



The analysis of supply chain of palm oil in PT. Tribakti Sarimas, Riau

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ABSTRACT

Supply chain at PT Tribakti Sarimas there are problems in the flow of materials. This research aims to identified supply chain and determine the priority of supply chain strategies at PT Tribakti Sarimas. This study has been conducted at PT Tribakti Sarimas Kuantan Singingi District Riau Province. The research methods used were qualitative descriptive. The respondents for this study are 30 farmers, 5 collectors, and 4 employees of PT Tribakti Sarimas. This research has shown that the supply chain of rubber at PT Tribakti Sarimas in Kuantan Singingi include farmers, collectors, PT Tribakti Sarimas amd consumers. The internal factor evaluation matrix has total score of 2.6919, while the external factor evaluation matrix has total score of 2.3707. The supply chain management strategy result at PT Tribakti Sarimas with AHP method shows that the chosen quantity weight is 0.279 and the chosen main alternative is the company maximizes the use of facilities and infrastructure to improve the quality of CPO with the weight is 0.165. Companies must pay attention to the quality of CPO by utilizing company facilities and infrastructure.



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INTRODUCTION

Palm oil (*Elaeis guineensis*) is one of the crops grown in Indonesia. Indonesia has a palm oil production in 2020 of 49,117,260 tons. Year⁻¹ and the planted forest area is 14,996,010 ha (General Departement of Curtivation, 2020). The largest producer of palm oil in Indonesia is Riau province. One of the districts where oil palm is grown is Kuantan Singingi Regency with an area of 82,503 hectares with a yield of 129,157 tons (BPS, 2019).

PT Tribakti Sarimas is a palm oil processing company located in Kuantan Singingi Regency. This company processes palm oil into *crude palm oil* (CPO). Raw materials for CPO processing come from farmers through traders, then the raw materials are processed into *palm oil* and distributed to a number of domestic and foreign oil and gas companies.

Each of these actors will form a supply chain network. According to Negara et al., (2017), supply chain is a concept of implementing an integrated logistics system. There are three types of flows that must be managed in the supply chain, namely material flows, financial flows and information flows (Siswandi et al., 2019). The flow of material at PT Tribakti Sarimas comes from several areas in Riau, the FFB in the company is an old palm oil mill. This makes CPO raw materials reduced and companies need to source materials from outside. FFB originating from outside the region is not in accordance with factory standards (the level of maturity of fruit such as raw fruit and rotten fruit) so that the quality of the CPO produced is not good. The distribution of material from the plantation to the factory is not optimal, this results in raw materials not arriving at the factory on time, thus disrupting the CPO production process.

The application of the concept of supply chain management is necessary to meet consumer demand for agricultural products, both as raw materials for the agricultural industry, and demand for fresh produce that can be consumed directly, so that supply chain participants can benefit from upstream (farmers) to downstream (end consumers). A supply chain is defined as a series of decision-making processes related to the flow of materials, information, and money that are taken together to continuously get a product into the hands of the final consumer (Shoffiyati et al., 2019).

Supply chains will function smoothly if there is certainty about supply and demand (Noviantari et al., 2015). The factory must maintain the supply chain so that it can function smoothly, at PT Tribakti Sarimas this supply chain does not run smoothly, causing delays in the products to be sent to consumers. This happens because the distribution of FFB from plantations is often delayed so that it hampers the CPO production process. In the management of FFB, there is a maximum time limit of 24 hours from the time the FFB is harvested. If it exceeds this time, it can increase the FFA of CPO (Hudori, 2015). The product must be manufactured in the right quantity, at the right time, and in the right place with the aim of achieving minimal system overhead. Supply chain management can overcome inventory problems so that products are always available and consistent with consumer demand (Santosa and Herjanto, 2018).

Based on Tahir and Mundiya (2020) research on supply chain relationship analysis on seaweed quality in Bantaeng Regency with the SWOT method, the supplier has a role in determining product quality. Furthermore, Siswandi et al. (2019) research on the development of supply chain management for Kintamani Bali Arabica coffee with the AHP method shows that the criteria for increasing added value, alternative reliability, and process quality performance indicators are priorities that play a role in developing a competitive Kintamani Arabica coffee supply chain management system.

This study aimed to identify supply chain flows and prioritize supply chain strategies for oil palm at PT Tribakti Sarimas, Kuantan Singingi Regency.

METHOD

This study was carried out at PT Tribakti Sarimas, Kuantan Mudik District, Kuantan Singingi Regency, Riau Province. This study was carried out by field observations with qualitative descriptive analysis. Qualitative descriptive analysis was performed using the SWOT (*Strengths, Weaknesses, Opportunities, Threats*) method to characterize the palm oil supply chain at PT Tribakti Sarimas and develop alternative corporate strategies by combine strengths and weaknesses with opportunities and threats and *an analysis of process* (AHP) system to determine the outcome of the weighting of strategic priorities.

Sampling method is done by *purpose sampling*, which is a sampling technique that is suitable for the research objectives set forth by the researcher. Respondents to collect data are individuals from stakeholders. The questionnaire was distributed to the respondents including 30 oil palm farmers, 5 collectors, 4 employee PT Tribakti Sarimas.

The data used in this study is divided into two data sources, namely primary data and secondary data. Primary data is collected in several ways, namely field observations and interviews, while secondary data is collected through literature studies.

The data analytics used is to define the supply chain using the four basic elements of the supply chain, *strength, weakness, opportunity, threat* (SWOT) and *analytical hierarchy* (AHP).

RESULT AND DISCUSSION

Supply Chain Network Structure

Supply chain network structure can be formed through members with respective roles. Actors in the palm oil supply chain include farmers, collectors and PT Tribakti Sarimas to consumers. The structure of the supply chain network can be seen in Figure 1.



Figure 1 Supply Chain Network Structure

Figure 1 shows that the supply chain at PT Tribakti Sarimas only has 1 chain. The scope of supply of PT Tribakti Sarimas includes farmers, traders and PT. Tribakti Sarimas is an industry that processes palm oil into CPO. Meanwhile, the supply chain coverage of the CPO starts from raw material suppliers, other companies as importers, distributors, *retailers* to consumers.

The palm oil supply chain at PT Tribakti Sarimas begins with farmers. Farmers are the main source of raw materials in the form of fresh fruit bunches (FFB) for PT Tribakti Sarimas. Oil palm

farmers, this activity is supported by the Department of Agriculture with advice on farming techniques. Farming activities have not been implemented optimally by farmers due to limited resources of farmers. Clusters of fresh fruit sourced from community plantations (subsistence) cannot be sold directly to palm oil mills (palm processing) but must go through collectors (Pramana et al., 2021).

Collectors carry out activities to collect FFBs from some farmers to sell to factories. The collectors take the FFB to farmers' gardens every 10 days and are immediately delivered to PT Tribakti Sarimas. This company processes FFB into *crude palm oil*. This product is sent to companies producing cooking oils, vegetable oils (biodiesel, aptur and cosmetics).

According to Negara et al. (2017), the supply chain has 3 flows to manage, which are the flow of goods from upstream to downstream, the flow of finance from downstream to upstream, and the flow of information from upstream to downstream or vice versa. Figure 1 shows the flow of goods starting from farmers as FFB producers and then being sold to collectors. FFB was collected by collectors sold to PT. Tribakti Sarimas. If the availability of raw materials matches the production capacity, the product supply chain will operate smoothly and on time to the consumer (Ningsih et al., 2021).

Financing flow starts from PT Tribakti Sarimas to collectors by transfer bank and manual payments from collectors to farmers in accordance with the number of FFBs sold. Information flows occur from farmers to collectors, traders to PT Tribakti Sarimas, PT Tribakti Sarimas to other companies or vice versa. The relationship between each party in the supply chain will communicate, the Farmer and the collector will inform the FFB quantity and the price, while the collector and PT Tribakti Sarimas will inform the FFB quantity, the price and quality of the FFB and receive information on the availability of raw materials. exactly so that doesn't happen. delay in production.

Business Process

The supply chain business process has two assessments, namely the cycle review and the push/pull assessment. An overview of the cycles occurring at PT Tribakti Sarimas can be seen in Figure 2.

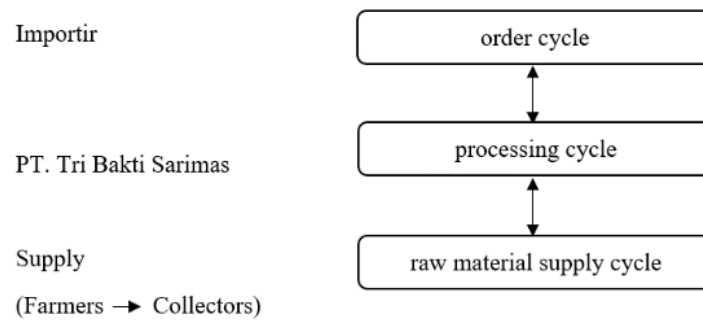


Figure 2 An overview of the oil palm supply chain cycle at PT Tribakti Sarimas

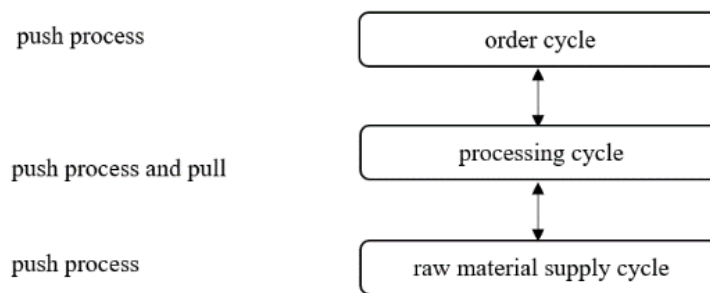


Figure 3 An overview of the push/pull of the palm oil supply chain at PT Tribakti Sarimas

The members of the palm oil supply chain participating in the cycle assessment are the suppliers of raw materials (farmers and traders), *crude palm oil* (PT. Tribakti Sarimas) and cooking oil companies or companies. is different. The raw material inventory cycle is provided by farmers through collectors traders. Meanwhile, the processing cycle continues to match the raw material *input of the CPO inventory*. The ordering cycle is carried out by the cooking oil company with PT Tribakti Sarimas by unifying the quantity of orders for CPO. Then PT Tribakti Sarimas fulfills the order of cooking oil company.

A push/pull review took place at PT Tribakti Sarimas. Push review occurs during raw material inventory cycle and in this cycle collectors trade FFB for PT Tribakti Sarimas without any order, in process cycle there is push and pull. Pushing occurs when the factory produces CPO for storage, while pulling occurs when ordering from cooking oil companies or other companies. The order cycle taken by cooking oil companies or others is an accelerated process. The push process is an activity to predict consumer orders (Pamungkassari et al., 2018). The pull process is a consumer response/request (Brown et al., 2005).

An overview of the push/pull operation can be seen in Figure 3.

Chain resources include physical resources and human resources. Physical resources include available natural resources, processing facilities, transportation vehicles, auxiliary materials, and others. Meanwhile, human resources at PT Tribakti Sarimas are led by a director with the help of 3 managers namely factory department manager, livestock department manager and field manager and administrative manager. This company has a workforce of 250 people.

Chain Management

Corporate applies contractual arrangements to cooking oil companies or other companies. Contractual agreement includes order quantity, agreed price, delivery time and other issues. PT Tribakti Sarimas does not implement a contract system with raw material suppliers, namely farmers and traders.

SWOT Analysis

Internal and external factors of palm oil supply chain

Determining the internal and external factors of the company is very important to get an

overview of the company. According to Purnomo et al. (2014) assessed internal and external factors with analysis of *internal factor assessment* (IFE) and *evaluation of external factors* (EFE) to obtain a score for each factor. This assessment is used to determine the degree of influence of internal and external factors on the palm oil industry at PT Tribakti Sarimas. The following calculation of *the internal factor assessment* can be seen in Table 2.

Based on Table 1, the main strengths of PT Tribakti Sarimas are adequate machinery, equipment and infrastructure with a score of 0.5042, this company updates and maintains machinery and equipment in order to launch crude palm oil production. While the main weakness of this company is irregular fertilization. The score

obtained from the irregular fertilization factor was 0.1821. This is because many farmers rarely fertilize their oil palm plantations, thereby reducing the quantity of FFB harvested. The total score in Table 1 shows that the company is quite able to take advantage of its strengths to control its weaknesses. According to David (2011), if the total score of internal factors is > 2.5 , the company is still in a strong position to take advantage of strengths and minimize existing weaknesses.

Evaluation of external factors including opportunities and threats is done by scoring on the EFE matrix. The following calculation of *the external factor assessment* (EFE) can be presented in Table 2.

Table 1 Calculation matrix internal factor evaluation (IFE) of supply chain palm oil

| No | Strenght | Weight | Rating | Score |
|----------|--|--------|--------|---------------|
| 1 | Demand employment | 0,1176 | 4 | 0,4706 |
| 2 | Adequate machinery, equipment and infrastructure | 0,1261 | 4 | 0,5042 |
| 3 | Availability of experienced workforce | 0,1092 | 4 | 0,4006 |
| 4 | Area and land conditions that support | 0,1092 | 4 | 0,4006 |
| 5 | The company raises cattle in oil palm plantations | 0,1176 | 3 | 0,3529 |
| Weakness | | Weight | Rating | Score |
| 1 | Lack of knowledge in oil palm cultivation techniques | 0,1092 | 1 | 0,1457 |
| 2 | Low technology adoption | 0,1008 | 1 | 0,1008 |
| 3 | Irregular fertilization | 0,1092 | 2 | 0,1821 |
| 4 | Irregular maintenance | 0,1008 | 1 | 0,1345 |
| Total | | 1,0000 | | 2,6919 |

Table 2 Calculation matrix external factor evaluation (EFE) of supply chain palm oil

| No | Opportunities | Weight | Rating | Skor |
|--------|--|---------|--------|---------------|
| 1 | High export demand | 0,1327 | 4 | 0,4864 |
| 2 | Unlimited PKS capacity | 0,1224 | 4 | 0,4490 |
| 3 | Opening opportunities for patnering with government and private bodies | 0,1122 | 4 | 0,4490 |
| 4 | Expansion of land is still available | 0,1020 | 3 | 0,3061 |
| Threat | | Weight | Rating | Skor |
| 1 | Natural disasters and weather | 0,0816 | 1 | 0,0816 |
| 2 | Competitor country's production efficiency is higher | 0,1020 | 2 | 0,1701 |
| 3 | Industrial raw materials are getting limited | 0,1224 | 1 | 0,1224 |
| 4 | Palm oil price are unstable | 0,1429 | 1 | 0,1429 |
| 5 | Long queues at palm oil mills (PKS) | 0,00816 | 2 | 0,1633 |
| Total | | 1,0000 | | 2,3707 |

Table 2 shows that the main opportunity for external factors is high export demand with a score of 0.4864. The export demand for *crude palm oil* is not commensurate with the available raw materials, leading to an imbalance between supply and demand for raw materials. The biggest threat is the higher production efficiency of the competitor country or the presence of a competitor with a score of 0.1701. According to Nugraha (2011), the better the quality of the manufactured product, the more accepted the product will be in the world market. If the quality is low, it will be difficult to compete with competing countries.

The EFE matrix shows an overall score for external factors of 2.3707, which means that external conditions are below average or the company's inability to take advantage of opportunities and avoid threats. According to Dewi (2020), the total score of external conditions is below 2.5 (average), so it is not possible to take advantage of opportunities and minimize threats from the external environment.

Developing a Palm Oil Supply Chain Management Strategy at PT Tribakti Sarimas Kuantan Singingi Regency

The factors identified by IFE and EFE are representative of the internal and external conditions of PT Tribakti Sarimas. These factors are then carried out a SWOT analysis to create a SWOT matrix.

Based on Figure 4, it shows that the SWOT analysis offers four strategies, that is, the company can form partnerships with available partners both private and government, company employees must implement the techniques cultivating to

company standards, the company makes maximum use of facilities and infrastructure to improve the quality of the CPO, and company employees must increase their knowledge by participating in consultations. various studies and research.

Prioritizing the oil palm supply chain management strategy at PT Tribakti Sarimas Kuantan Singingi Regency

The prioritization of criteria elements and alternative strategies is done using *Analytical Hierarchy Process (AHP)* with application expert choice 11. This hierarchy is based on observations and interviews as well as literature studies.

This hierarchy consists of three levels, *objective*, criterion and alternative strategy. Level I *Objective* is the preferred strategy for palm oil supply chain management at PT Tribakti Sarimas, Kuantan Singingi Regency, province of Riau. The next level II is to identify the appropriate criteria to be considered in the palm oil supply chain. These criteria include cultivation, human resources, quality, quantity and price. Level III is an alternative strategy consisting of seven alternatives obtained from the SWOT matrix. As an alternative, companies can establish partnerships with existing partners, both private and government, the company's employees must practice farming techniques according to the company's standards. The company makes maximum use of the facilities and infrastructure to improve the quality of CPO and the company employees must increase their knowledge by participating in various consulting and training. The following hierarchy and weighting results can be seen in Figure 5.

| | | |
|--|--|---|
| Internal Factor | Strenght 1. High labor absorption 2. Adequate machinery, equipment and infrastructure 3. Availability of experienced workforce 4. Areas and land conditions that support 5. The company raises cattle in oil palm plantations | Weakness 1. Lack of knowledge in oil palm cultivation techniques 2. Low technology adoption 3. Irregular fertilization 4. Irregular maintenance |
| Faktor Eksternal Opportunity 1. High export demand 2. Unlimited PKS capacity 3. Opening opportunities for partnering with government and private bodies 4. Expansion of land is still available | SO Companies can establish partnerships with available partners, both private and government | WO Company employees must carry out cultivation techniques according to company standards |
| Threats 1. Natural disasters and weather 2. Competitor country's production efficiency is higher 3. Industrial raw materials are getting limited 4. Palm oil prices are unstable 5. Long queues at palm oil mills (PKS) | ST The company maximizes the use of facilities and infrastructure to improve the quality of CPO | WT Company employees must increase their knowledge by participating in various counseling and trainings |

Figure 4 SWOT Matrix of supply chain palm oil

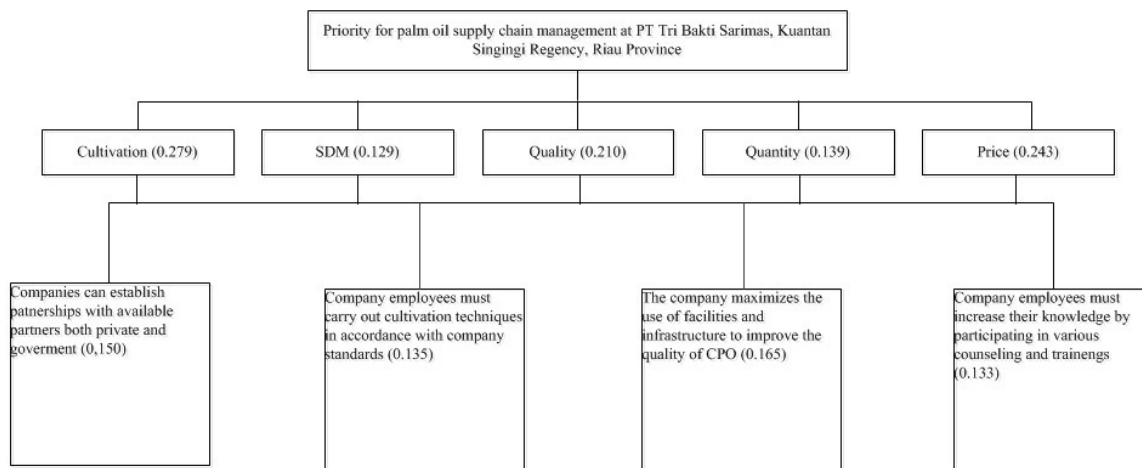


Figure 5 Analytical Hierarchy Process (AHP) of supply chain palm oil

Based on the results of data processing using expert choice 11, the priority of alternative strategies recommended is that the company maximizes the use of facilities and infrastructure to improve the quality of CPO with a weight of 0.165 and the main criterion is cultivation with a weight of 0.279.

CONCLUSION

Based on the results of the study, it can be concluded that the flow of the oil palm supply chain includes farmers, traders and PT Tribakti Sarimas. The results of developing a palm oil supply chain management strategy at PT Tribakti Sarimas with AHP method show that the company makes maximum use of facilities and infrastructure to improve CPO quality with a weight of 0.165 and criteria is farming with a weight of 0.279.

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