Operation Reference (SCOR) model which is a conceptual model developed by the Supply Chain Council (SCC). Based on the measured metrics, it can be concluded that the performance of supply chain management of this company is less efficient. The main causes of the product delivery are the company's policy on quantity standard for delivery, delays from Third-Party Logistics (3PL), and the limited transportation capacity.

INTRODUCTION

Preliminary

It is known that the importance of good distribution management is similar to the quality where the manufacturer must be able to ensure the integrity of the goods, on-time delivery of goods, as well as maintenance and the effectiveness and efficiency in running business processes (Widyanesti & Indraka, 2016). In this modern era, the competition is not among the organizations, but it is now has changed to be among the supply chains. It is a new area to get the competitive advantage by managing an effective supply chain (Li, Ragu-Nathan, Ragu-Nathan, & Rao, 2006). Supply chain management (SCM) starts from the integration of raw material procurement and service activity, conversion into semi-finished goods and finished products, until delivery to the customers. These

activities include the purchasing and outsourcing activities as well as other functions important to the relationship between the suppliers and distributors (Heizer & Render, 2015). The right application of SCM can provide a competitive advantage which has a positive impact on the product and supply chain system built by the company (Sanny, 2018). In the increasingly competitive of the globalization era, the competition in the industry has intensified. To deal with such a competitive competition, PT.XYZ, producing motorcycle lubricant products, must develop the right strategic move. One of the strategic steps that can be taken is to evaluate the performance of the company's supply chain. A decent supply chain management will result in the effective and efficient production process. The supply chain is made up of all the parties involved to meet customer demand, either directly or indirectly. The supply chain does not only consist of manufacturers and suppliers, but also transportation, warehousing, retailers, and customers (Chopra, & Meindl, 2013). The supply chain management refers to the planning, designing and controlling the information and material flow across the supply chain to meet customer needs in an efficient manner, both presently and in the future (Schroeder, 2007). According to Heizer & Render (2015), supply chain management is the coordination of the entire supply chain activities for enhancing customer value. To measure the performance of the supply chain management, we can use the SCOR Model Version 11.0. One of the main significant advantages of implementing this model is that it supports the supply chain performance and helps the company to optimize it (Supply Chain Council, 2015).

Problem Formulation
Based on the description of the background outlined above, the problems are formulated as follows:
1.   How is the performance of motorcycle lubricant products in PT.XYZ by using SCOR Model version 11.0?
2.   What should be done by PT.XYZ in improving the performance of its supply chain management?

Purpose of the Study
The purposes of this study are to:
1.   Evaluate the performance of the supply chain management of motorcycle lubricant products in PT.XYZ by using SCOR Model version 11.0
2.   Provide recommendations to PT.XYZ in improving the performance of its Supply Chain Management.

LITERATURE REVIEW
Supply Chain Operations Reference (SCOR) Model Version 11.0
   SCOR model is a management tool used to handle, improve and communicate supply chain management decisions in the company with its suppliers and customers (Erkan, & Bac, 2011). SCOR model provides an overview of the standard supply chain processes, performance metrics, best practices and technologies that allow the company to improve the performance of its supply chain (Georgise, & Thoben, 2012). This model supports communication and

collaboration among members of the supply chain expected to improve the effectiveness of supply chain management. Furthermore, SCOR model provides the overall standard of the supply chain process, performance metrics, practices, and technologies that can improve the supply chain performance (Sarjono, Suprapto, & Megasari, 2017). SCOR model is used to design, describe, arrange and rearrange various types of commercial or business activities (Paul, 2016). SCOR Model describes that the supply chain is composed of six major integrated management processes, i.e. Plan, Source, Make, Deliver, Return and Enable (Supply Chain Council, 2015).

Table 1. *Performance of SCOR Model Metric System*

Performance Attributes	Performance Attributes Definition	Level-1 Metrics
Supply Chain Reliability	Supply chain performance in delivering the right product to the right place, at the right time, in the right condition and packaging, in the right amount with proper documentation, and to the right consumer.	Perfect Order Fulfillment (POF)
Supply Chain Responsiveness	Supply chain speed in providing products for consumers.	Order Fulfillment Cycle Time (OFCT)
Supply Chain Flexibility	Supply chain capability in response to the changes in the market in order to maintain competitiveness.	Upside Supply Chain Flexibility (USCF), Upside Supply Chain Adaptability (USCA), Downside Supply chain Adaptability (DSCA)
Supply Chain Costs	Costs related to supply chain operations.	Total Cost to Serve (TCTS)
Supply Chain Asset Management Cost	Effectiveness and efficiency of an organization in supporting the fulfillment of consumer demand that includes the management of fixed capital and working capital.	Cash-to-Cash Cycle Time (CTCCT), Return on Supply Chain Fixed Assets (ROF), Return on Working Capital (ROW)

Source: Paul (2016)

SCOR Model Metrics
     A metric is a standard for measurement of the performance of a process. SCOR metrics are diagnostic metrics. SCOR recognizes three levels of predefined metrics, namely:
• Level-1 metrics. These are diagnostics for the overall health of the supply chain. These metrics are also known as strategic metrics and key performance

indicators (KPIs). Benchmarking of level-1 metrics helps establish realistic targets that support strategic objectives.

- Level-2 metrics. These serve as diagnostics for the level-1 metrics. The diagnostic relationship helps to identify the root cause or causes of a performance gap for a level-1 metrics.
- Level-3 metrics. These serve as diagnostics for level-2 metrics.

The performance analysis of the level-1 metrics to level-3 metrics are referred to as the decomposition. Decomposition helps identify the processes that need to be studied further (Processes are linked to level-1 and level-2 metrics).

MATERIALS AND METHODS

Table 2. *Research Design*

Research Objectives	Research Methodology	Research Type	Analysis Unit	Time Horizon
T1	Interview	Descriptive	PT. XYZ	Cross Section
T2	Interview	Descriptive	PT. XYZ	Cross Section

Description:

T1: Evaluating the performance of the supply chain management of motorcycle lubricant products in PT.XYZ by using SCOR Model version 11.0

T2: Providing recommendation to PT.XYZ in improving the performance of its Supply Chain Management.

Table 3. *Analysis Methods*

Objective	Analysis Method
T1	SCOR Model
T2	SCOR Model

RESULTS AND DISCUSSIONS
The concept of SCOR performance measurement methods
1. Level-1 Mapping

At level-1 of the SCOR 11.0 model, the SCOR Model process existing in the supply chain is defined in more detail. The supply chain management process of PT.XYZ consists of six SCOR processes, i.e. plan, source, make, deliver, return, and enable. At level-1 mapping, there are processes of supply chain management of the oil products started from suppliers to consumers.
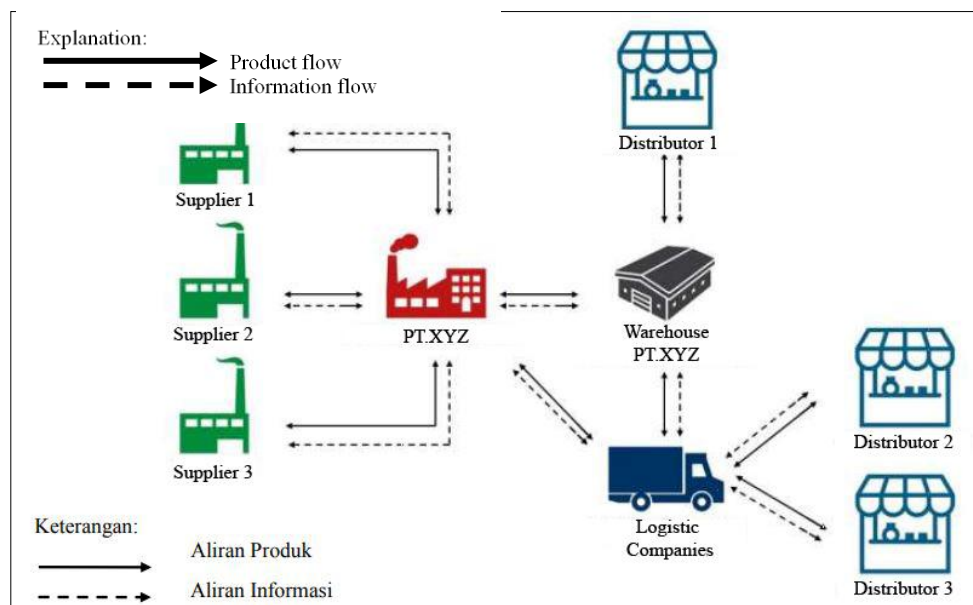
Figure 1. Mapping of SCOR Level-1 Model

The SCOR 11.0 model has the ability to measure the supply chain management performance of PT.XYZ through the performance attributes of reliability, responsiveness, agility, cost management and asset management.

SCOR model used to evaluate the performance of the product supply chain. It can be identified that the goals of the company are to give the best service level and increase corporate profits.

• The first goal can be achieved by analyzing the values of the three indicators, namely delivery performance, responsiveness to the customer's demand, and flexibility to the demand changes.

• The second goal can be achieved by analyzing the values of the two indicators, namely, supply chain cost and asset management efficiency.

Performance of SCOR Level-1 Metrics
There are some metrics of the performance attributes, namely the supply chain reliability proxied by the metric of Perfect Order Fulfillment (POF), supply chain responsiveness proxied by the metric of Order Fulfillment Cycle Time (OFCT), supply chain flexibility proxied by the metrics of Upside Supply Chain Flexibility (USCF), Upside Supply Chain Adaptability (USCA) and Downside Supply Chain Adaptability (DSCA), supply chain cost proxied by the metric of Total Cost to Serve (TCTS), and supply chain asset management proxied by the metrics of Cash-to-Cash Cycle Time (CTCCT), Return on Fixed Assets (ROF) and Return on Working Capital (ROW). From those performance attributes, SCOR card will be made to measure the supply chain performance and benchmark the company's competitors in the same industry. Subsequently, we performed a gap analysis to measure the difference between the actual condition and the target. The column of chance is filled with the revenue when the

performance metrics re upgraded to a targeted position. Both can be seen in Table 5.

Table 4. *The scope of SCOR Process Elements*

Process in SCOR	Supplier	PT. XYZ	Warehouse	Logistic Companies	Customer
Plan	Making planning of the raw materials needed for production, as well as meeting consumer demand	Making planning for fulfilling consumer demand, conducting planning for raw material requirements, production, finance, facilities, and activities of oil product delivery to consumers	Planning, storage, maintenance, expenses, and delivery of products to consumers	Planning any kind of transportation, transporting oil products from PT. XYZ and delivery to consumers	Purchase planning and payments for products
Source	Working together and make an agreement with the suppliers of bottles and addictive substances so that the quality is good and the price is reasonable	Ordering raw materials which are needed and appropriate for the production process. The next step is to do a quality check before the production process begins	Receiving goods from the production process	Receiving oil products from PT. XYZ to be delivered to consumers	Ordering products through the phone to PT. XYZ
Make	Producing raw materials needed by PT. XYZ	Producing oil products, performing a quality check on the products produced, and repacking the products	-	-	-
Deliver	Transporting raw materials to PT. XYZ	Fulfilling the order and delivering the order to the company's warehouse before it is delivered to the consumer	Shipping the order to consumers through the logistics company	Shipping the products from the factory or warehouse of PT. XYZ to the customer's locations	-
Enable	Managing supplier performance by implementing raw material order system of the PT. XYZ by using the phone, email for the number of reservations of raw materials	Managing the supply chain network of PT. XYZ using phone and email to communicate orders or deliveries from the beginning to the end of the supply chain	Managing the entire information related to warehousing with manual recording	Monitoring and managing the delivery performance via email and phone	Managing all the information related to the request or order of the consumer with manual recording in Microsoft Excel comprising the unit of oil sold and the type of oil to be ordered to PT. XYZ

Table 5. *Model of SCOR Level-1 Metrics, Gap analysis of the performance between actual data and target*

Attribute		SCOR Level-1 Metrics	Actual	Performance vs Competitor Company		Target	Gap Requirement	Opportunity (IDR)
				Advance	Best In Class			
External	Reliability	Perfect Order Fulfillment (%)	80.92%	76.87%	80.92%	93.47%	12.55%	2,905,037,856
	Responsiveness	Order Fulfillment Cycle Time (day)	0.00125 days	0.00199 days	0.00125 days	0.00092 days	35.14%	8,132,979,892
	Agility	Upside Supply Chain Flexibility (day)	-	-	-	-	-	-
		Upside Supply Chain Adaptability (%)	-	-	-	-	-	-
		Downside Supply Chain Adaptability (%)	-	-	-	-	-	-
		Value at Risk (VAR)	-	-	-	-	-	-
Internal	Cost	Total Cost to Serve (%)	45.17%	54.81%	45.17%	30.10%	15.07%	3,488,360,198
		Cost of Goods Sold (%)	42.59%	47%	42.59%	36.39%	6.20%	1,435,158,144
	Asset Management Efficiency	Cash to Cash Cycle Time (day)	103,75 days	110.61 days	103.75 days	78.83 days	24.01%	5,557,765,651
		Return on Supply Chain Fixed Assets	0.63 times	0.46 times	0.63 times	0.72 times	12.50%	2,893,464,000
		Return on Working Capital	0.46 times	0.25 times	0,46 times	0.57 times	19.29%	4,465,193,645

Performance of SCOR Level-2 Metrics

At this stage, the step that needs to be taken is to determine the configuration and the ability of the process at the previous level where the results will contain the entire supply chain network in more detail and deeper. The processes found in level-2 mapping are as follows (Paul, 2016):

1. Planning

There are several plans, namely:

a. Supply Chain Plan (useful to know how many resources needed).

b. Purchase Plan (useful to know the quantity of the raw materials to be purchased or ordered).

c. Production Plan (useful to know how many orders to produce)

d. Shipping Plan (useful to know what shipping service to use)

e.   Return Plan (useful to know the return of raw materials to the suppliers or products from consumers to the company).

2.   Execution

There are some executions, namely:

a.   The implementation of 'source make' to 'stock product'.

b.   The implementation of 'make-to-stock'.

c.   The implementation of 'deliver make' to 'stock product'.

d.   The implementation of 'source return' of a defective product.

e.   The implementation of defective product deliveries.

3.   Enable

The condition of a management information system that has been applied in the company is analyzed to know the company's performance in managing the overall supply chain.

At level-2 mapping, the detailed description of the processes in the company's supply chain is demonstrated, ranging from the processes related to suppliers, production, and distribution of the products to the consumers. Figure 2 shows the six activities, i.e. plan, source, make, deliver, return and enable.
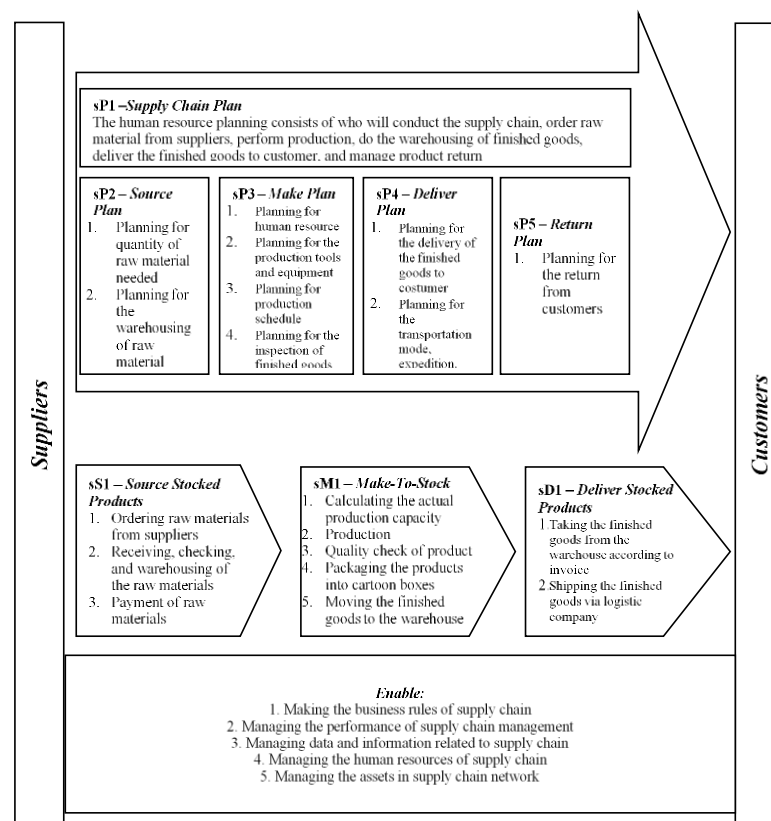

Figure 2. Mapping of SCOR Level-2 Model

Performance of SCOR Level-3 Metrics

The level-3 mapping analysis is conducted to see a more detailed delivery process. This is conducted because the performance and value of POF OFCT are not optimal based on the level-2 analysis. The level-3 mapping is conducted for all activities in the delivery process. Figure 3 shows the delivery management of

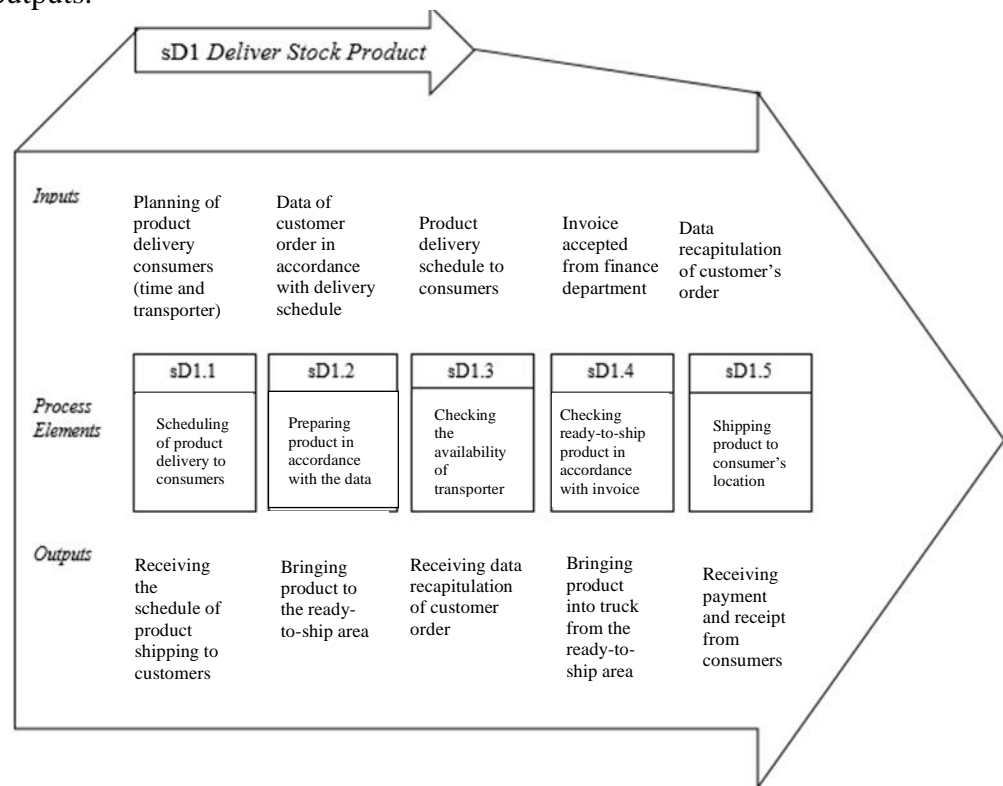PT.XYZ to its consumers. This comprises of input, process elements, and outputs.

Figure 3. Mapping of Level-3 SCOR Model

Performance of SCOR Level-4 Metrics

Based on mapping analysis of SCOR Level 1-3 Models and Fishbone diagram, it can be concluded that the root causes of the delivery delay are:

1. The products are not delivered right away if in small quantity (pending)
2. The transportation of the logistics firms is not in accordance with the delivery schedule.
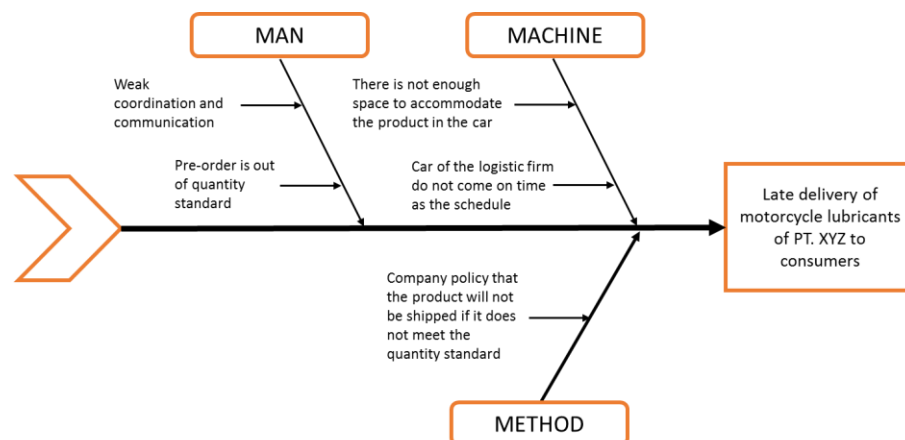

Figure 4. Fishbone Diagram

CONCLUSIONS

This study focuses on the performance of the supply chain management of PT. XYZ producing motorcycle lubricant products. The supply chain starts from the raw material ordering, production, until the delivery of finished products to consumers. The delivery of products is across the areas in East Java province and done by the partners, i.e. logistics companies. The performance analysis of the supply chain management uses SCOR Model version 11.0 consisting of six main management processes, i.e. plan, source, make, deliver, return, and enable. In addition, it has three levels of mapping. The mapping of the SCOR Model in level 1 uses the performance attributes such as reliability, responsiveness, agility, costs, and asset management efficiency to evaluate the performance of the company's supply chain. The assessment of each attribute in level 1 uses performance metrics such as POF, OFCT, TCTS, CTCCT, RSCFA, and RWC with the following results, 80.92%, 0.00125 days, 45.17%, 103.75 days, 0.63 times and 0.46 times respectively. This clearly shows that the supply chain performance is not optimal, thus requiring a more depth evaluation, especially on OFCT. According to the existing calculation, it is known that in the OFCT, the delivery to the consumer shows delay from the specified target. The results of benchmarking with competitors show that PT. XYZ is in the best position in its class. This means the performance of its competitors is still under PT. XYZ. However, this does not mean that PT. XYZ does not need to improve. From of gap analysis with the new targets to be achieved by the company, it is shown that the chance of getting the biggest profit is higher if PT. XYZ shortens the OFCT of initially 0.00125 days to 0.00092 days.

The mapping of the SCOR level-2 model is performed in three types of processes, namely planning, execution, and enable. The company carries out planning and execution processes such as planning related to the supply chain (sP1), planning related to raw materials (sP2), planning related to the manufacturing or production (sP3), planning related to the delivery of products to consumers (sP4), planning related to returned products (sP5), doing activities related to raw materials for the production of the stocked products (sS1), conducting production activity for the stocked products (sM1), delivering the stocked products (sD1), checking for the quality of the raw materials received from the suppliers (sSR1), and checking the defective products returned by consumers (sDR1). As for the Enable, the sales and purchasing processes are supported by the system to manage the information flow in the company. After performing the analysis, we found that there is a problem at the point of sD1 namely, *deliver stocked products* which causes the POF and OFCT of the company not optimal. Thus, it is necessary to search more insight into the exact causes of the delays in sD1 performance. This is done at level 3.

A further analysis was carried out on the sub of the sD1 process, namely, *deliver stocked products*, consisting of the analysis of *the processing order lead time*, *waiting to be delivered*, and *purchase order lead time* to determine the largest percentage of the delays. It was found that the period of *waiting to be delivered* shows the longest delay among other specified targets. The Fishbone

diagram is then used to identify the root causes and we obtained seven root problems associated with the use of logistic services. These services are not optimal and often cause a delivery delay (pending).

Recommendation for PT.XYZ

In this research, we offer some alternative solutions for PT. XYZ, namely:

1. To overcome the delay or over capacity, this motorcycle lubricant manufacturer needs to consider other third-party logistics (3PL) companies. PT XYZ needs to build more cooperation with some other logistic firms. Before selecting the suitable 3PL company, PT XYZ should better conduct market research beforehand and choose the most effective and efficient 3PL company. As East Java province is the region with the greatest demand for the lubricant product, it is very unfortunate if delivery delay often happens. So, PT. XYZ should have a backup if the existing 3PL company is experiencing a delay or other constraints. This aims to minimize the delay which results in non-optimal gross profit.

2. The delivery delay is often caused by the company's policy where the product will not be shipped if the quantity is small or the pre-order is not in accordance with the cubic standard. The issue in pre-order quantity is caused by a weak coordination between the internal divisions of the company and the consumers. Thus, the consumers should always be reminded of the cubic standard. In addition, to meet the high demand of consumers, the company can obtain the products available in other distributors in East Java.

Recommendation for Further Research

The further research may use the entire region in Indonesia, where the company sells its products.

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