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Measuring Supply Chain Performance Using the SCOR Model: A Case Study of CV. XYZ

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Abstract

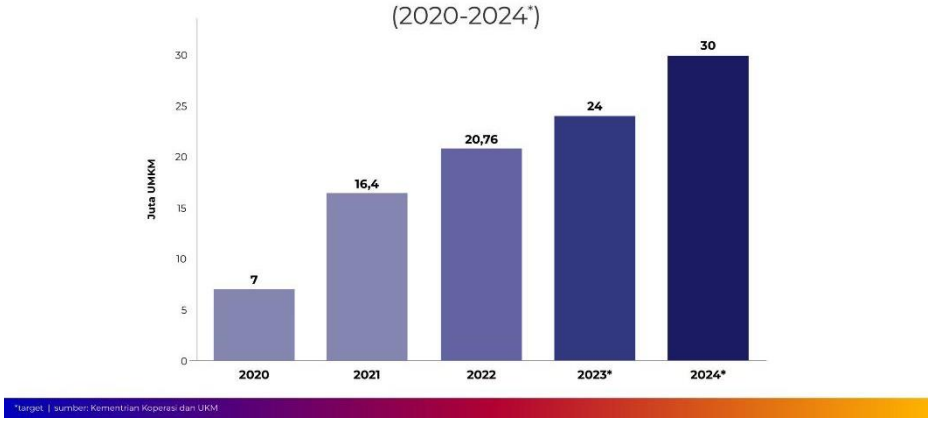
This research discusses the design of a performance measurement system for supply chain management using the Supply Chain Operations Reference (SCOR) model developed by the Supply Chain Council. The SCOR model focuses on five main activities within a company's supply chain, namely plan, source, make, deliver, and return. All activities are linked with performance attributes such as reliability, responsiveness, flexibility, cost, and assets. The implementation of this model is applied to CV. XYZ, a company that operates in the production of plain and printed T-shirts, which is located in East Java. The research was conducted from January 2024 to September 2024. The results of the study identified that there are 35 performance indicators representing supply chain activities, with the following breakdown: 9 indicators for the plan activity, 7 indicators for the source activity, 6 indicators for the make activity, 7 indicators for the deliver activity, and 6 indicators for the return activity. The Analytical Hierarchy Process (AHP) method was used to weight each activity in the SCOR model. Based on the results, the highest priority was the source activity (0.252), followed by deliver (0.222), plan (0.221), make (0.209), and return (0.095). From the scoring system, it was found that 23 indicators have a green score, 8 indicators have a yellow score, and 4 indicators have a red score. The limitation of this research is that one SCOR activity, "enable," was not analyzed. Therefore, it is recommended that future research analyze all SCOR activities.

Keywords: T-shirt Supply Chain, Supply Chain Management Performance Measurement, Supply Chain Operations Reference (SCOR), Key Performance Indicator (KPI), Analytical Hierarchy Process (AHP).

1. INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are business entities characterized by criteria such as asset value, annual turnover, and a limited number of employees, as defined by government regulations in each country. In Indonesia, MSMEs play a significant role in the national economy, as they dominate the economic structure with over 99% of businesses in the country. Their significant contribution to the Gross Domestic Product (GDP) exceeds 60%. In addition, MSMEs serve as the main pillar of labor absorption, absorbing 97% of the national labor force. MSMEs role in increasing economic inclusion and expanding entrepreneurial access for the community makes them a crucial factor in promoting economic prosperity and eradicating poverty. With innovation and the right policy support, MSMEs can continue to play its role in driving the sustainability of economic growth.

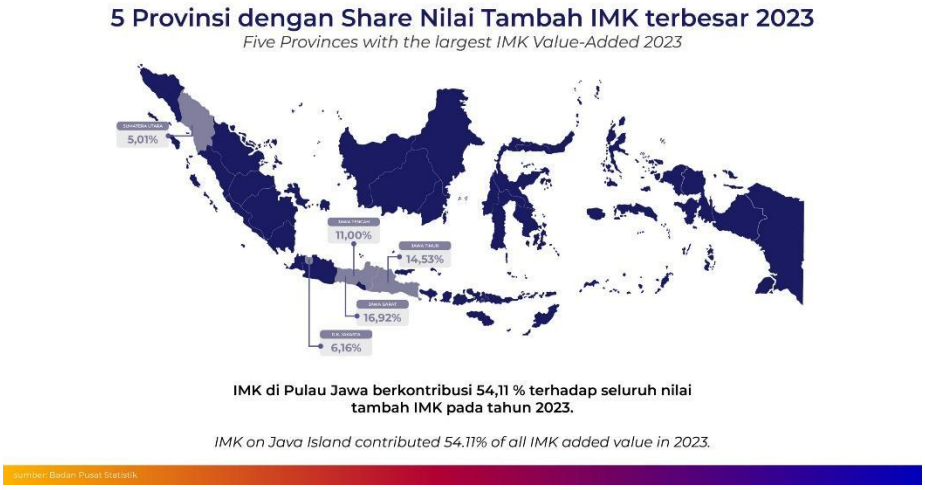
Figure 1. Number of MSMEs from 2020 to 2024



Source: Kadin.id

According to the data from Indonesia KADIN in 2023, the Micro and Small Industry (IMK) sector showed positive growth in each quarter, with an average increase of 2.55%. The ready-made garment industry (Indonesia Standard Industrial Classification/ISIC 14) became the second-largest contributor to value added, experiencing consistent growth with an average increase of 3.02%.

Figure 2. Distribution of MSMEs with the Highest Value Added in 2023



Source: Kadin.id

In 2022, the Micro and Small Industry (IMK) sector showed impressive performance with a trend of positive growth. Various provinces in the Java region, such as DKI Jakarta, West Java, Yogyakarta, and East Java, demonstrated stable growth throughout the year. Nineteen provinces outside of Java also showed positive and stable growth. This situation highlights a comparison between regions, where IMK business activities in both Java and outside Java are increasing, which is in line with the recent years of Indonesia's economic recovery. Based on the available data, the number of MSMEs has been increasing year after year, triggering intense competition among businesses and creating challenges that need to be addressed (Nadira, 2022). The ready-made garment sector serves as an example of the MSMEs industry in Indonesia. One of the MSMEs operating in the garment industry is CV. XYZ in Bojonegoro, which produces plain T-shirts. With the increasing demands from customers, competition between companies

has intensified. They need to continuously improve the quality of their product to meet customer requests. Supply Chain Management (SCM) refers to a series of activities such as purchasing raw materials from suppliers, managing production processes, and distributing products to customers. Active involvement from all stakeholders is important for creating a well-structured supply chain network. In this case, CV. XYZ company also participates in SCM activities, particularly in managing the flow of materials from the beginning to the end. As of June 2024, there are 55 companies marketing plain T-shirts produced in Bojonegoro (primary data, 2024). This situation challenges CV. XYZ to always improve its competencies to remain competitive. If the company can achieve advantages that are not only competitive but sustainable, the company can become the market leader. Sabri (2020) stated that company goals can be achieved through performance measurement, which also serve as a reference for companies to compete effectively with their competitors.

Supply Chain Management (SCM) is the management of the flow of goods, information, and funds in the production and distribution processes, from raw material suppliers to consumers. SCM covers all the steps required to create and deliver a product or service, which include the procurement of raw materials, production, storage, distribution, and relationship management with suppliers and customers. The primary purpose of SCM is to optimize operational efficiency and reduce costs while ensuring high product quality as well as customer satisfaction. With effective management of the supply chain, companies can become more responsive to changing market demands and maintain a competitive advantage (Widyarto, 2019). The significant growth of the plain T-shirt industry at the national level and the potential of CV. XYZ are not aligned with the realities observed in the field. CV. XYZ halted the production process in the plain T-shirt line at the end of 2023. This is evidenced by the company's declining revenue in that year.

CV. XYZ experienced sales growth in its first year. However, sales declined by 31% in 2023. Based on the observations and interviews conducted with the company, they have primarily relied on cost as their main indicator for evaluating performance effectiveness. They do not have a specific measurement system to assess which areas need improvement among the parties involved in supply chain management. Supply chain management itself is important because it influences efficiency, effectiveness, as well as competitive advantage in the market. By optimizing the management of goods, information, and resources, companies can reduce their production costs, accelerate delivery times, and improve product quality.

Supply Chain Operations Reference (SCOR) serves as a standardized framework for analyzing and measuring a company's supply chain performance. SCOR consists of five main processes, which are plan, source, make, deliver, and return. These processes help formulate more efficient operational strategies. The primary goal of implementing SCOR at CV. XYZ is to gain a comprehensive understanding of their supply chain performance, identify areas for improvement, and increase operational efficiency. By using SCOR, CV. XYZ can monitor the effectiveness of their material and information flow, optimize costs, and enhance customer satisfaction, thus creating a sustainable competitive advantage.

Based on the explanation provided, this research aims to (1) descriptively evaluate the supply chain management performance of CV. XYZ; ((2) identify SCOR model elements that hinder the achievement of supply chain management performance at CV. XYZ using the SCOR model approach; and (3) propose improvements in the performance of supply chain management measurement at CV.XYZ using the SCOR model. It is expected that this research will serve as a reference for measuring supply chain management performance in companies, helping them identify performance indicators that require improvement and providing a foundation for evaluating future supply chain management activities.

2. METHODS

This research used a qualitative approach using a descriptive case study method. The aim of this method is to analyze an event or phenomenon that occurs in the research object. A case study is a research design that commonly used in various fields, particularly in evaluation, where researchers conduct an in-depth analysis of a case, program, activity, or process involving one or more individuals. The data collected in this research is descriptive qualitative. A descriptive case study is conducted at CV. XYZ to measure supply chain management performance. This analysis aims to identify factors that hinder the achievement of optimal supply chain performance. The results of this research are expected to serve as an evaluation tool to improve the company's performance across various aspects.

The supply chain management performance measurement research was conducted at CV. XYZ and focused on the management activities process, which includes planning, sourcing, making, delivering, and returning. For the sourcing and making activities, the researcher targeted home industries that collaborated with CV. XYZ. The historical data for supply chain management performance measurement was collected from January 2023 to December 2023 to provide a comprehensive overview within a one-year budget period. Primary data were collected through observation, questionnaires, and interviews with the owner, production department, and procurement department of CV. XYZ. The secondary data are information on supply chain management activities such as planning, sourcing, making, delivering, and returning, which were in line with real conditions and the company's performance data over the specified time period.

The research data was collected through several stages, including a preliminary study, field study with observation, interviews, documentation, and literature review. For data analysis, the researcher identified the key performance indicators by interviewing internal company personnel regarding supply chain management activities at CV. XYZ. These activities include planning, sourcing, making, delivering, and returning. Performance attributes for each activity include reliability, responsiveness, flexibility, cost, and assets.

3. RESULT

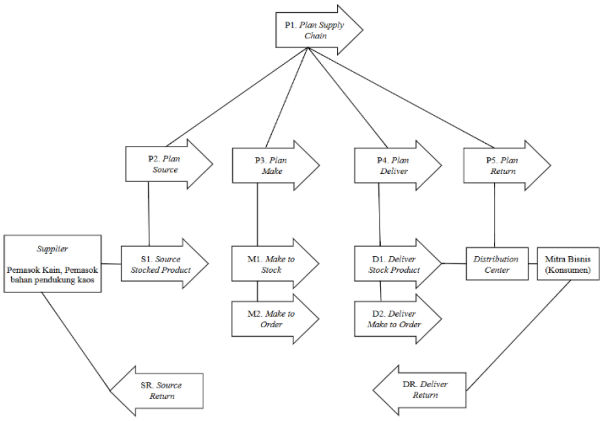
3.1 Performance Measurement of CV. XYZ Products

Performance measurement at CV. XYZ is functional, with each department having different performance indicator standards and reporting them weekly or monthly. So far, the company's supply chain performance measurement has not been comprehensive, which primary focus on financial indicators. As a result, other indicators, such as relationships with employees, suppliers, and customers, have not been explored in depth.

3.2 CV. XYZ Supply Chain Management Activities

When designing effective performance indicators for CV. XYZ, it is important to understand the processes and activities within the T-shirt production supply chain. To gain a comprehensive understanding of the T-shirt supply chain management activities at CV. XYZ, interviews were conducted, and the results were mapped onto a SCOR model toolkit. By using the toolkit to illustrate supply chain management activities, the company can integrate various separate activities into a single, organized unit. This creates a supply chain architecture that highlights the detailed ongoing processes and illustrates the relationship with other business units in the supply chain. The following figure maps CV. XYZ's T-shirt supply chain management activities:

Figure 3: Mapping Toolkit for CV. XYZ's T-shirt Supply Chain Management Activities



Source: Processed data

As a distribution center for T-shirts produced by tailors, CV. XYZ needs suppliers for raw materials such as fabrics, threads, and other important supporting materials for T-shirts. To ensure a smooth supply chain process, CV. XYZ conducts thorough planning for various aspects, including sourcing, planning, delivery, and returns. After completing the planning stage, CV. XYZ fulfills demand by sourcing according to the specified product requirements. The procurement process is carried out using a method of procuring products that are already available in stock, which is done weekly. After the raw materials are obtained, the production process is carried out by producing T-shirts based on the predetermined production plan and customer orders. As the T-shirts are finished, the delivery process is carried out based on the specifications (source return).

3.3 Establishment of the Key Performance Indicators for Supply Chain Management

To measure supply chain management performance, it is important to identify performance indicators that are related to supply chain management activities in the company. The developed performance indicators will be aligned with the indicators previously implemented by CV. XYZ, which can represent activities in supply chain management. Additionally, other indicators that are not currently in place and do not reflect supply chain activities will be added based on the SCOR model concept, according to ongoing processes. Based on the SCOR model, the hierarchy used for measurement has five primary activities, namely plan, source, make, deliver, and return. There are 35 key performance indicators (KPIs) that represent the ongoing supply chain activities. These KPIs consist of 9 indicators for planning, 7 indicators for sourcing, 6 indicators for production, and 7 indicators for delivery. In general, these indicators encompass the entire range of supply chain management activities at CV. XYZ.

Table 1. Identification of Key Performance Indicators for the Plan Process

VARIABLE	CODE	INDICATOR	DESCRIPTION
A. PLAN	**A.1**	***Reliability***	
	A.1.1	*Plan Employee Reliability*	To assess employees' ability in the planning process
	A.1.2	*Accuracy of Forecast Technique*	Accuracy level of product forecasts compared to actual sales

	A.1.3	*Internal Relationship*	To assess the ability to manage relationships with business partners and artisans
A. PLAN	**A.2**	***Flexibility***	
	A.2.1	*Planning Flexibility*	To assess the company's flexibility in adjusting production planning and scheduling in response to demand
	A.2.2	*Re-Planning Flexibility*	To evaluate the flexibility to adapt plans based on changes in demand
	A.3	***Cost***	
	A.3.1	*Planning Cost*	To determine the significance of operational cost planning
	A.3.2	*Planning Labor Cost*	To determine the significance of operational cost planning
	A.4	***Assets***	
	A.4.1	*Assets Turnover*	The ratio of total product sales to the capital invested in footwear procurement
	A.4.2	*Inventory Turnover Rate*	To measure the frequency of total inventory turnover for products stored in the warehouse over a monthly period

Source: Processed data

Note:

A. : level 1 (SCOR activity)

A.1, A.2, A.3, A.4 : level 2 (SCOR activity)

A.1.1, - A.4.2 : level 3 (SCOR indicator)

Table 1 shows that the "plan" variable has four dimensions that can be used as performance metrics, with each dimension having two and three performance indicators. The dimensions included in the "plan" variable are reliability, flexibility, cost, and assets. However, the responsiveness dimension was not evaluated because the performance indicators defined by SCOR do not align with the company's implementation.

The following performance indicators are based on the SCOR theory concept: plan employee reliability, internal relationships, planning flexibility, re-planning flexibility, planning cost, and planning labor cost. Additionally, the performance indicators based on the company's implemented performance are forecast accuracy, asset turnover, and inventory turnover rate.

Table 2. Identification of Key Performance Indicators for the Source Process

VARIABLE	CODE	INDICATOR	DESCRIPTION
B. SOURCE	B.1	*Reliability*	
	B.1.1	*Perfect Order Fulfillment*	Assessment of footwear products that are in good condition and delivered on time to the distribution center

	B.1.2	*Source Employee Reliability*	Evaluating employees' ability to execute procurement procedures.
	B.1.3	*Quality of Raw Materials*	An evaluation of whether the raw material quality meets the established standards
	B.1.4	*Source Fill Rate*	Demand fulfillment rate
	B.2	*Responsiveness*	
	B.2.1	*Service Level Material*	The availability rate of materials
	B.3	*Flexibility*	
	B.3.1	*Supplier Volume Flexibility*	Flexibility to meet additional product demand
	B.4	*Cost*	
	B.4.1	*Purchased Materials Cost*	Costs associated with material purchases

Source: Processed data

Note:

B. : level 1 (SCOR activity)

B.1, B.2, B.3, B.4 : level 2 (SCOR attribute)

B.1.1 – B.4.1 : level 3 (SCOR indicator)

Table 2 shows that the “source” variable has four dimensions that can be used as performance indicators, with each dimension having four and one performance indicator. The dimensions included in the “source” variable are reliability, responsiveness, flexibility, and cost. However, the assets dimension was not evaluated because the performance indicators defined by SCOR do not align with the company’s implementation.

The following performance indicators are based on the SCOR theory concept: perfect order fulfillment, source employee reliability, quality of raw materials, service level material, supplier volume flexibility, and purchased materials cost. Additionally, the performance indicator based on the company's implementation is the source fill rate.

Table 3. Identification of Key Performance Indicators for the Make Process

VARIABLE	CODE	INDICATOR	DESCRIPTION
C. MAKE	C.1	*Reliability*	
	C.1.1	*Make Employee Reliability*	Reliability of tailors in producing T-shirts
	C.1.2	*Product Failure in Process*	Monthly production failure rate
	C.2	*Flexibility*	
	C.2.1	*Make Flexbility*	Flexibility of the production process to adapt to increased or sudden product demand

	C.3	*Cost*	
	C.3.1	*Material Efficiency*	Measuring the efficiency of raw material usage in production
C. MAKE	C.3.2	*Machine Efficiency*	Machine efficiency in the production process
	C.3.3	*Sourcing Labor Cost*	Costs associated with labor

Source: Processed data.

Note:

C. : level 1 (SCOR activity)

C.1, C.2, C.3 : level 2 (SCOR attribute)

C.1.1 – C.4.3 : level 3 (SCOR indicator)

Table 3 shows that the “make" variable has three dimensions that can be used as performance dimensions, with each dimension having three or one performance indicators. The dimensions included in the "make" variable are reliability, flexibility, and cost. However, the responsiveness and assets dimensions were not evaluated because the performance indicators defined by SCOR do not align with the company's implementation.

The following performance indicators are based on the SCOR theory concept: make employee reliability, make flexibility, material efficiency, machine efficiency, and sourcing labor cost. Additionally, the performance indicator based on the company’s implementation is product failure in process.

Table 4. Identification of Key Performance Indicators for the Deliver Process

VARIABLE	CODE	INDICATOR	DESCRIPTION
D. DELIVER	D.1	*Reliability*	
	D.1.1	*Employee Deliver Reliability*	To assess employees’ ability to manage deliveries
	D.1.2	*Defect Rate*	To evaluate the rate of defective products received from suppliers
	D.1.3	*On Time – In Full*	To calculate the percentage of on-time product deliveries
	D.1.4	*Perfect Order Fulfillment*	User request fulfillment
	D.2	*Responsiveness*	
D. DELIVER	D.2.1	*Deliver Lead Time*	To measure the time elapsed from ordering finished goods to their arrival at the company
	D.3	*Flexibility*	
	D.3.1	*Delivery Flexibility*	To assess the company’s flexibility in delivering products to meet customer demand
	D.4	*Cost*	

	D.4.1	*Transportation Cost*	To evaluate the shipping costs of products

Source: Processed data

Note:

D. : level 1 (SCOR activity)

D.1, D.2, D.3, D.4 : level 2 (SCOR attribute)

D.1.1 – D.4.1 : level 3 (SCOR indicator)

Table 4 shows that the "deliver" variable has four dimensions that can be used as performance dimensions, with each dimension having four and one performance indicators. The dimensions included in the "deliver" variable are reliability, responsiveness, flexibility, and cost. However, the assets dimension was not evaluated because the performance indicators defined by SCOR did not align with the company's implementation.

The following performance indicators are based on the SCOR theoretical concept: employee deliver reliability, on time – in full, perfect order fulfillment, and deliver flexibility. Additionally, the performance indicators based on the company's implementation are defect rate, delivery lead time, and transportation cost.

Table 5. Identification of Key Performance Indicators for the Return Process

VARIABLE	CODE	INDICATOR	DESCRIPTION
E. Return	E.1	*Reliability*	
	E.1.1	*Return Employee Reliability*	Assessing employees' ability to handle customer complaints
	E.1.2	*Return Rate to Supplier*	Return of defective products to the supplier
	E.2	*Responsiveness*	
	E.2.1	*Time to Solve a Complain*	Number of days required to replace a product that does not meet customer specifications
	E.2.2	*Satisfaction*	Assessing customer and business partner satisfaction levels
	E.3	*Cost*	
	E.3.1	*Total Claim*	To determine the number of claims submitted by customers in one month
	E.3.2	*Claim Loss*	To determine the value of customer

			claims filed in one month

Source: Processed data

Note:

E. : level 1 (SCOR activity)

E.1, E.2, E.3 : level 2 (SCOR attribute)

E.1.1 – E.3.2 : level 3 (SCOR indicator)

Table 5 shows that the "return" variable has three dimensions that can be used as performance dimensions, with each dimension having two performance indicators. The dimensions included in the "return" variable are reliability, responsiveness, and cost. However, the flexibility and assets dimensions were not evaluated because the performance indicators defined by SCOR did not align with the company's implementation.

The following performance indicators are based on the SCOR theoretical concept: return employee reliability, time to solve a complaint, satisfaction, and claim loss. Additionally, the performance indicators based on the company's implementation are return rate to supplier and total claim. A re-check was then conducted to ensure the validity of these performance indicators in relation to the company's supply chain conditions.

3.4 Specifications of Key Performance Indicators

After determining the performance indicators, the next step is to specify them to avoid any confusion. To prevent any ambiguity, a clear definition of the name, code, type, unit, definition, target, period, and measurement method or formula for each indicator is required. Therefore, each key performance indicator has a specific metric, as shown in the table below:

Table 6. Specifications of Key Performance Indicator

Name	Plan Employe Reliability
Code	A.1.1
Type	Larger is better
Unit	Scale 1-5
Definition	This performance indicator is used to assess an employee's ability to carry out the planning process
Target	3,5
Period	Year
Formula	Questionnaire for the company

Name	Accuracy of Forecast Technique
Code	A.1.2
Type	Lower is better
Unit	Percentage (%)
Definition	This performance indicator is used to measure the accuracy of production demand forecasting
Target	20

Period	Month
Formula	$\frac{\text{difference in sales units} - \text{forecasted units}}{\text{forecasted units}} \times 100\%$

Source: Processed data

3.5 Weighting of Key Performance Indicators

The weighting of Key Performance Indicators (KPIs) is the process of assigning a value or weight to each key performance indicator based on its importance or priority in achieving organizational goals. KPIs are used to measure the performance of individuals, departments, or organizations. Weighting aims to identify which indicators are most critical to achieve within the company. This process is typically carried out using various quantitative or qualitative methods, ensuring that each KPI is assigned a weight corresponding to its contribution to the company's strategic objectives.

The weighting activities using the Analytic Hierarchy Process (AHP) is a multi-criteria decision-making technique that determine the priorities of activities or elements based on pairwise comparisons. In the case of weighting, AHP helps assign weights to activities by breaking down a complex problem into a hierarchy consisting of goals, criteria, subcriteria, and alternatives. Each element within the hierarchy is compared pairwise based on subjective judgments or quantitative data, and then their relative weights are calculated. AHP produces numerical weights for each activity reflecting its level of importance in achieving the main goal. The result enables more objective and structured decision-making in KPI management.

Table 7. Weighting of Key Performance Indicators

Variable	Code	Indicator	Weight	Global Weight
A. PLAN (0,221)	**A.1**	***Reliability***	**0,491**	**0,1085**
	A.1.1	*Plan Employee Reliability*	0,300	0,0326
	A.1.2	*Accuracy of Forecast Technique*	0,343	0,0372
	A.1.3	*Internal Relationship*	0,356	0,0468
	A.2	***Flexibitily***	**0,212**	**0,0316**
	A.2.1	*Planning Flexibility*	0,675	0,0152
	A.2.2	*Re-Planning Flexibility*	0,325	0,0378
	A.3	***Cost***	**0,171**	**0,0202**
	A.3.1	*Planning Cost*	0,534	0,0176
	A.3.2	*Planning Labor Cost*	0,466	0,0276
	A.4	***Assets***	**0,125**	**0,0113**
	A.4.1	*Assets Turnover*	0,409	0,0163
	A.4.2	*Inventory Turn Over Rate*	0,591	0,0163

B. SOURCE (0,252)	**B.1**	***Reliability***	**0,238**	**0,0600**
	B.1.1	*Perfect Order Fulfillment*	0,449	0,0270
	B.1.2	*Source Employee Reliability*	0,124	0,0073
	B.1.3	*Quality of Raw Materials*	0,181	0,0109
	B.1.4	*Source Fill Rate*	0,246	0,0148
	B.2	***Responsiveness***	**0,420**	**0,1058**
	B.2.1	*Service Level Material*	1,000	0,1058
	B.3	***Flexibility***	**0,116**	**0,0292**
	B.3.1	*Supplier Volume Flexibility*	1,000	0,0292
	B.4	***Cost***	**0,226**	**0,0570**
	B.4.1	*Purchased Materials Cost*	1,000	0,0570
C. MAKE (0,209)	**C.1**	***Reliability***	**0,489**	**0,1022**
	C.1.1	*Make Employee Reliability*	0,724	0,0740
	C.1.2	*Product Failure in Process*	0,276	0,0282
	C.2	***Flexibility***	**0,211**	**0,0441**
	C.2.1	*Make Flexibility*	1,000	0,0441
	C.3	***Cost***	**0,300**	**0,0627**
	C.3.1	*Material Efficiency*	0,497	0,0312
	C.3.2	*Machine Efficiency*	0,133	0,0083
	C.3.3	*Sourcing Labor Cost*	0,370	0,0232
D. DELIVER (0,222)	**D.1**	***Reliability***	**0,287**	**0,0637**
	D.1.1	*Employee Deliver Reliability*	0,141	0,0089
	D.1.2	*Defect Rate*	0,235	0,0150
	D.1.3	*On Time – In Full*	0,290	0,0185
	D.1.4	*Perfect Order Fulfillment*	0,335	0,0213
	D.2	***Responsiveness***	**0,405**	**0,0899**

	D.2.1	*Delivery Lead Time*	1,000	0,0899
	D.3	***Flexibility***	**0,133**	**0,0295**
	D.3.1	*Delivery Flexibility*	1,000	0,0295
	D.4	***Cost***	**0,176**	**0,0391**
	D.4.1	*Transportation Cost*	1,000	0,0391
E. RETURN (0,095)	**E.1**	***Reliability***	**0,329**	**0,0312**
	E.1.1	*Return Employee Reliability*	0,591	0,0184
	E.1.2	*Return Rate to Supplier*	0,409	0,0128
	E.2	***Responsiveness***	**0,520**	**0,0494**
	E.2.1	*Time to Solve a Complain*	0,243	0,0120
	E.2.2	*Satisfaction*	0,757	0,0374
	E.3	***Cost***	**0,151**	**0,0143**
	E.3.1	*Total Claim*	0,626	0,0090
	E.3.2	*Claim Loss*	0,374	0,0053

Source: Key Performance Indicator Weighting

The activities of CV. XYZ's supply chain management, which align with the company's plan, source, make, deliver, and return processes, have various weights. The highest weight indicates that the activity is the most important compared to the other activities. Based on Table 7, the "source" activity has the highest weight of 0.252. The "deliver" activity has the second highest weight of 0.222, followed by the "plan" activity with a weight of 0.221. The two lowest activities are "make" with a weight of 0.205 and "return" with a weight of 0.095. The weighting of these activities suggests that CV. XYZ's T-shirt products should focus more on the artisan activities, specifically the sourcing and delivering processes, to improve company performance. This indicates that the T-shirt artisan activities, as suppliers to CV. XYZ, are critical processes for the company.

3.5 Actual Performance Value of Key Performance Indicators

In the performance measurement stage, CV. XYZ utilized actual performance data from 2023 for each Key Performance Indicator (KPI). Table 4.8 presents the actual performance of the KPI for code A.1.1, "plan employee reliability," using a scale of 1 to 5. The results from the questionnaire, which assessed performance over one year, revealed an actual score of 2.33 from January to December, based on the average responses of the participants. The target score was set at 3.50. Therefore, it can be concluded that the performance indicator for "plan employee reliability" did not meet the expected target. This same approach applies to the assessment of other performance indicators that also use a scale of 1 to 5.

For performance indicators using a percentage (%), such as the KPI for code A.1.2, "accuracy of forecast technique," the actual data from the company is evaluated on a monthly basis. In January, the actual

performance score was 25.41%, while the expected target was 20.00%. This indicates that the performance indicator for "accuracy of forecast technique" exceeded the target. Similarly, this evaluation method applies to other performance indicators that use percentages (%), units, days, and costs (Rp). Below is a table showing the actual performance scores and the expected targets for each KPI:

Table 8. Actual Performance of Key Performance Indicators for 2019

Kode	Indicator Kinerja	Satuan	Tipe KPI	Jan.	Feb.	Mar.	April	Mei	Juni	Juli	Agst.	Sept.	Okt.	Nov.	Des.	Target
A.1.1	*Plan Employee Reliability*	Skala 1-5	*Larger is better*	2,33	2,33	2,33	2,33	2,33	2,33	2,33	2,33	2,33	2,33	2,33	2,33	3,50
A.1.2	*Accuracy of Forecast Technique*	%	*Larger is better*	25,41	21,31	43,31	-7,73	106,09	-75,60	13,13	66,67	27,61	87,37	11,03	16,20	20,00
A.1.3	*Internal Relationship*	Skala 1-5	*Larger is better*	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	4,00
A.2.1	*Planning Flexibility*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
A.2.2	*Re-Planning Flexibility*	Skala 1-5	*Larger is better*	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	4,00
A.3.1	*Planning Cost*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
A.3.2	*Planning Labor Cost*	Skala 1-5	*Larger is better*	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33
A.4.1	*Assets Turnover*	%	*Larger is better*	152	168	151	166	279	97	149	160	183	132	106	164	200
A.4.2	*Inventory Turn Over Rate*	%	*Larger is better*	14,22	14,25	14,63	14,31	8,53	10,90	11,48	11,24	10,51	9,88	9,44	9,17	10,00
B.1.1	*Perfect Order Fulfillment*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
B.1.2	*Source Employee Reliability*	Skala 1-5	*Larger is better*	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	4,00
B.1.3	*Quality of Raw Materials*	Skala 1-5	*Larger is better*	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	4,00
B.1.4	*Source Fill Rate*	Skala 1-5	*Larger is better*	100	100	100	100	100	100	100	100	100	100	100	100	100%
B.2.1	*Service Level Material*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
B.3.1	*Supplier Volume Flexibility*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,75
B.4.1	*Purchased Materials Cost*	Skala 1-5	*Larger is better*	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	4,00

Kode	Indicator Kinerja	Satuan	Tipe KPI	Jan.	Feb.	Mar.	April	Mei	Juni	Juli	Agst.	Sept.	Okt.	Nov.	Des.	Target
C.1.1	*Make Employee Reliability*	Skala 1-5	*Larger is better*	2,92	2,92	2,92	2,92	2,92	2,92	2,92	2,92	2,92	2,92	2,92	2,92	3,17
C.1.2	*Product Failure in Process*	%	*Lower is better*	0,11	0,22	0,38	0,14	0,53	0,10	0,13	0,34	0,12	0,11	0,16	0,11	0,25
C.2.1	*Make Flexibility*	Skala 1-5	*Larger is better*	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	4,00
C.3.1	*Material Efficiency*	Skala 1-5	*Larger is better*	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	2,75	3,75
C.3.2	*Machine Efficiency*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
C.3.3	*Sourcing Labor Cost*	Skala 1-5	*Larger is better*	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,25	3,63
D.1.1	*Employee Deliver Reliability*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
D.1.2	*Defect Rate*	Unit	*Lower is better*	24	32	37	30	39	26	16	33	12	10	13	10	25
D.1.3	*On Time – In Full*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
D.1.4	*Perfect Order Fulfillment*	Skala 1-5	*Larger is better*	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	3,00	4,00
D.2.1	*Delivery Lead Time*	Hari	*Lower is better*	11	12	20	13	13	*	42	11	16	14	16	14	12
D.3.1	*Delivery Flexibility*	Skala 1-5	*Larger is better*	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	3,67	4,33
D.4.1	*Transportation Cost*	Rp	*Lower is better*	157.6	150,000	600,33	479,843	153,333	*	316,666	580,283	387,33	328,710	553,360	482,333	500,000
E.1.1	*Return Employee Reliability*	Skala 1-5	*Larger is better*	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	3,33	4,33
E.1.2	*Return Rate to Supplier*	%	*Lower is better*	0,37	0,35	0,45	0,41	0,50	0,10	0,28	0,45	0,30	0,20	0,33	0,20	0,35
E.2.1	*Time to Solve a Complain*	Hari	*Lower is better*	7	7	7	7	7	7	7	7	7	7	7	7	7
E.2.2	*Satisfaction*	Skala 1-5	*Larger is better*	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	3,83	4,33
E.3.1	*Total Claim*	Unit	*Lower is better*	17	25	29	19	60	2	11	27	17	8	14	26	20
E.3.2	*Claim Loss*	Skala 1-5	*Lower is better*	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,67	1,33

*tidak ada kuantitas produksi

Sumber: data perusahaan

Based on the results in Table 8, each indicator is categorized into two types: "larger is better" and "lower is better." For example, the indicator A.1.1, "plan employee reliability," is classified as "larger is better," which indicates that the company's actual performance data is still below the target. The expectation is

that the actual performance will exceed the target value. On the other hand, the indicator A.1.2, "accuracy of forecast technique," is classified as "lower is better." This indicator shows that some monthly actual data are still above the target, whereas the goal is for the actual performance to be lower than the target.
In June, there were two indicators marked with an asterisk (*), which indicate that there was no production quantity during that month. This was due to the company's decision to grant a holiday for Eid to all employees of CV. XYZ. Additionally, many artisans did not carry out production processes during that month as a significant number returned to their hometowns.

3.6 Scoring System Key Performance Indicator

A Key Performance Indicator (KPI) scoring system is an evaluation method used to assess an organization's performance based on predefined indicators. Each KPI is measured using specific metrics, which result in a score that reflects the extent to which strategic and operational goals have been achieved. The purpose of this scoring system is to facilitate performance monitoring, identify areas for improvement, and support data-driven for making decisions. With such a system in place, companies can effectively allocate resources and strategies to achieve their stated objectives.

4. CONCLUSION

Based on the analysis and discussion of the research results on supply chain performance measurement at CV. XYZ, the following conclusions can be drawn:

1) The performance measurement system at CV. XYZ is functional, with each department having its own performance indicators and reporting them on a weekly or monthly basis. However, the supply chain performance measurement at the company is not yet comprehensive, as some other indicators, such as relationships with employees, suppliers, and customers, have not been explored in depth.
2) Based on the analysis of the traffic light system discussed in Chapter 4, the factors that hinder the achievement of supply chain performance at CV. XYZ using the SCOR model are as follows:

a) Plan Employee Reliability
b) Accuracy of Forecast Technique in March, May, August, and October
c) Re-Planning Flexibility
d) Assets Turnover in June
e) Quality of Raw Materials
f) Purchased Materials Cost
g) In-Process Product Failures in March, May, and August
h) Make Flexibility
i) Defect Rate in March, May, and August
j) Delivery Lead Time in March, July, September, and November
k) Return Rate to Supplier in May
l) Total Claim in March, May, and August

However, there is a correlation between the performance indicators that are interconnected when there is an increase in the production of T-shirts during Ramadan, as follows:

a) Product Failure in Process
b) Defect Rate
c) Return Rate to Supplier
d) Total Claim

3) There are indicators with a red score, which indicate that immediate improvement is required by both the company and the artisan:

a) Accuracy of Forecast Technique indicates the extent to which the company's sales forecasts deviate from actual sales.

b) Product Failure in Process, which is caused by fluctuating demand. When demand is high, the limited artisan prevents the company from fulfilling all orders. Therefore, it is recommended that the artisan increase their workforce during peak demand periods. Additionally, to minimize production failures or defects, CV. XYZ should be more actively involved in the production process, particularly in quality control.

c) Delivery Lead Time in certain months indicates delays in product delivery by the artisan. It is recommended that the company implement a sanction system for artisan who exceed the delivery deadline. This is expected to encourage the artisan to be more punctual in fulfilling customer orders.

d) Total Claims in a particular month indicates a high number of claims, which often due to increased demand. It is recommended that CV. XYZ increase its quality control personnel during peak demand periods to conduct inspections on both in-process and finished products.

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