

ANALYSIS OF SUPPLY CHAIN PERFORMANCE OF BANANA CHIPS IN DAHLIA MSMEs

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ABSTRACT

This study aims to analyze the performance of Banana chips supply chain management in Dahlia MSMEs, Gorontalo City in August-September 2022. This research method is a case study using primary and secondary data types. Data analysis techniques used in this study is the analysis of Supply Chain Operation Reference (SCOR) which then the calculation results will be compared with the data Benchmark. The results showed that of the 4 attributes with 7 assessment indicators only 4 indicators are in the superior category, namely perfect order fulfillment, delivery performance, cash to cash cycle and order fulfillment cycle while the other 3 indicators are volume flexibility, lead time and daily inventory are in the advantage category with the total cost used for Banana chips supply chain process is IDR. 7,560,000 in one production process. The impact for managerial is because the lead time that has not reached a superior position has a strong relationship with volume flexibility where long waiting times will result in the inability of the supply chain to maintain the flexibility of production volume, of course, this will have an impact on daily inventory, because it still have to wait for the schedule for the delivery of raw materials plus the production and marketing process.

Keyword: Banana chips; MSMEs; Performance; SCOR; Supply chain.

INTRODUCTION

In 2019, the contribution of the Micro, Small and Medium Enterprises (MSMEs) sector to Gross Domestic Product (GDP) on the basis of current prices (ADHB) was 60.51% while on the basis of prevailing prices (ADHK) it reached 57.14% and labor absorption reached 96.92% of the total workforce in Indonesia (Jayani, 2021). This indicates that the MSME sector is one of the important sectors in supporting the Indonesian economy. The Central Bureau of Statistics of Gorontalo province divides MSMEs into 5 business units, namely food, clothing, chemical and building, metal and electronics and handicrafts. Data from The Central Bureau of Statistics of Gorontalo province (2020) shows that MSMEs in the food sector are in the top position with 8,621 business units, which are then followed by MSMEs in the handicraft sector with 3,880 business units and MSMEs in the clothing sector with 2,296 business units. In the lowest 2nd position are chemical and building MSMEs with 1,947 units and metal and electronics MSMEs with 944 units.

As the capital of Gorontalo province, Gorontalo city has adequate potential for MSMEs in the food sector. In accordance with Central Bureau of Statistics Gorontalo province recorded that from 2017-2019 the total number of MSMEs in the food sector in Gorontalo City was as many as 5,115 business units. Dahlia MSMEs is one of the MSMEs in Gorontalo city that has been in the world of processed food industry for 10 years. One of the superior products is banana chips made from bananas. As a raw



material that is often used in the food industry, bananas have a lot of usefulness. In accordance with what was conveyed by Yair & Lahav (2017) bananas can be consumed as food, the leaves are used as wrappers or as disposable plates, and decorations.

Bananas as agricultural products that have perishable properties, therefore an agro-industry is needed to process bananas from raw materials into a processed product with a longer life cycle and added value that can generate profits for the agro-industry. According to Hadiguna (2017) the processed products need to be processed efficiently, so as not to generate waste and there will be no mismatch in the supply chain because it does not consider the life cycle and end of life of the product. Therefore, the need for a management that is able to form relationships between various organizations in order to improve the efficiency of a supply chain. According to Mutakin & Hubeis (2011) this can be created through the concept of Supply Chain Management (SCM). The concept of SCM can be defined as an effort to coordinate and integrate various product related activities in the supply chain to improve operational efficiency, quality and customer service to achieve sustainable competitive advantage for the entire organization (Wisner *et al.*, 2009).

As a manufacturer in the supply chain, Dahlia MSMEs are still processing and producing so that the availability of raw material supply needs to be considered in order to meet market demand. Field problems obtained from interviews with Ms. Leni as the owner of MSMEs is the stock of banana chips sometimes can not fulfill consumer demand. Demand for banana chips on weekdays ranges from 500-900 packs and on holidays can reach 1500-2000 packs. In one production requires 50-100 bunches of bananas to meet the demand. Due to the limited raw materials and delays in fulfilling supplies from distributors, sometimes MSMEs cannot meet consumer demand, such as in May 2021 where the total supply that cannot be met is around 300 packs dimana hal ini tentu akan mempengaruhi kinerja rantai pasok yang dilihat dari 5 atribut yaitu reliabilitas, tanggungjawab, ketangkasannya, manajemen aset dan biaya. This problem is in line with research results Supu (2013), Suudi & S (2021), and Talumewo *et al.* (2014) that the amount of raw material supply will affect production due to the absence of efficient management of the supply chain. Where supply chain efficiency can improve company performance as an effort to face competition (Duwimustaroh *et al.*, 2016; Purnomo *et al.*, 2021).

Research on supply chain performance has been carried out, such as Mustaniroh *et al.* (2019) which evaluated the performance of pasteurized milk supply chain with 4 analyzes, namely green supply chain management (GSCM), analytical hierarchy process (AHP), traffic light system (TLS) and oriented matrix (OMAX). While the research Duwimustaroh *et al.* (2016) that examines the performance of cashew supply chain with the analysis of data envelopment analysis (DEA). So in this case the researcher is interested in applying SCM in analyzing the supply chain performance of Banana chips produced by Dahlia MSMEs through supply chain operation reference (SCOR) analysis where according to Aramyan *et al.* (2006), and Indriani *et al.* (2019) there are several advantages of this analysis, namely assessing the overall performance of the supply chain, a balanced approach and supply chain performance in various dimensions. Supply Chain Operations Reference (SCOR) model is a model developed by the Supply Chain Council. The SCOR model is used to measure and improve the performance of a company's total supply chain (Supply Chain Council, 2012).

METHOD

This study was conducted in Dahlia MSMEs located in Gorontalo City, East City District. This study was conducted from August to September 2022. This study uses primary data obtained through interviews with Dahlia MSMEs and secondary data through literature studies. The data analysis used is a supply chain operation reference

(SCOR) model that allows identifying supply chain performance indicators by describing the supply chain process, so that it can be used as a measure to improve performance (Prayogo, 2018). SCOR has a category in measuring supply chain performance called performance attributes. Attributes in the supply chain include reliability, responsibility, agility, asset management, and cost which can be seen in Table 1. This model includes the assessment of delivery and demand fulfillment performance, inventory and asset management, production flexibility, warranties, process costs, and other factors that affect the overall performance assessment in a supply chain (Supply Chain Council, 2012).

Table 1. Calculation of Supply Chain Operation Reference performance metrics

Attributes	Definition Of Performance Indicators	Unit	Calculation Way
Reliability	1. Order fulfillment is the number of requests, fulfilled without waiting, measured by each type of product	%	Number of requests fulfilled / total requests
	2. Delivery performance is the percentage of delivery on time in accordance with the date of consumer orders and or the date desired by consumers	%	Total on-time delivery / total customer orders
Responsibility	1. Order fulfillment cycle	Day	Production cycle (source + make + deliver)
	2. Lead time fulfillment is describing the time required by the company to meet consumer demand from suppliers to the hands of consumers	Day	Order fulfillment lead time
Agility	The time required to respond in the event of an unexpected order either increase or decrease the order without being penalized	Day	Number of cycles of searching goods + cycle of making + cycle of sending + lead time
Asset Management	1. Cash to Cash Cycle	Day	Average time consumers pay
	2. Daily supplies for suppliers	Day	Storage duration
Cost	Total costs incurred by the company in conducting material handling from suppliers to consumers	IDR	Total cost of (planning + procurement + manufacture + shipper + return)

Source: Indriani *et al.* (2019)

After calculating the value of each supply chain performance indicator, the next step is to compare the actual data calculation results with the superior food SCOR Card value as its benchmark (Bolstorff & Rosenbaum, 2011) which has been validated by the Supply Chain Council. Benchmark is a value used as a comparison of the company's supply chain performance in the context of a competitive environment (Harison & Hoek, 2019). Benchmarks consist of three classifications: parity, advantages, and superior. Parity is a value that is commensurate with the average value of supply chain performance. Advantages indicate a value that is between the value of parity with superior which indicates that the value is good. Superior is a value that shows that the performance of the supply chain is superior. The supply chain performance benchmarks are taken from Bolstorff & Rosenbaum (2011), and Marimin & Maghfiroh (2010) which can be seen in Table 2.

Table 2 is a benchmark or data that is used as a benchmark that aims to see whether the performance of a company measured by supply chain operation reference

(SCOR) is included in the category of parity, advantage, or superior. Parity category can be interpreted that the performance of the supply chain is at a balanced point, indicators that are in this category need to be improved to support increased supply chain efficiency. The next category is advantage, the results of the calculation of the company's performance in this category indicate that the company's performance is good, just evaluate it so that it can reach the last category, namely superior.

Table 2. Supply Chain Performance Benchmarking Criteria

SCM Attributes	Performance Indicator	Benchmarking		
		Parity	Advantage	Superior
Eksternal Performance				
Reliability	Delivery Performance (%)	85	90	95
	Order Fulfillment (%)	85	90	95
Responsibility	Order Fulfillment Cycle (day)	13 - 15	9 - 12	≤ 8
	Lead Time (day)	25	20	15
Agility	Supply Chain Flexibility (day)	42 - 27	26 - 11	≤ 10
Internal Performance				
Asset	Cash to Cash Cycle (day)	45 - 34	33 - 21	≤ 20
Management	Daily supplies (day)	27 - 14	13 - 0.01	= 0.00
Cost	Total Supply Chain Management Cost (%)	13 - 19	8 - 4	≤ 3

Source: Bolstorff & Rosenbaum (2011); Marimin & Maghfiroh (2010)

Superior category is a category that shows the performance of the supply chain of a company is at its best. Where the company only needs to evaluate and monitor in order to maintain the performance of its supply chain. In this study, the respondents were SMEs consisting of 8 members, 7 retail outlets and distributors.

RESULTS AND DISCUSSION

In the analysis of supply chain management performance using the supply chain operation reference (SCOR) model, there are attributes called performance attributes. Performance attributes are divided into 5 namely reliability, responsibility, agility, cost and asset management. The five performance attributes have metrics called assessment indicators. The result of Banana chips supply chain performance calculation using SCOR model can be seen in Table 3.

Table 3. Banana Chips Supply Chain Performance Attributes

Attributes	Indicator	Actual Data
Reliability	Perfect Order Fulfillment	100%
	Delivery Performance	100%
Responsibility	Order Fulfillment Cycle	6 days
	Lead Time	19 days
Agility	Volume Flexibility	24 days
Asset Management	Cash To Cash Cycle	15 days
	Daily Supplies	13 days
Cost	Total Cost	IDR. 7,560,000

Source: Primary data after processing, 2022

Table 3 describes the performance measurement of Banana chips supply chain measured by 5 attributes and 8 assessment indicators. The reliability attribute explains that Dahlia MSMEs can produce Banana chips and distribute them to retail outlets and consumers because the actual data on order fulfillment indicators is perfect and delivery performance is 100%. This means that Dahlia MSMEs are able to meet consumer demand and retail outlets for Banana chips products perfectly both in terms of product quantity and timeliness.

Furthermore, the responsibility attribute is the ability of Dahlia MSMEs in carrying out the Banana chips production process to fulfill consumer orders with the assessment indicators being the order fulfillment cycle and lead time (waiting time). The actual data of both responsibility indicators are 6 days and 19 days. This means that in one production process the distributor supplies raw materials continuously every 2 weeks to Dahlia MSMEs which will then be produced and marketed. Lead time calculation describes the time required by Dahlia MSMEs in fulfilling orders calculated from the fulfillment of raw materials, which is 15 days plus a 3 days production process and a 1-day distribution process.

Next is the agility attribute, in the supply chain performance of Banana chips agility is measured by flexibility as an assessment indicator that describes the average time required by Dahlia MSMEs in overcoming the possibility of a surge or decrease in demand for Banana chips. Actual Data shows that Dahlia MSMEs take 24 days to overcome this, meaning that if there is a surge in demand such as on big days, consumers must wait 25 days for the product to receive.

The indicators of lead time and flexibility as well as the order fulfillment cycle are interrelated with each other. Where consumers are required to wait approximately 3 weeks for the order to reach the hands of consumers. However, this can be overcome because of the availability of Banana chips stocks as measured by the daily inventory indicator. Daily inventory is an indicator of asset management in measuring the performance of the supply chain that defines the number of Banana chips that are able to meet consumer needs when there is a delay in fulfilling chip stocks and a surge in demand for Banana chips. The actual data of this indicator shows that the daily supply of Banana chips can last for 13 days. In addition to daily inventory, the cash to cash cycle is an asset management indicator that describes the average payment time for Dahlia MSMEs to distributors in supplying raw materials and receiving payments from retail outlets. Actual Data shows this cycle occurs once every 15 days. This means that Dahlia MSMEs will pay for the purchase of raw materials as well as receive payments from retail outlets every 15 days. This number of days is obtained from the average payment time for MSMEs to distributors, which is 15 days and the time retail outlets pay to Dahlia MSMEs.

In the Banana chips supply chain process, the cost of running the process is called total supply chain management cost (TSCMC). Actual Data shows the cost of Dahlia MSMEs in running the Banana chips supply chain process is IDR. 7,560,000. This cost is obtained from the sum of 5 supply chain processes, namely plan, source, make, deliver, return.

The results of this study are in line with Suud *et al.* (2021) research which uses perfect order fulfillment, delivery performance, lead time, order fulfillment cycle, flexibility, daily inventory, cash to cash cycle and total cost as indicators of supply chain performance assessment. While in the Sembiring (2018) study there are several different assessment indicators from this study, namely upside adaptability, downside adaptability, overall value at risk, return on fixed assets and return on working capital.

After obtaining actual data on the supply chain performance of Banana chips in Dahlia MSMEs, a comparison will be made between the actual data and the benchmarking data that has been validated by the Supply Chain Council. Benchmarking data is used as a criterion in determining the company's performance. Benchmarking data is divided into 3 elements, namely parity, advantage, and superior. Comparison between actual data and benchmarking data can be seen in Table 4.

Table 4 explains that, based on the assessment indicators in get the actual data that has been described in the Table 3. The results of the company's performance measurement on the reliability attribute with indicators of perfect order fulfillment and delivery performance of each by 100%. That is, the company's performance in order fulfillment and in delivery has the best or superior performance by being in a superior position. This is in accordance with the statement of Yolandika *et al.* (2016) that the closer to 100% means that the performance achievement is getting better, and when it

reaches 100% means that the delivery performance achievement is in a position of perfection.

Table 4. Comparison of performance attributes and SCOR Benchmarking

Atributtes	Indicator	Data Actual	Data Benchmark		
			Parity	Advantage	Superior
External Performance					
Reliability	Perfect Order Fulfillment (%)	100	85	90	95
	Delivery Performance (%)	100	85	90	95
Responsibility	Order Fulfillment (day)	6	13 - 15	9 - 12	≤ 8
	Lead Time (day)	19	25	20	15
Agility	Volume Flexibility (day)	25	42 - 27	26 - 11	≤ 10
Internal Performance					
Asset	Cash to cash cycle (day)	15	45 - 34	33 - 21	≤ 20
Management	Daily Inventory (day)	13	27 - 14	13 - 0.01	= 0.00

Source: Primary Data after processing, 2022

The value of the company's performance on the responsibility attribute, measured by indicators of order fulfillment cycle and order fulfillment lead time. The order fulfillment cycle is the time required to fulfill consumer orders starting from the fulfillment of raw materials to the hands of consumers and lead time is the time required to fulfill orders for Banana chips starting from the fulfillment of raw materials, production process to distribution. The results of performance calculations obtain actual data for each of 6 days and 19 days when compared with benchmark, order fulfillment cycle indicators are in the superior category. The lower the order cycle the better the performance of the supply chain (Prayogo *et al.*, 2018; Yolandika *et al.*, 2016). While the lead time indicator is in the advantage category. Order fulfillment lead times in a supply chain are affected by a variety of unpredictable factors, making it difficult to ascertain. One of the factors affecting the lead time is the fluctuating amount of raw material delivery (Apriyani *et al.*, 2018).

Dahlia MSMEs supply chain performance measurement on the agility attribute with volume flexibility indicator is the time required by the company if at any time there is a change in orders that must be fulfilled. Actual Data shows a value of 25 days less than 26 days and greater than 11 days means that the company's agility is in a profitable position. According to Bai & Sarkis (2013) the value of flexibility depends on the circumstances and capabilities of the system in an effort to achieve its targets.

In the asset management attribute, the valuation indicators are cash to cash cycle and daily inventory. The cash to cash cycle shows the company's ability to convert product inventory into cash that has achieved its best performance because it has a value of 15 days. The faster the time spent in changing inventory, the better the achievement of supply chain performance (Sutawijaya & Marlapa, 2016; Pujawan & Mahendrawati, 2017). The company's daily inventory performance of 13 days, is in a profitable position because the stock of Banana chips available can last 13 days.

CONCLUSION

The supply chain performance of Banana chips in Dahlia MSMEs has met the superior category on indicators of perfect order fulfillment, delivery performance, cash to cash cycle and order fulfillment cycle. While lead time, volume flexibility and daily inventory indicators are still in the advantage category. Lead time that has not reached a superior position has a strong relationship with volume flexibility where long waiting times will result in the inability of the supply chain to maintain the flexibility of production volume. This of course has an impact on daily inventory, because it still have to wait for the schedule for the delivery of raw materials plus the production and marketing process. It would be nice for MSMEs to look for more than one raw material

supplier who has sufficient availability and is in accordance with production standards As well as indicators of volume flexibility, lead time, and daily inventory.

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