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PERFORMANCE IMPROVEMENT STRATEGY OF SUPPLY CHAIN MANAGEMENT IN SEI GALUH PALM OIL MILL, PT PERKEBUNAN NUSANTARA V

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Abstract: Palm oil becomes Indonesia's leading agricultural commodity which is inseparable from competition with CPO producers from other countries. PT Perkebunan Nusantara V (PTPN-V) is a state-owned company engaged in palm oil plantation and processing palm oil fresh fruit into crude palm oil (CPO) and palm kernel (palm kernel). One of the 12 palm oil processing units of PTPN-V is the Sei Galuh Palm Oil Mill (PKS SGH), in the past 5 years the plant has the lowest performance compared to 12 other factories. Therefore, the purpose of this research is to analyze the supply chain of PKS SGH and performance improvement strategy of supply chain management at the PKS SGH through SCOR-AHP approach. The result shows that supply chain strategy in this research is to run lean supply chain strategy because the output is a functional product. So the strategy applied was should low cost strategy (efficient). The result of performance measurements obtained matrix order fulfillment, quality conformity, processing cycle time, and employee costs is "good". Then, matrix order fulfillment time, flexibility of capacity increase and cash to cash cycle is "average"; while matrix supply flexibility and cost of processing were obtained "poor" results.

Keywords: supply chain, SCOR, AHP, crude palm oil (CPO), PTPN-V

Abstrak: *Minyak kelapa sawit sekarang ini menjadi komoditas pertanian unggulan Indonesia yang tidak terlepas dari persaingan dengan para produsen CPO dari negara lain. PT Perkebunan Nusantara V (PTPN-V) merupakan badan usaha milik negara yang bergerak di bidang perkebunan dan pengolahan kelapa sawit yang mengolah tandan buah segar (TBS) kelapa sawit menjadi minyak sawit (crude palm oil / CPO) dan inti sawit (palm kernel). Salah satu unit usaha dari 12 pengolahan kelapa sawit PTPN-V adalah Pabrik Kelapa Sawit Sei Galuh (PKS SGH), selama 5 tahun terakhir pabrik ini memiliki kinerja terendah dibanding 12 pabrik lainnya. Oleh karena itu, tujuan dari penelitian ini adalah menganalisis rantai pasok kinerja PKS SGH untuk merumuskan strategi peningkatan kinerja manajemen rantai pasok di PKS SGH PTPN-V melalui pendekatan metode SCOR-AHP. Hasil uji identifikasi strategi tipe supply chain dalam penelitian adalah menjalankan strategi lean supply chain karena produk yang dihasilkan merupakan produk fungsional. Pengukuran kinerja diperoleh hasil matriks pemenuhan pesanan, kesesuaian mutu, waktu siklus pengolahan dan biaya karyawan bernilai good. Kemudian matriks waktu pemenuhan pesanan, fleksibilitas peningkatan kapasitas dan siklus cash to cash menunjukkan nilai average, sedangkan matriks fleksibilitas pasokan dan harga pokok pengolahan diperoleh nilai poor.*

Kata kunci: *rantai pasok, SCOR, AHP, minyak kelapa sawit, PTPN-V*

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INTRODUCTION

Palm oil commodities are an important aspect in meeting the needs of food and non-food industries that are widely traded in the world. The prospect of palm oil is still very potential where the countries of China and India as the world's biggest importers of palm oil are not affected by environmental issues currently developing (Chalil, 2015). In addition, an increase in Indonesia's population will also increase demand for palm oil in the coming years (Widodo et al. 2010).

The prospect of palm oil commodities in the world trade of potential vegetable oils has greatly encouraged the Indonesian government to spur the development of the domestic palm oil industry. PT Perkebunan Nusantara V (PTPN-V) is a state-owned enterprise engaged in plantation and palm oil processing which processes fresh fruit bunches (FFB) of palm oil into crude palm oil (CPO) and palm kernel. The total production of PTPN-V CPO in 2015 reached 358 million tons through 12 palm oil processing plants spread in 5 (five) districts in Riau. One business unit of 12 palm oil processings of PTPN-V is the Sei Galuh Palm Oil Mill (PKS SGH) with an installed engine capacity of 50 tons of FFB / hour, but it is over the past 5 years the plant has the lowest performance compared to 12 other factories. Fulfillment of the SGH PKS raw material supply is done through empowering three plantation sources, namely the Nucleus Estate, Plasma Gardens and Third Party FFB Purchases.

Jakfar et al. (2015) revealed that the factors that influence the increase in competitive advantage of oil palm are the productivity of the palm oil plantation itself, allocation of investment and operating costs, PKS capacity and yield of CPO. However, the problem that arises at this time is that the SEI Galuh Center Garden is replanting an area of 1,505 Ha and the rest that has not been replanted despite entering the age of old plants with low productivity. Likewise what happens to Plasma Gardens that have entered the age of old plants with very low productivity. This resulted in the supply of palm oil FFB raw material to SGH VFD to meet factory capacity and CPO production was not achieved. In addition, SGH VFD machines and equipment are often damaged so that factory capacity does not match those installed. The processing of oil palm FFB is below the factory capacity resulting in inefficient operational costs so that the profits obtained by the company are not optimal. The planned data and realization of processing of oil palm FFB SGS PKH can be seen in Figure 1.

Based on the above data it is known that for the past four years the realization of SGH MCC processing has never reached the set target. SGH MCC is faced with problems in managing supply chain management where most of the SGH MCC raw materials are currently supplied through the purchase of FFB from external partners. Competition in obtaining oil palm FFB that matches the quantity and quality around PKS SGH is quite high.

Supply chain management (SCM) is one of the approaches that can be used to understand the flow process and the transfer of goods from the raw material stage to the final consumer (Afrinando, 2012). The supply chain in understanding industry is all parties and processes and functions involved, both directly and indirectly in the fulfillment of products expected by customers (Chopra and Meindl, 2013). In order to obtain maximum performance, companies need to harmonize competitive strategies with their supply chain strategies. The supply chain of agricultural products is different from the supply chain in manufacturing products. Marimin and Maghfiroh (2013) state that there are two types of agro-industry supply chains, namely supply chains for fresh products and supply chains for processed agricultural products such as CPO. Lembito (2013) revealed that the Supply Chain Management model is a business strategy to improve the competitiveness of palm oil agroindustry in Indonesia.

Figure 1. Plans (■) and realization (■) of oil palm FFB processing in SGH PKS

Based on the description and conditions that have been stated, it is necessary to do the right strategy research, in order to ensure the smooth production in the SGH VFD. The formulation of the right strategy requires accurate performance measurement periodically. Supply chain performance measurement is fundamental, this is needed to determine the position of the company's performance and the direction of continuous improvement and performance improvement that is in accordance with the conditions of the company (Van de Vorst, 2002).

The SCOR model is a reference model of supply chain operations. SCOR is able to map supply chain parts. Basically SCOR is a process-based model. This model integrates three main elements in management, namely business process re-engineering, benchmarking, and process measurement into the framework of functional traffic in the supply chain (Paul, 2014). SCOR method is one method used to measure the supply chain performance of an agricultural commodity (Irfan et al. 2008; Handayani, 2014; Sari et al. 2014; Suryaningrat, 2015). The SCOR method requires the actual data from the company using supply chain performance based on five metrics, namely supply chain reliability, supply chain responsiveness, supply chain agility, supply chain costs and supply chain asset costs where each of them has several performance assessment attributes (Bourne et al. 2003; Nugraha, 2015).

This study aims: 1) Identify the type of supply chain in SGH MCC and its supporting factors; 2) Measuring the performance of the SGH MCC supply chain using the Supply Chain Operations Reference (SCOR) method; 3) Develop strategies for improving supply chain performance in SGH MCC.

The scope of this research is limited to the level of supply chain implementation, starting from the procurement of oil palm FFB until the processing process becomes Crude Palm Oil (CPO) and palm kernel (palm kernel), until the storage of CPO in the tank is deposited with data.

METHODS

This research was carried out at the Sei Galuh palm oil mill PT Perkebunan Nusantara V. The choice of location was done intentionally (purposive). This research was conducted using descriptive methods using primary and secondary data. The collection of data and information is carried out in several ways, namely in-depth interviews with respondents, Observation methods, namely by collecting data through direct observation at the research location, and literature studies conducted to obtain information theoretically. The sampling technique of respondents was done by purposive sampling. This is done by considering that the respondents' concerned have experience, expertise and competency so that they are considered representative to answer the questions in the questionnaire.

Data analysis carried out in this study: 1) Qualitative descriptive analysis to identify the structure and role of the supply chain supported by the opinion of the resource person (General Manager and relevant Managers in SGS SGS) and through field observations; 2) Analyzing the type of supply chain with a questionnaire and the formula model that has been applied by Huang et al. (2002); 3) Assessment of supply chain performance using analysis of the Supply Chain Operation Model (SCOR) approach with performance attributes measured are reliability, responsiveness, agility, cost, and assets. The actual value of performance metrics is formed in the percentage of the target; 4) Formulation of strategies through Focus Group Discussion (FGD), assessment of alternative strategies through expert opinion based on the AHP questionnaire processed with PRIEST (Preference Elicitation using Pairwise Comparisons) software (Siraj et al. 2015). Based on the description of the research background and method of analysis, the frame of mind in this study can be seen in Figure 2.

RESULTS

Identification of Supply Chain Types

Analysis of the results of the data using a model of determining the supply chain strategy with a product type approach developed by Huang et al. (2002) obtained results from respondents consisting of General Manager, SGH PKS Manager, Core Garden Manager Sei Galuh, Plasma Manager Sei Galuh and PTPN-V Commercial Section Head that CPO products were functional products, which showed their handling should use the Lean Supply Chain type (LSC). The strategy set for functional products with type LSC uses a low cost strategy, which emphasizes the efficiency of production costs. An efficient strategy in SGH MCC can be seen in several characteristics such as product inventory, manufacturing (process) and supplier selection.

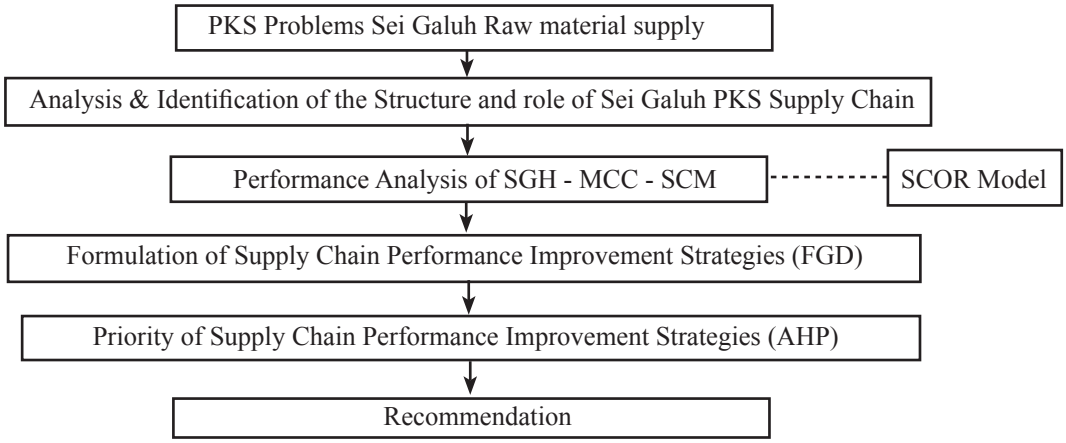


Figure 2. Research framework

The characteristics of the SGH MCC supply chain generally reflect LSC type supply chain characteristics that emphasize efficiency strategies, but there are still some things that must be done to support the supply chain in accordance with LSC supply chain types such as a review of production capacity in terms of labor and engine capacity. The characteristics and strategies of the SGH MCC supply chain are reflected and implemented in the factors that support the supply chain performance. The factors that support supply chain performance in SGH MCC are facilities, inventory, transportation and prices.

1. Facilities

The production process facility is located in an area of 19 ha with a current installed capacity of 50 tons of FFB / hour and began operating in 1990. Facilities in the production and inventory process at SGH VFD are located in one location aimed at increasing efficiency. PKS SGH has a palm kernel production facility with a capacity of 1,000 m^3 and all of them are located in the same location, namely in the Village of Majapahit, Kampar District, Kampar District, Riau Province. SGH VFD inventory facilities consist of 2 tanks of CPO stockpiles with a capacity of 5,000–10,000 tons, while tank timbun in the port is owned by PT SAN which is a partner of PTPN-V but is structurally connected. This is because the tank deposit at the plant will serve the port storage tank so that it can adjust to the product shipping schedule. Hadiguna (2009) revealed that the supply schedule from the factory has an important role, therefore to support the effectiveness of inventory management at the port, it is necessary to determine the time of re-ordering for filling the storage tank at the port.

2. Stock

Based on the supply chain characteristics, SGH MCC implements a minimum inventory of products, this is to maintain quality maintained in the storage area until delivery to customers. While the raw material in the form of fresh fruit bunches harvested comes from the nucleus, plasma plantations and third parties are stacked in loading ramps as raw material inventories, but are immediately processed to avoid deterioration due to the increase in free fatty acid levels.

3. Transportation

One of the driving factors for other supply chain performance is transportation, namely the movement of inventory from one place to another in the supply chain with various combinations of movements and routes. This is where there is a trade off between responsiveness and efficiency that is real, according to the type of functional product that emphasizes low costs but also requires high responsiveness to consumer needs. Then the selection of transportation routes for the transport of CPO products and palm kernel is through land transportation, while for product delivery out of the island, consumers will take it themselves to the SAN Dumai port tank using transporasti laut (tanker). Procurement of raw materials in the form of FFB from various sources (Core Gardens, Plasma Gardens and Third Parties) uses its own transportation, namely by land and directly delivered to the factory to be processed directly into CPO and palm kernel.

4. Price

The product price on CPO products in SGH PKS has been determined based on the overall CPO production from

12 factories at PTPN-V, except for the price of products that do not match the quality (claims) of consumers if they cannot be reprocessed at the factory, 20% below the tender price. The price of purchasing raw materials depends on the price of FFB in the market and the level of competition between palm oil mills. Competition around PKS SGH is quite high, especially in terms of obtaining raw materials (oil palm FFB) according to the quantity and quality expected. Plasma farmers' prices can generally be controlled by companies because plasma farmers are already tied to the prices set by the Plasma-FFB Pricing Team, in contrast to the fluctuating FFB originating from independent smallholders. Hadiguna and Saqinah (2013) revealed that the price of FFB from independent smallholders was determined by collector traders who were accomplices of PKS outside large companies (PTPN V, PT Sinar Mas, PT Astra, PT Asian Agri) palm oil in Riau.

Performance Measurement of SGH MCC Supply Chain Management System

Performance measurement allows companies to assess whether supply chains can be better. Measurement of supply chain performance in SGH PKS is measured by the SCOR method which is carried out by evaluating five performance attributes, namely to measure attributes of supply chain performance reliability, responsiveness, flexibility to customers and suppliers, supply chain costs and asset management efficiency. The types of benchmarks used are the Karya Wihana Tirta PKS (PKS FWT) which is a competing palm oil mill around PKS SGH which has relatively new machinery and equipment with a capacity of 60 tons FFB/hour. The results of the SGH MCC supply chain performance measurement based on the measurement of effectiveness and efficiency using the SCOR method can be seen in Table 1.

Performance indicators categorized into the criteria of Poor, Marginal, Average, Good, or Excellent based on the measurement of supply chain performance Trienekens and Hvolby (2000).

SGH MCC Supply Chain Performance Improvement Strategy

Analysis of supply chain performance conditions is carried out through interviews with SGH MCC management, direct observation in the field, so that the objectives of the supply chain performance improvement that will be achieved in the SGH PKS are obtained. Based on AHP output (Figure 2) weights and priorities of determinants of supply chain performance in SGH MCC, it shows that reliability factors are the first priority.

While the second level is the cost factor, in line with the fact that CPO products are functional products with a lean supply chain approach emphasizing the low cost strategy (optimal production costs). The third rank is responsiveness, this factor is strongly related to the processing time cycle the speed of fulfillment of customer demand. It should be noted that high responsiveness generally will also lead to high costs. The last rating is assets, which is considered as a supporting factor of the increase in supply chain performance, because of the cash to cash cycle that affects the time of payment of production from consumers that will be used to purchase raw materials.

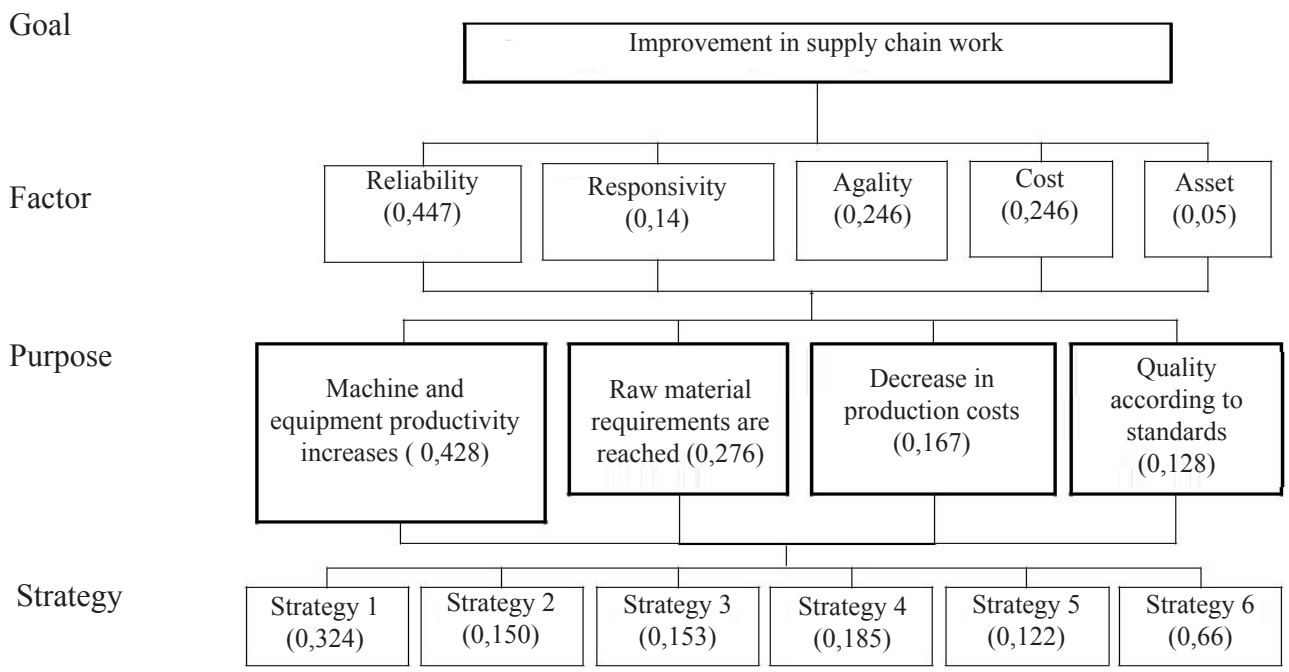
Weighting of objectives can be done to determine the importance of attachment among the four objectives to be achieved through improving supply chain performance. Based on the output from AHP, it can be seen that objective 1, the increase in machine and equipment productivity occupies the first priority with the highest average weight of 0.428, followed by goal 2, namely the fulfillment of raw materials with an average weight of 0.276. Then the third rank is goal 3, lowering production costs with an average weight of 0.167 and the last is goal 4 with an average weight of 0.128. The sequence illustrates that the initial goal that must be achieved is to increase the productivity of machinery and equipment, where the effort must be made is to repair machines and equipment in an integrated manner so that the processing can take place continuously and the product can be fulfilled on demand.

The next level of hierarchy is an alternative strategy in an effort to improve the performance of the SGH MCC supply chain. Based on the AHP analysis with the hierarchy that has been formed, the results of the weighting and priority strategies for improving the performance of the SGH VFD supply chain are obtained, where the strategy with the highest weight is integrated machine repair & equipment planning (0.324). The state of factory equipment and machinery is one of the determining factors for fulfilling product orders, both quantity and quality. If the VFD is damaged so that it stops processing, it will reduce the quantity of production so that the fulfillment of orders is not reached.

The second priority strategy is to add raw material suppliers (0.185). Adding suppliers of third party FFB raw materials is a strategic thing, because with the addition of suppliers it is expected that the factory will continue to process so that it can fulfill customer orders continuously. Then the third priority strategy is to improve servants to suppliers and buyers (0.153). SGH MCC services to raw material suppliers are process elements related to the mechanism and flow of company activities in receiving FFB. Good service in PKS will attract TBS suppliers such as the speed of the FFB loading queue, accurate weighing and objective sorting of each supplier. Hidayat et al. (2014) stated that there is a need for a stakeholder dialogue approach to obtain fair rewards for both parties, such as the main supplier of SGH MCC.

Table 1 The results of the SGH VFD SCOR performance matrix calculation

Performance Attributes	SCOR Metric	Performance	Benchmark	Indicators
Reliability	Order fulfillment	78%	Min 90 %	Good
	Quality Comformity	72%	NA	Good
Responsivity	Processing cycle time	85%	Min 90 %	Good (average)
	Fulfillment time order	27 days	18 days	66%(Average)
Agility	Increased flexibility capacity	66%	98 %	Average
	Supply flexibility	8 days	2 days	25 % (poor)
Cost	Cost of processing	Rp. 647,88	Rp. 250,-	39 % (poor)
	Employee costs	77%	NA	Good
Asset	Cash to Cash siclus	35 days	22 days	62% (Average)



Description:
Strategy 1. Planning for machine & equipment improvements in an integrated manner
Strategy 2. Normalization of the number of employees
Strategy 3. Improve servants to suppliers and buyers
Strategy 4. Add suppliers of raw materials
Strategy 5. Improve supervision of receipt of raw materials
Strategy 6. Review product contracts from customers

Figure 3. AHP hierarchy weight increase in supply chain performance in SGH PKS

The fourth strategy is the normalization of the number of employees (0,150). Rationalization of the number of employees is needed to increase effectiveness and efficiency in SGH MCC so that the cost of processing decreases and increases the purchase price of raw materials from suppliers. Then the fifth strategy is to increase supervision of the acceptance of raw materials (0.122). Increased supervision of raw material receipts is carried out so that the quality of raw materials to be processed into CPO products is guaranteed, this is in line with the objectives to be achieved, namely maintaining quality that is in accordance with standards. Next, the next strategy is to review product contracts from customers (0.066). The effectiveness of CPO sales will facilitate the processing process and also improve the supply chain performance of cash to cash. The sale price of production will affect the determination of the purchase price of FFB because it is one component in preparing the purchase price of FFB.

The priority strategy produced is not the best strategy and considers other strategies is not good, but this priority strategy is the most appropriate strategy to improve the performance of the SGH MCC supply chain with the support of other strategies in its implementation.

SGH MCC supply chain performance measurement is done to formulate the right strategy for SGH MCC in an effort to increase the competitiveness of SGH MCC. If the PKS is able to compete with similar industries, the SGH MCC will be able to develop to achieve the company's vision. The priority strategy produced is not the best strategy and considers other strategies not good, but this priority strategy is the most appropriate strategy to improve the performance of the SGH MCC supply chain supported by other strategies in its implementation.

Managerial Implications

Details of managerial implications that can be implemented are presented in Table 2. The implementation of strategies for planning engine and equipment improvements in an integrated manner on SGH PKS can be done through identification of all machines and equipment whose performance is less than optimal. Then revitalization activities can be coordinated with the head office (PTPN V). The activity is expected to increase productivity and decrease the production costs of SGH PKS.

Table 2. Strategies, programs and targets recommended of SGH PKS

Recommendation strategy	Program	Target
Planning repair machine & equipment In a manner Integrated	- Identify all machines equipment that as poorly optimal perform - Coordination with Sections Office Processing Technology Center to form a team factory revitalization	- Increased productivity factory machinery and equipment - Decrease/emphasis Production cost
Total Normalization of PKS employees Sei Galuh	- Dank factory employee rotation factory office to the garden - Coordination with the HR department and Sei Galuh plantation employees for employee transfers so according to the norm of the number of employees with a capacity of 50 tons of FFB / hour	- Increased productivity of machinery and factory equipment - Decreasing/suppressing Production Costs
Improve services to suppliers and buyers	- Speed up the queue for loading FFB - Accuracy in the process of weighing FFB - Update Quality Control testing - Reducing complaints from customers	- Fulfillment of raw materials - Quality products that meet standards
Adding raw material suppliers	- Looking for potential raw material suppliers around the Sei Galuh neighborhood - Pricing that competes with nearby factories - Make a special SOP for receiving FFB for PKS SGH	- Fulfillment of raw materials - Decreasing/suppressing Production Costs
Increasing Supervision of Acceptance of raw materials	- Employee periodic rotation of raw material sorting - Conduct periodic reviews of raw material supplies	- Fulfillment of raw materials - Quality products that meet standards
Evaluate product contracts with customers	Coordinate with the Commercial Office Headquarters together with the buyer for the revised contract of payment	Product quality according to standards

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The conclusions are as follows: Supply chain type is a lean supply chain with the strategy applied is a type of low cost strategy (efficient). Factors supporting supply chain performance in SGH MCC are facilities, inventory, transportation and prices. Performance measurement results obtained from the order fulfillment matrix, quality suitability, processing cycle time and employee costs are good. Then the order fulfillment matrix, flexibility in increasing capacity and the cash to cash cycle show average values, while the supply flexibility matrix and cost of processing are obtained by the poor value. Based on the FGD, six strategies for improving the performance of the SGH supply chain were obtained, with the priority of the chosen strategy being to improve machinery and equipment in an integrated manner.

Recommendations

Improvements in the performance of the SGH MCC supply chain are considered to be quite urgent to do, considering the SCOR performance values of each performance matrix are classified as average and there are even a few poor ones. Therefore an increase in the productivity of machinery and equipment is immediately carried out by planning integrated engine and equipment repairs.

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