Analysis of Supply Chain Performance in the CPO Production Process Using the Supply Chain Operations Reference (SCOR) Method

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Abstract

PT Kebun Ganda Prima–Palm Oil Mill (PT KGP–PKS) Kembayan is a company engaged in oil palm plantation and processing, with Crude Palm Oil (CPO) as its primary product. The company faces several challenges related to the performance of its CPO production supply chain. This study aims to evaluate the performance of the CPO supply chain and propose best-practice recommendations to enhance its efficiency and effectiveness. The research applies the Supply Chain Operations Reference (SCOR) model to assess supply chain performance based on three key attributes: Reliability, Responsiveness, and Flexibility. Performance evaluation is conducted through benchmarking by comparing actual operational data with company-defined targets, followed by inefficiency analysis to identify performance gaps. Subsequently, a best-practice analysis is performed to formulate improvement strategies. The results indicate that the supply chain reliability of PT KGP–PKS Kembayan is at a satisfactory level, with a Perfect Order Fulfillment (POF) rate of 87.11%. Full order delivery reached 100% with no returns, document accuracy and product condition also achieved 100%, while on-time delivery accuracy was 87.11%, with a delay rate of 12.89%. In terms of responsiveness, the order fulfillment lead time was 6.33 days (151.92 hours), which is below the company's standard of seven days and therefore considered acceptable. Regarding flexibility, the supply chain requires an additional three days (72 hours) to respond to disruptions, indicating a good adaptive capacity. Overall, the findings provide a basis for targeted improvements to enhance the performance of the CPO supply chain at PT KGP–PKS Kembayan.

1. Introduction

Elaeis guineensis Jacq or oil palm is a plant species from the Arecaceae family that thrives in tropical climates. This plant originates from the Nigeria region in West Africa. Currently, the palm oil plantation industry plays a crucial role in the international palm oil supply network, with contributions from approximately three million small-scale farmers across various parts of the world who produce about 4 million tons of palm oil (Pasaribu et al., 2021). Indonesia has experienced a very significant development in the palm oil industry, marking a major transformation in the plantation sector. Oil palm cultivation has spread to 22 provinces out of a total of 33 provinces in Indonesia. The islands of Kalimantan and Sulawesi have become the two main areas for oil palm plantation development. Approximately 90% of the national oil palm plantation area is concentrated in these two islands, which also contribute to 95% of Indonesia's total Crude Palm Oil (CPO) production (Ismai, 2017). West Kalimantan (Kalimantan Barat) is one of the provinces with very promising potential for oil palm development. Production data shows an increasing trend from 2015 to 2020, specifically: 703,770 tons (2015), 748,850 tons (2016), 772,633 tons (2017), 973,442 tons (2018), 1,311,338 tons (2019), and 1,428,859 tons (2020). However, there was a production decrease in 2021 to 1,428,859 tons (Eksos, 2023).

One of the industries in West Kalimantan that produces CPO (Crude Palm Oil) is PT. Kebun Ganda Prima-PKS Kembayan, specifically in the Tayan Hulu District, Sanggau Regency. This company operates in the plantation and palm oil industry, with its main product being oil palm fruit. PT. Kebun Ganda Prima-PKS Kembayan was established in August 2017. The company's maximum target oil production is 2,500 tons (6,200 M^3) per month. PT. Kebun Ganda Prima is an oil palm operational unit belonging to the SIMP Group (PT. SALIM IVOMAS PRATAMA Tbk), and PKS (Pabrik Kelapa Sawit / Palm Oil Mill) is also part of the SIMP group, active since 1995, with a focus location in Sanggau, West Kalimantan. It possesses complete legality and serves plasma farmers through its integrated Palm Oil Mill (PKS). However, it faces operational challenges such as low supply of Fresh Fruit Bunches (TBS) and legal issues regarding farmer claims. Despite this, the company also runs a CSR (Corporate Social Responsibility) program and is a subject of environmental research.

1.1 Literature Review

The optimization of the performance of all elements within the supply chain network is crucial. This condition will contribute positively to strengthening the company's image and increasing the level of customer trust (Deswati, 2020). Performance evaluation serves as a strategic instrument that assesses the company's operational activities, involving collaboration between business owners, the management team, and the workforce in a continuous effort to achieve established organizational goals (Firdaus, 2020). Measuring supply chain performance is very important for a company to understand the effectiveness of each component involved in the supply chain system (Sriwana et al., 2021). However, to date, PT Kebun Ganda Prima PKS Kembayan has not systematically implemented supply chain performance measurement. As a result, the company often faces various obstacles, including product delivery delays to consumers and irregularities in the production process. Both of these problems can indicate that supply chain management in the palm oil plantation activity is not yet running optimally. Therefore, it is important for PT Kebun Ganda Prima PKS Kembayan to measure its supply chain performance. Through this step, the company will be able to identify the performance of every involved component, as well as recognize the parts deemed critical and requiring special attention. The results of this measurement are expected to become the basis for formulating appropriate improvement strategies and providing meaningful considerations for company management in supporting efforts to develop and increase competitiveness through a more integrated supply chain system improvement.

Supply chain performance measurement can be done using various methods such as Balanced Scorecard (BSC), Performance Prism, and Supply Chain Operation Reference (SCOR). BSC and Performance Prism still have several practical shortcomings. BSC is considered to be too focused on financial aspects and pays less attention to non-financial indicators, often leading to sub-optimal results (Elisabeth, 2018). Meanwhile, the Performance Prism lacks clear measurement standards and tends to be difficult to implement due to differing interests among stakeholders (Rufaidah and Vidianto, 2018). SCOR is the most effective method to implement for supply chain performance measurement at PT Kebun Ganda Prima PKS Kembayan. SCOR is a continuously evolving and flexible method that can be adapted to the supply chain characteristics of any company. SCOR's main

advantage lies in its ability to combine Benchmarking, Best Practice Analysis (BPA), and Business Process Reengineering (BPR) into one integrated system, making the evaluation results more accurate. The implementation of this method at PT Kebun Ganda Prima PKS Kembayan is chosen because SCOR has advantages over other methods, especially in assessing overall supply chain performance. Unlike other methods that only focus on the company's internal activities, SCOR is specifically designed to evaluate all processes in the supply chain in an integrated manner (Kambie et al., 2020). The SCOR approach is a framework applied for comprehensive supply chain performance evaluation. Its main function is to describe how supply chain activities operate, by incorporating benchmarking analysis elements into its evaluation system. The SCOR framework is designed with an organized structure and has several hierarchical levels. At the initial level, there are six core activities that are the main focus, including: Plan, Source, Make, Deliver, Return, and Enable. Subsequently, at the second level, SCOR assesses performance through parameters such as Reliability, Responsiveness, Agility, Asset Management, and Cost. At the third level, this framework applies parameters based on Key Performance Indicators (KPIs) which are adapted according to the specific characteristics and needs of each organization (Yusrianafi and Dahdah, 2021). Based on the above, this research aims to analyze supply chain performance and provide recommendations for improvement strategies for the parts that are not yet operating optimally. In its implementation, this research will involve several parties who play important roles in supply chain activities, to obtain accurate data in the performance measurement process. It is hoped that the results of this research can help identify the activities that need to be improved, so that the overall supply chain performance at PT Kebun Ganda Prima PKS Kembayan can be enhanced. The objectives to be achieved in this research are: (a)To obtain an analysis of supply chain performance using the Supply Chain Operation Reference (SCOR) method at PT. Kebun Ganda Prima-PKS Kembayan, and (b) To determine improvement recommendations to enhance the palm oil supply chain performance at PT. Kebun Ganda Prima-PKS Kembayan.

2. Research Methods

Place and Time of Execution

This research was conducted at PT. Kebun Ganda Prima-PKS Kembayan, Tayan Hulu District, Sanggau Regency. The research period will span from July 2025 until completion. Data processing was carried out at the Agroindustry Management Laboratory, Agricultural Industry Technology study program, Tribhuwana Tunggadewi University, Malang.

Research Stages

The execution of this research consists of several research stages aimed at determining supply chain performance using the Supply Chain Operations Reference (SCOR) method. The more detailed stages of the research are as follows:

Table 1. Research Stages

No.	Research Stage	Activity Description	Output
1	**Problem Identification**	Observing the CPO production and distribution process at PT. Kebun Ganda Prima-PKS, and identifying problems in the supply chain.	Research problem formulation
2	**Literature Review**	Reviewing theories related to supply chain, the SCOR method, and relevant previous research references.	Theoretical framework and basis for analysis
3	**Determination of Objectives and Scope**	Defining the boundaries and focus of the analysis on the CPO supply chain process based on the SCOR model levels 1 and 2.	Research objectives and scope
4	**Development of Research Instruments**	Interviews, and field observation data collection formats.	Data collection instruments
5	**Collection of Primary and Secondary Data**	Conducting interviews, direct observation at the Palm Oil Mill (PKS), and collecting supporting documents and production reports.	Quantitative and qualitative supply chain data

No.	Research Stage	Activity Description	Output
6	**Data Processing and Grouping**	Organizing data based on the five SCOR processes: **Plan, Source, Make, Deliver, and Return**.	Performance values for each SCOR process
7	**Supply Chain Performance Measurement**	Using SCOR performance indicators: **Reliability, Responsiveness, Agility, Cost, and Asset Management**.	Performance values for each SCOR process
8	**Analysis of Measurement Results and Performance Evaluation**	Analyzing the weaknesses and strengths of the existing supply chain performance based on data and benchmark values.	Findings and interpretation
9	**Formulation of Recommendations**	Formulating improvements that can be made by the company to enhance supply chain performance.	Strategic recommendations
10	**Report Writing and Conclusion**	Compiling the research results into a thesis report from Chapter I to Chapter V.	Complete thesis

SCOR Level Indicators

The SCOR Model consists of three main hierarchical levels that are interconnected in analyzing and improving supply chain performance:

Level 1 – Top-Level Process

This level describes the macro-processes in the supply chain. SCOR groups the main processes into five categories, namely:

- Plan – Planning all supply chain activities, including demand and supply.
- Make – The process of producing goods and services.
- Deliver – The process of shipping products to customers.
- Return – Handling the return of products or materials.
- Enable – Supporting activities such as information management, human resources (HR), and policies.

This level is used to view a general overview of the supply chain process and determine the focus area for performance improvement.

Level 2 – Configuration Level

This level breaks down the main processes into more detailed process categories, which reflect the company's operational strategy. For example, within the "Make" process, there are categories such as Make-to-Stock, Make-to-Order, or Engineer-to-Order. This level allows the company to identify operational patterns and compare performance across divisions or similar industries (benchmarking).

Table 2. Indikator Level SCOR

Level	Process Category (SCOR)	Process Activity	Implementation at PT. Kebun Ganda Prima – PKS Kembayan
Level 1	**Plan**	Supply chain planning	Compiling plans for Fresh Fruit Bunch (FFB) harvesting, procurement of fuel and spare parts, and planning the Palm Oil Mill (PKS) production capacity.
	Make	Production process	Sterilization, stripping, pressing, clarification, purification, and storage of Crude Palm Oil (CPO).
	Deliver	Product distribution	Shipping CPO to refineries or customers using tanker trucks.
	Return	Product distribution	Return of tankers, packaging, or handling of damaged products (if applicable).
	Enable	Supply chain support	Management of information systems, HR, Standard Operating Procedures (SOPs), and supply chain performance monitoring.

Level	Process Category (SCOR)	Process Activity	Implementation at PT. Kebun Ganda Prima – PKS Kembayan
Level 2	Plan Supply Chain	Planning for harvest and production needs	Estimation of daily FFB volume, adjustment to mill capacity.
	Make-to-Stock	Production based on inventory	Production process is run according to the daily CPO output target.
	Deliver Stocked Product	Delivery of finished product	CPO is delivered to customers according to contract or request.
	Return Defective Product	Return of defective product	Handling of CPO or waste that does not meet specifications.
	Manage Performance	Supply chain monitoring	Use of KPIs such as Reliability, Responsiveness, Agility, Cost, and Asset Management.

Data Processing and Analysis

Description of the Supply Chain at PT Kebun Ganda Prima-PKS

The supply chain is described starting from the delivery of Fresh Fruit Bunches (FFB) and the manufacturing process, which is the processing of CPO (Crude Palm Oil) supply chain structure. The supply chain structure can be viewed through the activities of procuring goods or services that cooperate and are interconnected with one another to create and distribute goods.

Identification of Supply Chain Processes

This involves identifying every process in the supply chain, from design to product delivery. This process begins with planning, which considers the needs for production, storage, and demand. The sourcing stage involves selecting reliable suppliers and an efficient procurement system for raw materials. The production (make) process is then carried out by maximizing resource utilization and ensuring product quality is maintained.

Performance Measurement

Performance measurement is carried out based on three main dimensions in the SCOR model:

a. Reliability

The metric measured for the reliability performance attribute is Perfect Order Fulfillment (POF). POF is the percentage of orders that meet delivery performance, are shipped on time, comply with demand, and are undamaged. POF is calculated using the formula:

$$POF\ (\%) = \frac{(Total\ order - Order\ Defect\ Rate)}{Total\ Order}\ x\ 100\%$$

(This is the standard interpretation of the POF formula, filling in the missing text/numerator from your original input).

b. Responsiveness

The metric measured for this attribute is Order Fulfillment Cycle Time (OFCT). Order Fulfillment Cycle Time measures the speed with which a company fulfills an order, from the moment it is received until it is delivered to the customer. OFCT is calculated using the formula:

$$OFCT = \left(\frac{The\ actual\ cycle\ time\ for\ all\ orders\ delivered}{Total\ number\ of\ POs\ Fulfilled}\right) x100\%$$

(This is the standard interpretation of the OFCT formula, filling in the missing text from your original input).

c. Flexibility

Flexibility is measured by the company's ability to increase capacity within a certain timeframe, including:

Upside Source Flexibility → The supplier's ability to increase the supply of raw materials quickly.

Upside Make Flexibility → The mill's ability to increase production capacity when demand rises.

Upside Deliver Flexibility → The distribution unit's ability to increase shipping volume as needed

3. Result and Discussion

The results section summarizes the data collected for the study in the form of descriptive statistics and also reports the results of relevant inferential statistically analysis (e.g., hypothesis tests) conducted on the data. You need to report the results in sufficient detail so that the reader can see which statistical analyses were conducted and why, and to justify your conclusions. Mention all relevant results, including those that are at odds with the stated hypotheses (American Psychology Association 2001: 20).

Company Overview

PT. Kebun Ganda Prima-PKS is located in West Kalimantan Province, specifically in the Tayan Hulu District, Sanggau Regency. The company was established in 2017, with a factory building area of 4.40 Ha, a wastewater pond area of 4.01 Ha, and a reservoir covering 2.00 Ha, bringing the total factory area, including the pond and reservoir, to 10.41 Ha. Accessibility to the company's location is achieved via land transportation. The road connection utilizes four-wheeled and two-wheeled vehicles, with a travel time of approximately ± 2 hours via the Kalimantan cross-road. However, the condition of the Kedakas road in Tayan Hulu District, at the intersection turn-off, is still unpaved with stones and clay. In terms of human resources, PT. Kebun Ganda Prima is led by Manager Pakkat Antonius Sibarani, with Budi Wahyudi Tanjung serving as the Assistant Head. The company employs a total of 66 people, consisting of 7 staff members and 59 employees. To meet its raw material needs, the company collaborates with various suppliers, including Tayan Hulu Estate, Kembayan Estate, and several cooperatives such as Koperasi Satria Usaha Bersama, Koperasi Sumber Makmur Perkasa, Koperasi Bopakat Cahaya Sawit, Koperasi Usaha Mitra Tani, and Village-Owned Enterprises (BumDes) Karok Jayo. As one of the CPO (Crude Palm Oil) producing industries in West Kalimantan, PT. Kebun Ganda Prima PKS Kembayan holds a strategic position in the regional palm oil industry. The company not only focuses on production but also runs a Corporate Social Responsibility (CSR) program and participates in various environmental research initiatives, demonstrating a commitment to sustainable development and corporate social responsibility. Location is the place where a company operates and produces goods and services. According to KBBI (Great Dictionary of the Indonesian Language), location is the setting and place. The selection of a location for a company significantly influences the success of an endeavor. Therefore, location is very important for a company, as it will affect the company's position in the competition and determine its survival. PT. Kebun Ganda Prima-PKS Kembayan is located in Sanggau Regency, Tayan Hulu District, Sanggau Regency, West Kalimantan. Geographically, PT. Kebun Ganda Prima-PKS Kembayan is located between [Missing Geographical Coordinates]. This location selection is based on the easy availability of raw materials and a strategic layout for palm oil cultivation. The location map of PT. Kebun Ganda Prima-PKS Kembayan can be seen in the figure.

Supply Chain Members

Supply chain members are parties directly or indirectly involved in the process of fulfilling product needs. These supply chain members include three main parties: suppliers, producers/mills, and distributors/transporters.

Suppliers

The parties that provide raw materials for the production process include two types of plantations:

First: Those serving as suppliers of Fresh Fruit Bunches (FFB) from Plasma farmers and Independent farmers (Swadaya). Plasma farmers are joined in a formal partnership with the core company (the palm oil plantation company), while independent farmers operate independently without a formal partnership with the core company; they manage their land and sell their harvest autonomously.

Second: The company's core plantation (kebun inti), which is the company's main source of FFB raw material. The core plantation consists of oil palm plantation areas owned, managed, and operated directly by the plantation company (the core company).

b. Producers/Mills

The producer/mill is the party that processes the raw material into a finished product, which is CPO (Crude Palm Oil). The mill used to process FFB into CPO is the Palm Oil Mill (PKS).

c. Distributors/Transporters

This party is responsible for the transportation and distribution of both raw materials and semi-finished products. The transport of FFB from the plantation to the PKS uses dump trucks and shunting trucks, while the shipment of CPO from the PKS to the PT. LBL Tayan dock uses tank trucks.

Supply Chain Performance Analysis Based on the SCOR Model

The SCOR model is used to analyze Supply Chain performance based on five core processes: Plan, Source, Make, Deliver, and Return. Each process is analyzed using five performance attributes: Reliability, Responsiveness, Agility, Cost, and Asset Management Efficiency. These five core processes are detailed below:

a. Plan Process (Planning)

In the Supply Chain Operation Reference (SCOR) model, Plan is a crucial initial stage that serves as the foundation for coordinating all supply chain activities, ranging from raw material procurement (FFB), the processing at the mill, to the distribution of the final product (CPO). At PT. Kebun Ganda Prima-PKS Kembayan, the Plan stage includes activities related to Source (procurement). The procurement process involves receiving raw materials (FFB) from both the core and plasma plantations, where the maximum FFB selected by the company is 5-10 loose fruits with a reddish-orange color. Performance indicators used are: FFB delivery Lead Time and Raw material quality (FFB). In the planning stage, the company also schedules operations, including sterilizer loading, stripping, pressing, clarification, and purification, to ensure no bottlenecks occur in the material flow. Furthermore, the planning division considers the mill's processing capacity, the availability of transport fleets, manpower, and supporting utilities such as water, steam, and electricity, to ensure optimal production runs. Planning also encompasses the analysis of market demand and needs to determine the production volume that must be achieved, as well as the planning for CPO distribution to the refinery or other industrial customers. The Plan process also considers potential risks such as weather changes, FFB supply fluctuations, machine damage, and market dynamics, enabling the company to make quick decisions based on both best-case and worst-case scenarios. Thus, the Plan stage serves as a strategic foundation for integrating all supply chain activities, minimizing uncertainty, increasing operational efficiency, and ensuring that the CPO produced meets customer needs on time and with the right quality.

b. Make (Production)

The Make (Production) stage is the core process of transforming FFB into CPO through a series of activities including sterilization, stripping, pressing, clarification, and purification. At PT. Kebun Ganda Prima–PKS Kembayan:

Sterilization is carried out with a capacity of 120 tons of FFB, filling four tubes with a capacity of 30 tons each, a steaming time of 85 minutes, and a pressure of 38 bar. This process is followed by stripping using two thresher units, each with a 40-ton capacity, to separate the loose fruit (brondolan). Subsequently, the loose fruit enters the pressing station, which has three press units, each with a 25-ton capacity and a pressure of 50–80 bar, to extract the oil. The resulting crude oil is then processed in the clarification station, with a 150 m^3 capacity, to separate oil, water, and impurities. The final stage is purification, using two purifier units with a 12.5 ton/hour capacity, to produce clean CPO that meets quality standards. The performance of the Make stage is evaluated through indicators such as CPO yield (rendemen), process efficiency, and machine downtime, as a measure of production effectiveness and reliability.

c. Deliver (Distribution)

The Deliver (Distribution) stage in the SCOR model is the process of moving the final product, Crude Palm Oil (CPO), from the company's storage facilities to the customer or destination port. This includes preparation for shipment, quality inspection, document management, and product transportation. At PT. Kebun Ganda Prima–PKS Kembayan, CPO distribution is conducted via storage tanks (tangki timbun) which serve as temporary storage before the oil is transferred to the transport vehicles. Shipment is carried out using tanker trucks that meet cleanliness and roadworthiness standards to ensure the CPO is not contaminated during transit. The loading process uses a pumping system at a controlled temperature so that the CPO's viscosity remains stable and easily flowable. Additionally, the company ensures the completeness of documents such as waybills (surat jalan), COA (Certificate of Analysis), and other supporting documents to guarantee smooth delivery and compliance with customer and regulatory requirements.

d. Return (Returns)

The Return stage in the SCOR model encompasses the process of handling products returned due to failure to meet required quality specifications, damage during shipment, or document non-compliance that prevents the product from being accepted by the customer.

In the context of the palm oil mill (PKS) industry, including at PT. Kebun Ganda Prima–PKS Kembayan, the product return process is relatively rare because the CPO shipped has undergone strict quality inspection in the clarification, purification stations, and laboratory before entering the storage tanks and being sent to the buyer. Furthermore, prior to shipment, the company ensures that quality parameters such as FFA (Free Fatty Acids), moisture content, impurities, and color comply with contract standards, thus making the risk of product returns very low.

Supply Chain Estimation

Supply chain estimation at PT. Kebun Ganda Prima-PKS Kembayan is performed by considering several key aspects: the volume of raw material supply (FFB), the mill's processing capacity, CPO production output, and distribution time and cost.

a. Raw Material Supplier Estimation (Upstream Supply Chain)

The main raw material supplier, Fresh Fruit Bunch (FFB), comes from three primary sources: the company's core plantation, plasma farmers, and independent farmers. Based on production data, the FFB supply capacity to PKS Kembayan can reach an average of 250–300 tons of FFB per day, depending on the harvest season. The supply distribution is generally divided into:

- Core plantation: 60% of total supply.
- Plasma farmers: 30%.
- Independent farmers: 10%.

This calculation is used to estimate the daily and monthly raw material availability so that the mill can operate at its optimal capacity.

b. Mill Production Capacity Estimation (Internal Supply Chain)

The capacity of the palm oil mill (PKS) in Kembayan is approximately 30 tons of FFB per hour. With an average operating time of 16 hours per day, the total processing capacity can reach: 30 tons/hour x 16 hours} = 480 tons of FFB/day). However, under normal conditions, the mill's utilization rate is between $80-90\%$, depending on raw material availability and the condition of the production machinery. From the processing, the resulting CPO yield (rendemen) ranges from $20-22\%$, depending on the FFB quality and process efficiency. Thus, the estimated daily CPO production can be calculated as follows: 480 { tons FFB/day} x 21% = 100 { tons CPO/day}.

c. Production Distribution Estimation (Downstream Supply Chain)

The resulting CPO product is then distributed to the PT. LBL Tayan dock. Based on storage capacity, the CPO storage tanks at PKS Kembayan have a volume of approximately 2,500 tons, which can hold the production output for 15 days of operation. Shipments are typically made 1–2 times per week, with a volume of $\pm 200–250$ tons per shipment. Distribution is carried out using specialized CPO tanker trucks with a capacity of 25-30 tons per unit.

d. Supply Chain Cycle Time Estimation

Cycle time describes the total duration from harvesting until the product is received by the industrial customer, which can be broken down as follows:

Table 3. Supply chain cycle time estimation.

Process Stage	Time (Average)	Description
Harvesting and FFB Collection	1 day	From the plantation to the weighing station
Transportation to the Mill (PKS)	1 day	Depends on distance ($\pm 10–30$ km)
FFB Processing $\rightarrow$ CPO	1 day	Includes sterilizing and clarifying
CPO Storage and Shipment	2–3 days	Waiting for the distribution schedule
Total Estimated Cycle Time	**5–6 days**	From harvesting until CPO reaches the industrial buyer

Supply Chain Efficiency and Risk Estimation

Based on observation results, the efficiency of the CPO supply chain at PT. Kebun Ganda Prima is influenced by several factors:

- FFB transportation efficiency, especially road conditions and fleet availability.
- Mill performance, such as machine downtime and production process stability.
- Raw material quality, as FFB that is delayed in processing can reduce the yield (rendemen).
- Distribution delays, which can reduce the time available for delivery to the PT. LBL Tayan dock.

From the estimation results, the average supply chain efficiency level is in the range of 85-90%, which indicates that the supply chain system is operating quite optimally but still has room for improvement, especially in logistics management and coordination among partners.

Supply Chain Condition (As-Is Phase)

AS-IS modeling is the design of a supply chain that maps the current state of the Plan (planning), Source (sourcing), Make (production), Deliver (delivery), and Return (returns) processes (Utami, A. P., 2019). The As-Is Phase describes the actual condition of the operational supply chain system at PT. Kebun Ganda Prima-PKS Kembayan at the time the research was conducted. The analysis aims to understand the real processes in the field, including the main activities in the Supply Chain, the structure of inter-company relationships, and the operational performance of each stage, from raw material provision to final distribution.

Table 4. Supply Chain Flow As-Is Phase of PT. Kebun Ganda Prima

Level	Actor	Process	Code	Activity
Supplier	Plasma Farmers / Independent Farmers / Core Plantation	**Source**	S1	Conducting the harvesting of Fresh Fruit Bunches (FFB) at their respective plantations and delivering them to the mill using trucks.
			S2	Conveying information regarding the tonnage and delivery schedule of FFB to the mill's reception party.
Manufacturer	Kebun Ganda Prima – PKS Kembayan	**Plan**	P1	Planning all production activities, from raw material reception, processing, to the distribution of CPO and kernel output.
			P2	Preparing the daily production schedule based on the mill's processing capacity and the availability of FFB supply from the core, plasma, and independent plantations.
		Source	S1	Conducting the reception and weighing of FFB from suppliers for recording in the raw material reception system.
			S2	Performing quality inspection and storage of FFB at the loading ramp before processing.
		Make	M1	Executing the CPO production process through the stages of sterilization, stripping, pressing, clarification, and oil storage.
			M2	Carrying out the separation and drying of kernels, and storing the output in the warehouse.
		Deliver	D1	Scheduling the shipment of CPO and kernel to industrial buyers (refineries) according to the sales contract.
			D2	Managing shipping documents such as waybills, weighbridge results, and product stock reports.
		Return	R1	Managing product returns in case of quality complaints from the industrial buyer.

Level	Actor	Process	Code	Activity
Retailer / Buyer	PT. LBL Tayan	**Source**	S1	Purchasing CPO from PT. Kebun Ganda Prima based on a cooperation contract.
			S2	Confirming the reception of goods and checking the CPO quality upon arrival at the refinery location.

4. Conclusions

From the results of the analysis using the Supply Chain Operation Reference (SCOR) method, it is found that PT. Kebun Ganda Prima-PKS Kembayan already utilizes the SCOR method, but there are still internal constraints, specifically in the delivery time, which are caused by transportation vehicle scheduling, road conditions, and weather.The recommendations for improvement at PT. Kebun Ganda Prima-PKS Kembayan are: Based on the analysis using the SCOR method, the delivery delays at PT. Kebun Ganda Prima–PKS Kembayan caused by fleet scheduling, road conditions, and weather factors can be improved through enhancing the digital-based transportation scheduling system, adding reserve fleets, and strengthening coordination between the logistics department and transporters, accompanied by routine maintenance on road sections that frequently suffer damage, and determining alternative routes when road conditions are unsuitable. To anticipate bad weather, the company needs to utilize weather forecast data, prepare specific Standard Operating Procedures (SOPs) for shipment during the rainy season, and conduct periodic monitoring and evaluation of the delivery process, so that timeliness performance can increase and the implementation of SCOR runs more effectively. To improve supply chain performance in accordance with the SCOR analysis results, the company is advised to strengthen operational planning and scheduling through the use of digital-based monitoring systems, increase raw material supply flexibility by fostering closer relationships with suppliers, and enhance production process efficiency through routine maintenance and periodic evaluation. Furthermore, for the delivery process, the company needs to provide reserve fleets, improve coordination between departments, map alternative routes, and implement specific SOPs for extreme weather conditions to minimize delays. By consistently implementing these improvements, the company is expected to be able to enhance performance across all SCOR indicators, making the supply chain more responsive, efficient, and reliable in meeting customer needs.

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