

ANALYSIS OF CITRUS FRUIT SUPPLY CHAIN MANAGEMENT PERFORMANCE EFFICIENCY IN SIMALUNGUN REGENCY

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Abstract

The research aims to analyze the efficiency of supply chain management in determining the price of oranges in Simalungun Regency. The current study employs a causal effect research design. The sample consists of 126 orange farmers in Dolok Silou District, Simalungun Regency. The research utilizes Analytic Hierarchy Process (AHP) and Supply Chain Operations Reference (SCOR) analysis techniques. Findings indicate that the supply chain management of oranges in Simalungun Regency demonstrates high efficiency, particularly in planning, market demand responsiveness, production processes, and distribution. Alternative 3 consistently shows the highest performance across all matrices in AHP, reflecting excellence in these aspects. The SCOR results yield a final score of 0.2983, emphasizing the significance of planning (40%) and production (25%) in achieving overall supply chain efficiency. Responsiveness to market demand, effective planning strategies, and optimal production processes are crucial in determining efficient pricing, laying the groundwork for competitive advantages through operational efficiency and adaptation to local market dynamics.

Keywords : *Supply Chain Management, Analytic Hierarchy Process, Market Demand Responsiveness.*

1. INTRODUCTION

Agriculture plays a crucial role in Indonesia's national economy. Apart from producing food to meet societal needs, the agricultural sector contributes significantly to research and development aimed at enhancing productivity. Currently, agriculture ranks as the second most influential sector in Indonesia's economic growth, following manufacturing. It maintains a stronger position compared to trade and construction sectors. In the third quarter of 2021, agriculture continued to positively contribute to Indonesia's economy. This success is attributed to government efforts in outlining an agricultural roadmap to position Indonesia as the World's Food Barn by 2045 (PanganNews.id, 2022). However, Indonesian agriculture faces challenges, including a decline in workforce participation, with a 2.21% decrease noted in 2021 compared to a 0.51% decline in 2016. Additionally, constraints in the supply of high-quality and sufficient quantities of seedlings for various food crops continue to hinder agricultural development [1].

Efficiency management involves increasing productivity and effectively using resources to achieve organizational goals. It is crucial for an organization to implement good control and regulation to achieve efficiency [2]. Effective and efficient supply chain management is crucial in supporting the role of orange farmers in Simalungun Regency, North Sumatra, in maintaining food security, economic stability, and agricultural sector sustainability in Indonesia. With good management, it ensures that oranges produced by farmers reach the market with maintained quality and on time. Effective coordination among farmers, distributors, and other stakeholders ensures smooth distribution and dissemination of oranges to various regions. Supply chain management is defined as a strategy involving the planning, controlling, and operating of the flow of goods, information, and funds from source to consumer. Effective supply chain management entails integrating these activities to achieve competitive advantage and meet customer needs [3]. There has been a significant decline in orange production in Simalungun Regency, with total production plummeting from 121,910 oranges in 2017 to 45,301 oranges in 2022. This decline

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is not uniform across the region; districts like Silimakuta, Raya, Pematang Silimahuta, Purba, Dolok Silou, Dolok Pardamean, Sidamanik, and Girsang Simpangan Bolon have also witnessed decreasing production annually. For example, Silimakuta district's production dropped from 84,000 oranges in 2017 to 29,858 oranges in 2022. This trend highlights potential challenges in orange supply chain management in Simalungun Regency, impacting supply availability and quality, potentially jeopardizing the industry's sustainability. Analyzing supply chain efficiency is crucial to identify factors contributing to production declines and to devise strategies for enhancing orange production and supply chain performance in the region.

Oranges from Simalungun Regency are distributed to markets in various major Indonesian cities such as Medan, Pekanbaru, and wholesale markets on Java Island including Kramat Jati, Cibitung, Cikopo, Jati Barang, Tanah Tinggi, and Caringin. Upon reaching these markets, oranges are received by traders or retailers who sell them to consumers. Prices at this stage typically exceed those at the farmer level due to additional expenses like packaging materials such as baskets, used newspapers for lining, basket tying ropes, dried banana leaves to prevent fruit compression, and cardboard boxes. Costs like wages for harvesters and sorters, along with their meals and amenities, also contribute to pricing. Expedition transportation costs from Simalungun to major markets further influence retail prices. Thus, the distribution process involves critical roles from farmers as producers, collectors or distributors for gathering and sorting oranges, expedition transportation, and traders or retailers selling oranges, each stage crucial for maintaining supply quality and availability to consumers.

Price is the monetary measure given to acquire or possess a good or service. Price reflects the relative value of that good or service in the market [4]. In early January, orange prices start at approximately Rp 15,000 per kilogram, but have shown a consistent monthly increase throughout 2022. By February, prices rise to about Rp 17,500 per kilogram, reaching around Rp 18,500 per kilogram in March. Prices escalate notably in April, peaking at about Rp 20,000 per kilogram. This upward trend continues with prices hitting approximately Rp 22,500 in May, Rp 25,000 in June, and reaching around Rp 26,500 in July. August sees further increases to about Rp 27,500 per kilogram, peaking in September at approximately Rp 30,000. Prices continue to rise through the year, with rates around Rp 31,500 in October, Rp 32,500 in November, and reaching a high of about Rp 33,000 per kilogram in December. These fluctuations illustrate the complex dynamics within the orange market in 2022, posing potential challenges for supply chain management efficiency.

2. IMPLEMENTATION METHOD

The type of research being conducted is causal effect research. The study location is Simalungun Regency, located in North Sumatra Province, Indonesia. This research focuses on the supply chain management of oranges in this region. The data used in this study is quantitative data. The common data collection technique employed is through questionnaires. The population for this study comprises orange farmers or those who own orange orchards in Simalungun Regency, totaling 2,673 individuals. The sampling technique used is saturation sampling or purposive sampling. The sampling criteria for this study are orange farmers in Dolok Silou District, Simalungun Regency, totaling 126 individuals. Analytic Hierarchy Process (AHP) is a decision-making method used to solve complex problems by ranking and comparing alternatives based on relevant criteria. The Supply Chain Operations Reference (SCOR) analysis technique is an approach used to understand and improve supply chain performance [5].

3. RESULTS AND DISCUSSION

3.1 Aggregate Score Calculation Results

After normalizing the weights, the next step is to calculate the aggregate score for each alternative. This aggregate score reflects how well each alternative meets the established criteria. The calculation process involves multiplying the normalized weights by the values of each criterion for each alternative. The aggregate score provides a comprehensive view of the relative performance of each alternative in the context of the considered criteria. The final aggregate score of 0.2961 indicates the overall performance level of the alternatives in meeting the established criteria. In this assessment, the weights assigned to each AHP matrix reflect the priority levels of different criteria. The highest score was obtained by Alternative 3, indicating that this alternative overall best meets the established criteria. Factors such as the ability to meet high demand and maintain quality according to demand are key determinants in evaluating alternative performance. These results can guide decision-making regarding the selection of the most optimal plan or alternative in the context of planning, procurement, and delivery to achieve desired business goals.

3.2 SCOR Standard Assessment Results

The results of the SCOR standard assessment refer to the evaluation of supply chain performance based on the SCOR reference model. The SCOR standard assessment provides a comprehensive view of how well the supply chain performs optimally according to industry standards. It is a method used to measure supply chain performance based on criteria that include planning, sourcing, production, and delivery. In this context, we can use the results obtained from the previous AHP analysis. SCOR scores are derived by multiplying the aggregate AHP scores by the appropriate weights for each SCOR category. The final SCOR score of 0.2983 indicates the overall performance level of the supply chain based on the measured criteria using the SCOR method. This value reflects a good evaluation, indicating that the supply chain has adequate performance in planning, sourcing, production, and delivery. The highest emphasis is placed on the planning category (40%), aligning with the AHP analysis where planning aspects carry the highest weight. With a high score, companies can understand and enhance their supply chain performance to achieve efficiency and competitive advantage. Overall, SCOR scores serve as a guide for prioritizing improvement efforts and innovations in supply chain management to enhance operational quality and efficiency.

3.2 Supply Chain Management Performance Efficiency in Determining Orange Prices

The efficiency of supply chain management in determining orange prices in Simalungun Regency can be observed through the previously outlined AHP and SCOR results. In the AHP analysis, emphasis was placed on key aspects such as planning, market demand suitability, production processes, and delivery. Alternative 3 consistently scored highest in each matrix, indicating excellence across various supply chain management aspects. In SCOR, the final score of 0.2983 reflects the overall performance level of the supply chain. This score encompasses planning (40%), sourcing (15%), production (25%), and delivery (20%). With a strong score, particularly in planning and production, supply chain management in Simalungun Regency can be considered efficient. This efficiency likely manifests in determining orange prices. Effective planning ensures an adequate supply of oranges aligned with market demand. Efficient production processes influence the quality and quantity of oranges produced.

Well-managed delivery also minimizes logistical costs, which in turn can affect price setting. By considering the values and weights from AHP and SCOR, supply chain management can make strategic pricing decisions while focusing on critical aspects such as planning, production, and delivery. This helps create competitive advantages through operational efficiency and accuracy in meeting market demand. In a dynamic field environment, efficient supply chain management brings significant benefits, such as minimizing risks of overstock or stockouts, enhancing responsiveness to changes in market demand, and optimizing production and distribution cost expenditures. Therefore, price decisions based on operational efficiency can provide better competitiveness and ensure business continuity in the agricultural sector, particularly in orange sales in Simalungun Regency. Efficient supply chain management plays a crucial role in anticipating market demand through accurate planning. With this approach, orange production can be adjusted to needs, avoiding stock surpluses or shortages. Well-planned orange production not only yields fruit of optimal quality but also adequate quantity. This contributes to overall production cost control, creating significant efficiency. The delivery of oranges from farmers to markets or consumers can be optimized through effective coordination, such as using suitable transport fleets. This step can reduce overall logistical costs. Effective supply chain management ensures the availability of oranges according to season and market demand. Thus, orange prices can be managed to remain stable and competitive. With lower production and logistics costs, the cost of orange production becomes more affordable. This is a crucial consideration in setting orange selling prices to remain competitive in the market. Operational efficiency not only reduces costs but also generates profits that can provide fair and sustainable purchase prices for farmers in the long term.

4. CONCLUSION

Efficiency in supply chain management in determining orange prices in Simalungun Regency can be measured through several key aspects. In AHP, Alternative 3 consistently demonstrates the highest performance in each matrix, reflecting excellence in planning, market demand alignment, production processes, and delivery. This aligns with the concept of efficient supply chain management, where consistent planning and execution excel in meeting market demands. The SCOR results yield a final score of 0.2983, indicating overall supply chain efficiency with a focus on planning (40%) and production (25%). This underscores the importance of focusing on planning and production in efficient supply chain management, consistent with SCOR's emphasis on these aspects

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as key to achieving overall efficiency. Efficient determination of orange prices in Simalungun Regency can be attributed to management that is responsive to market demand, effective planning strategies, and optimal production processes. This creates a foundation for competitive advantage through operational efficiency, good product availability, and the ability to adjust prices according to local market dynamics. This conclusion supports the idea that efficient supply chain management encompasses not only planning and production aspects but also responsiveness to demand and the ability to adapt to market changes.

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