

SUPPLY CHAIN PERFORMANCE OF CALIFORNIA PAPAYA COMMODITY (*Carica Papaya (L). Var Calina*)

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ABSTRACT

The study aims to determine the marketing function, supply chain process, and supply chain performance of California Papaya suppliers to find solutions to problems that arise in the fruit commodity supply chain, namely, failure to achieve the realization of supply achievement according to recommendations. The research location at KN Jaya Farm Rancabungur Bogor Regency is from May 2022 to August 2022. Data collection methods through interviews and observations. The respondents were one-person farmers, seven suppliers, and one-person distributors. Data analysis is carried out descriptively and quantitatively analyzes supply realization compared to supply chain operation reference (SCOR) standards to determine supply chain performance achievements. Research shows the marketing functions carried out: sales and purchase activities, exchanges, physical functions: Packaging, transportation, facility functions: financing, standardization, risk protection, and market information. The supply chain process is the activity of the flow of goods, the flow of money, and the flow of information. Supply chain performance analysis consists of planning, procurement, delivery, and returns. The achievement analysis results in each matrix show that the realization of the supply chain has been carried out beyond the standards recommended by SCOR. The research concludes that the exchange function, the physical part, and the facility function carry out the marketing function. The supply chain process includes the activity of the flow of goods, money, and information. Supply chain performance has met the standard by 67% and the non-standard by 33% of the number of metrics recommended by SCOR. The recommendation of this study is to recruit suppliers from locations in the West Java region so that the metric component can 100% meet the standards and apply digital systems to ensure the efficiency and effectiveness of supply through blockchain technology.

1. INTRODUCTION

The strategic position of the Indonesian region is very influential; there is the production of various kinds of fruits that grow well in locations with tropical climates. Fruits, as a horticulture commodity, have a charm for the community. The varied shape and colors of the fruit are the attraction of each type. The increasingly high demand for fruit can provide benefits for agricultural business actors. The national production of Papaya fruit from 2015 – 2019 has increased from 851,532 tons in 2015 to 986,992 tons in 2019. The average papaya fruit production for five years is 901,101 tons (Central Bureau of Statistics, 2019). In addition to showing aspects of production, horticulture development is currently more focused on improving quality and being market-oriented. Agricultures must understand consumers' interests and needs so that farmers can produce appropriate and well-distributed products for better selling prices (Febriani, 2011). Papaya fruit production center area (*Carica papaya* L.) Calina IPB-9 varieties in Indonesia include West Java Provins. The national production of papaya in Indonesia in 2019 reached 986,992 tons. It amounted to 89.2 88 tons of the total national production of papaya supplied from the province of West Java (Central Bureau of Statistics, 2019).

California Papaya production in West Java in 2019-2020 increased, but the number of California Papaya requests exceeded the amount of production. This causes an imbalance between supply and demand. The imbalance can lead to the emergence of risks and the loss of opportunities to obtain profits from each supply chain actor, which ultimately affects the performance of members of the California Papaya supply chain. The condition of inequality in the supply of papaya Calina is also experienced by Malaysia, where Papaya Calina from Riau Province can be exported to Malaysia due to a lack of supply of papaya (Agricultural Quarantine Agency, 2019). The case in Pakistan is reported that During the pandemic period, the shortage of supplies of basic agricultural necessities, such as rice, vegetables, wheat flour, and eggs, has caused fear among suppliers and buyers due to the disruption of supply networks (Paul & Chowdhury, 2020). Measuring supply chain performance is essential because it maintains supply stability to end consumers, improves the efficiency of warehouse use and transportation facilities, shortens shelf life during the distribution process, reduces risks, and increases opportunities for revenue from supply chain actors. Moreover, in the global era, an efficient distribution strategy and supply chain management are needed in line with the revelation that competitive pressure in the global market requires companies to establish efficient distribution planning and inventory management in the Diep supply chain (Diep & Chaysiri, 2022).

The importance of papaya supply chain research is to maintain the supply stability available to meet customer demand. Similar research has also been conducted on the garlic commodity, stating that supply availability is an essential factor in influencing the performance of the garlic supply chain because, without a stable and regular supply, the performance of the garlic supply chain will be disrupted (Purwanto & Ismail, 2020). In the broccoli commodity, it was also reported that the cause of the inefficient supply chain included insufficient supply and less timely delivery (Adwiyah, 2017). Similar research has been conducted by Alam *et al.* (2021). The causes of inefficient supply chain performance are quality assurance, insufficient supply, and untimely delivery.

This research evaluates supply chain performance to optimize the California Papaya supply chain. Supply chain performance measurement is carried out to fix supply chain problems before they have a significant impact and to control the coordination of supply chain actors in meeting consumer demand (Chopra & Meindl, 2007). Since supplier performance critically affects overall supply chain performance (SCP), identifying and evaluating SCPs through standard indices is an integral approach to identifying problems and improving SCP (Tansakul *et al.*, 2022). The specific purpose of this study is that the research aims to determine the marketing function and supply chain process and measure supply chain performance in California Papaya suppliers.

2. METHODS

2.1. Research Location and Time

The research was conducted from May 2022 to August 2022. The determination of research location was chosen intentionally (purposive), namely at KN Jaya Farm in Mekarsari Village, Rancabungur District, Bogor Regency, considering that KN Jaya Farm is a large supplier that connects farmers with modern retailers' papaya Calina in Jakarta, Bogor, and Bekasi areas.

2.2. Respondent Determination Method

The respondents in this study consisted of 1 California Papaya farmer, one distributor conducted by purposive sampling, and seven suppliers who supplied to the distributor carried out by accidental sampling. The respondent as a distributor is KN Jaya Farm. KN Jaya is a hereditary business venture focusing on papaya Calina commodities since 2003. KN Jaya Farm has a warehousing area of 400 m² consisting of a warehouse, sorting place, and parking lot. KN Jaya Farm also has other assets, such as vehicles consisting of 5 truck cars, two tub cars, and three motorcycles; the total number of employees at KN Jaya Farm is 18 people, while the employees involved in the California Papaya business are ten people. Over the past year, KN Jaya Farm has fostered partner farmers in the district area of Bogor, Cianjur, Sukabumi, Tanggamus, and several districts in Lampung Province and Banten Lampung Province with an average total of 150 tons per month. The selection of KN Jaya Farm as a research location followed the recommendations of the Bogor Regency Food and Agriculture Security Service. As many as seven respondents are suppliers who routinely supply Calina papaya from Sumberjo, Way Kanan, Tanggamus, Lampung Province, as many as three people from Sukabumi one person, Banten as many as one people and two Cianjur people. The determination of supplier respondents is carried out by the accidental sampling method. The Accidental sampling method is carried out with the consideration that respondents can be interviewed directly at the distributor location during the handling of papaya delivery and, at the same time, can observe the standardization and sorting process.

The demographics of respondents showed that the distribution of sex at the supplier level at KN Jaya Farm was 100% male. This happens because suppliers think men have to work and have more vital energy, while women are enough to be good homemakers. The percentage of respondents' age is equal, namely the age of <30, as many as one person with a percentage of 14%, the age group of 30-40 as many as four people with a percentage of 57%, and the age group of 41-50 as many as two people with a percentage of 29%. Judging from the last education respondents have taken, most of the respondents to California Papaya suppliers at KN Jaya Farm are four junior high school students with 57% and senior high school as many as three people with a percentage of 43%. Judging from the length of farming respondents of California Papaya suppliers at KN Jaya Farm is classified as having been in running a business selling California Papaya for a long time, can be seen from the data above, namely 1-5 years as many as six people with a percentage of 86%, and 5-10 years as many as one person with a percentage of 14% of the total. The more extended California Papaya trading business experience supports the performance of each of the marketing agencies because the business experience that has been carried out will positively influence the profit and sustainability of activities in buying and selling California Papaya.

In terms of gender at the distributor level at KN Jaya Farm, it is 100% male. The percentage of the respondent age group is the same, namely the age of 41-50 years, as many as one people with a percentage of 100%. Judging from the last education taken by respondents, California Papaya distributors at KN Jaya Farm have high school / vocational education with a percentage of 100%. Judging from a long time of trying to farm respondents of California Papaya distributors at KN Jaya Farm is classified as having been running a California Papaya business for a long time, it can be seen from the data above, which is ten years with a percentage of 100%. California Papaya trading business experience has 19

(nineteen) years of supporting experience in running a California Papaya business which is quite long and can provide opportunities for California Papaya business actors in marketing California Papaya at KN Jaya Farm so that it can help farmers and suppliers in running this California Papaya business. The 14-day field interview process at the KN Jaya Farm location

2.3. Data Sources and Types

The data used in this study consisted of primary data and secondary data. Secondary data is from the Central Bureau of Statistics and SCOR reference data. Primary data were obtained from farmers, suppliers, and distributors through interviews and direct observation by filling out questionnaires at the KN Jaya Farm location.

2.4. Data Processing and Analysis Methods

The interview data was processed, followed by descriptive and marketing institutional analysis to answer the distribution function and supply chain activities. Supply chain performance analysis is carried out utilizing supply chain performance at KN Jaya Farm can be measured through performance matrices. Some performance matrix components include lead time order fulfillment, order fulfillment cycle, supply chain flexibility, cash-to-cash cycle time, and daily inventory. The interview results of seven supplier respondents found the actual average value of each matrix component, then compared it with the target/ideal and calculated the achievement of the matrix. If the actual value exceeds the target/outstanding value, the matrix achievement value is the final value in the SCOR calculation (SCC, 1996). This method is also used to measure the performance of the poultry supply chain (Bukhori *et al.*, 2015).

3. RESULTS AND DISCUSSION

3.1. Marketing Function

The marketing process carried out by California Papaya farmers generally involves suppliers, namely collecting merchants. Transportation of California Papaya fruit from each supplier location using a pickup car directly to the distributor KN Jaya Farm. The marketing function, it can be seen in Table 1.

Table 1 Functions of California Papaya Marketing Actors

Marketing Function	Farmer	Supplier	Distributor
Exchange			
Purchase	-	√	√
Sales	√	√	√
Physical			
Packaging	-	√	√
Transportation	√	√	√
Facilities			
Financing	√	√	-
Standardization	-	√	√
Risk Insurers	-	√	√
Market Information	√	√	√

Source: Primary Data (processed)

2.2. California Papaya Supply Chain Process

2.2.1. The flow of Information, Goods, and Money

The flow of information, goods, and money is the linkage between supply chain agencies in terms of supplying and meeting their supply needs. Fauziah *et al.* (2021) also state this supply chain activity that there are three functions in the marketing function: the exchange

function, the physical function, and the facility function. This supply chain activity is in line with the process of supply chain activity in the sago agro-industry. It is stated that the supply chain flow pattern consisting of raw material flow, product flow, financial flow, and information flow is going well and smoothly (Timisela *et al.*, 2014). The flow of information related to market price info, goods availability, and payment systems. California Papaya information, goods, and money flow can be seen in Table 2, while supply chain conditions can be seen in Table 3.

Table 2 California Papaya information, goods, and money flow at KN Jaya Farm, 2022
Types of Flow Commodities

Information	California Papaya	Money Item
Marketing information from the market to the distributor because <i>suppliers</i> routinely send California Papaya every day to KN Jaya Farm	Distributors take California Papaya from farmers and <i>suppliers</i> every day	Money was paid in cash after the papaya arrived at the KN Jaya location

Source: Primary Data (Processed)

In line with what was researched by Wuwung (2013) mentions the same thing in the supply chain, an efficient operation of the supply chain depends on the full and accurate flow of information data related to the product requested from the retailer to the customer.

Table 3 Supply chain condition flow

Descriptive Analysis	Papaya California
Structure	Supply chain actors consist of farmers, suppliers, and distributors
Supply Chain Management	-KN Jaya Farm's cooperation with farmers and suppliers based on a belief system -Transaction system that is for one day and paid in cash - The quantity of supply, standard, and delivery time have been determined
Supply Chain Resources	-Each supplier fosters farmer partners in turn so that it can supply California Papaya sustainably -Some suppliers cultivate California Papaya directly, and some buy directly from local farmers so that they can supply California Papaya to KN Jaya Farm
Chain Business Process	The supply chain process at California Papaya is carried out in a general trading pattern starting from farmers being sold to suppliers and then selling to distributors KN Jaya Farm.

2.2.2. Supply Chain Performance with SCOR Method

The supply chain process using the SCOR method consists of five processes: planning, sourcing, making, delivering, and returning. Supply Chain SCOR method also means the process of purchasing, sourcing, production, and distribution through the flow of materials and information (Miradji, 2014). Supply Chain Management Analysis at PT. Monier in Sidoarjo Balance Economics, Business, Mgt, and Acc. J.10p 19. The SCOR component can be seen in Table 4.

Table 4 Components of the Supply Chain Operation Reference (SCOR)

Marketing Agency	SCOR Components (Planning, Procurement, Shipping, and Returns)
Farmer	Farmers needed to calculate the right time and situation to plant California Papaya.

Supplier	Suppliers plan, procure, and ship California Papaya to KN Jaya Farm. The delivery process is carried out by the supplier using a truck. Delivery of California Papaya to KN Jaya Farm requires transportation costs; the supplier pays transportation costs. The goods that do not pass the sorting will be returned to the supplier or deducted 15% from the original price because they do not meet the criteria.
Distributor	Planning and procurement are held in order to supply and distribute California Papaya. If goods are damaged during delivery, then according to the agreement, the selling price is reduced, but the buyer receives all the goods.

Source: Primary Data, 2022 (Processed)

A performance matrix can measure supply chain performance at KN Jaya Farm; several components include order fulfillment lead time, order fulfillment cycle, supply chain flexibility, cash-to-cash cycle time, and daily inventory. The calculation of the California Papaya SCOR matrix at KN Jaya Farm can be seen in Table 5.

Table 5 Calculation of the California Papaya SCOR matrix at KN Jaya Farm

No	Matrix	Actual Value	Target/Ideal	Matrix Achievements
1	% Orders fully shipped	98%	95%	103% *
2	% Delivery performance on schedule	95%	100%	95% **
3	% Number of requests fulfilled	98%	100%	98% **
4	% Perfect condition	97%	95%	102% *
5	%Orders sent are complete and on time	98%	95%	103% **
6	% California Papaya stockpile	99%	100%	99% **
7	% Product delivery problems	5%	10%	0,5% *
8	% Percentage of defective products	2%	5%	2,5% *
9	% Returns of damaged products	2%	7%	0,28% *

Source: Primary Data, 2022 (Processed)

Description :

*Meets SCOR reference standards

**Has not met SCOR reference standards

Matrix: The component used to calculate the SCOR matrix

Actual value: The value obtained from the average supplier's final result

Ideal target: The standard of value used as a reference

Matrix achievement: Final value in SCOR calculation

Table 5 shows that metrics no, 1,4,5,7,8, and 9 have met the ideal target as recommended (67 %), but matrix components 2, 3, and 6 still need to be met (33 %). The delivery performance has not been following the schedule (point 2) due to the constraints of a relatively long distance from the farmer's location to KN Jaya Farm, namely the location from Sumberjo Village is 345 km away, the Tanggamus location is 365 km, and the Right Way is 440 km. Distance constraints are a severe concern because distance differences require serious handling. This was also revealed by Goni *et al.* (2022) that transportation plays an essential role in the supply chain context because it is infrequent for a product to be produced and consumed in the exact location. Therefore, a successfully implemented supply chain strategy must require proper transportation management. In addition to distance constraints, the delivery process is also constrained by the schedule of crossing queues from Sumatra Island to Java Island. This was also expressed by Simbolon *et al.* (2022) in a study that concluded that one of the factors for the effectiveness of an integrated intermodal transportation node is the connectedness/affordability factor (connectivity) which influences an effective intermodal transportation node. Thus KN Jaya can focus more on sources of papaya procurement in West Java and Banten, which do not require connectivity between modes of transportation. The percentage of KN Jaya's demand has yet to be met (point 3) because the location of the area

of origin Sukabumi and Cianjur districts are still experiencing the *Fusarium* outbreak, so many papaya farmers in that location failed to harvest. The supply at KN Jaya still needs to be met (point 6) due to the impact of the unmet number of shipments from suppliers. Thus, to minimize the fulfillment of supply chain criteria, an external strategy is needed, namely mapping marketing areas that are not affected by disease attacks. In papaya plants resulting in crop failure. This is in line with what Domnina *et al.* (2022) conveyed: through supply chain risk management strategies, the focus should be on external environmental analysis and supply chain sustainability.

Based on the results in Table 5, it can be concluded that the supply chain performance of fulfilling orders for KN Jaya Farm suppliers is better than equivalent research conducted by Abi Anwar *et al.* (2022), which stated that the results of measuring the performance of PT. ABCXYZ with the SCOR method on the perfect order fulfillment metric component of 88%. The achievement of meeting standards following SCOR recommendations in the marketing supply chain is strongly supported through the use of marketing technology using electronic media, as Purwanto & Ismail (2020) revealed that the perception of the use of E-Marketplace applications affects the perception of consumer benefits. This is because the ease of operation of E-marketplace services affects users; moreover, sales and purchase transactions become more effective and efficient. Business actors supplying papaya to KN Jaya Farm can take advantage of a good distribution network model in the e-commerce business and provide quality services through a fast and low-cost delivery period for equipment and materials to consumer locations that can provide more competitive prices for customers (Abdul & Evitha, 2019). In the end, the goal to be achieved from an integrated supply chain management, among others, is to guarantee that products are received by consumers at competitive prices, fast, of good quality, and easily accessible. One of the things that can be used as an indicator of success is cost efficiency along the supply chain so that product prices at the consumer level become competitive (Budiono & Syaichu, 2016). Identical to the papaya commodity, corn products from farmers to final consumers must be able to be carried out at an efficient cost. The use of supply chain technology can also be used Blockchain technology in line with what was conveyed in the agricultural product supply chain research that for practitioners to adopt blockchain technology to carry out agricultural supply chains during pandemic situations.

4. CONCLUSION

The Marketing function is the exchange function in the form of purchase activities carried out by suppliers; all marketing actors carry out the sales function. Suppliers and distributors carry out the physical function in the form of packaging, and all marketing actors carry out transportation. The facility's function is that farmers and suppliers carry out financing, suppliers and distributors carry out standardization, suppliers and distributors carry out risk insurers, and all marketing actors carry out market information. California Papaya supply chain processes consist of information, goods, and money flows. California Papaya marketing information starts from retail requests to distributors and then is informed to suppliers who have collaborated. The flow of California Papaya goods starts from the distributor buying California Papaya to farmers, and the supplier then sends it to the distributor and then sends it to retail. California Papaya money flow is paid in cash to the supplier after the distributor receives the California Papaya. California Papaya supply chain actors consist of farmers, suppliers, distributors (KN Jaya Farm), and retailers. Supply chain performance, such as planning, procurement, shipping, and returns, has proceeded according to the criteria in each supply chain institution. The achievement value on each matrix component has shown results that follow the standards recommended by SCOR as much as 67% of the total matrix components, namely the matrix of fully delivered orders, the perfect condition of goods, orders sent entirely and on time to KN Jaya consumers, product delivery constraints, percentage of damaged products and product returns. Meanwhile, 33% have yet to reach the standard,

namely delivery performance according to the schedule, the number of requests met, and the supply of California Papaya in KN Jaya.

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