

Measurement of Seaweed Supply Chain Performance in UD Bangkit



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ABSTRACT: This research aims to measure the performance of the supply chain at UD Bangkit, a trading business engaged in the production and distribution of seaweed. Supply chain performance measurement is carried out using the Supply Chain method Operations Reference (SCOR) which includes five main dimensions: reliability, flexibility, cost, assets and responsiveness. The research results show that measuring UD Bangkit's Performance Attributes using the SCOR and AHP approach obtained a value of 51.58, it can be said that supply chain performance is in the average category. Based on the SCOR calculation, the lowest final attribute value is the performance value attributes reliability and metrics are perfect order fulfillment of 72 with a performance value of 9.36, and a performance value attributes responsiveness and its metrics Order Fulfillment Cycle Time is 48 with a performance value of 7.2. The highest value was obtained for Asset attribute Management, with a result of 18.83.

KEYWORDS: Supply Chain, Performance Measurement, SCOR, Seaweed, UD Bangkit

INTRODUCTION

The supply chain is a series of activities required to plan, control, and manage the flow of products from raw materials to finished products that are ready for consumption by end customers. Measuring supply chain performance is important to understand how well each part of the supply chain functions and identify areas that need improvement (Chopra & Meindl, 2016). UD Bangkit is a trading business in Indonesia that focuses on producing and distributing seaweed. Seaweed is an important commodity in various industries, including food, cosmetics and pharmaceuticals (Zamroni & Yamao, 2011). However, like many small and medium businesses, UD Bangkit faces challenges in managing its supply chain efficiently.

Seaweed has high economic value and is one of the most abundant natural resources in Indonesia (Trivedi, 2019). The seaweed production process involves several stages, starting from cultivation, harvesting, processing, and distribution. Each stage in this supply chain has the potential to increase the added value of the product but also has its own challenges, especially in coordination and management (Lee & Nam, 2017). UD Bangkit has been operating for over a decade and has built a fairly extensive network of suppliers and customers. However, this company still faces several obstacles in its supply chain operations. These challenges include fluctuations in the quality of raw materials, uncertainty in market demand, as well as limitations in technology and human resources (Gunasekaran et al., 2004; Ivanov & Dolgui, 2020).

In the context of globalization and increasingly fierce competition, the ability to manage supply chains efficiently and effectively becomes very important. Companies that can improve their supply chain performance can gain significant competitive advantages (Christopher, 2016; Queiroz et al., 2020). Therefore, this research focuses on measuring supply chain performance at UD Bangkit to identify strengths and weaknesses and provide recommendations for improvement. The SCOR method was chosen in this research because it provides a comprehensive framework for measuring supply chain performance. The SCOR model includes five main dimensions relevant to supply chain management, enabling in-depth and comprehensive analysis (Huang et al., 2005; Govindan & Bouzon, 2018). Using this model is hoped to provide a clear picture of the condition of UD Bangkit's supply chain and the strategic steps that need to be taken to improve performance.

This research aims to identify areas for improvement and provide practical recommendations that can be implemented by UD Bangkit management. The results of this research are expected to provide a significant contribution to the development of more effective and efficient supply chain strategies, as well as increase the company's competitiveness in domestic and international markets (Schoenherr & Swink, 2015; Kovács & Falagara Sigala, 2021).

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LITERATURE REVIEW

Supply Chain Performance Measurement

Performance measurement is comparing the actual results obtained with those planned, in other words, the targets that have been targeted must be examined to what extent the achievements have been implemented to achieve the goals. Performance measurement and metrics play an eare importantng goals, evaluating performance, and determining actions for future programs (Gunasekaran, 2004). To improve company performance, it is necessary to implement a supply chain management strategy. Information sharing, long term relationship, cooperation and process Integration is part of the factors that influence supply chain management performance. Companies need to pay attention to information sharing as the basis for implementing supply chain management. Long term relationships, which can provide a competitive advantage to the company, cooperation which is the best alternative in optimal supply chain management and processes. Integration is a combination of all existing activities along supply chain management, so that when implemented, it can increase company productivity and profits (Syamil A, et.al, 2023). Performance measurement using SCOR can measure a company from upstream to downstream. This is what makes SCOR superior compared to other methods, which tend to measure only company internals.

RESEARCH METHODS

This research was conducted at the UD Bangkit storage warehouse located in Lappa sub-district, North Sinjai District, Sinjai Regency, South Sulawesi Province and in Bulutanah Village, Kajuara District, Bone Regency, Sulawesi Province. This location was chosen by considering that UD Bangkit is a trading type company where its business activities focus on seaweed commodities. The number of informants and samples was 30 people, with details in this research consisting of 5 farmers, 5 collectors, all employees of the directors and consumers of UD Bangkit. The analysis used in this research uses the SCOR model as a framework for measuring supply chain performance. The SCOR model includes five dimensions: reliability, flexibility, cost, assets, and responsiveness . Each dimension will be measured using relevant indicators and data obtained from the company.

RESULTS AND DISCUSSION

Seaweed Supply Chain

The supply chain is the activity of distributing goods/services sourced from the producer (the area of origin of the goods/services) and distributors to the final consumer. The seaweed commodity supply chain is formed from the relationships between institutions or parties involved in product flow, financial flow and information flow, starting from seaweed farmers as providers of seaweed raw materials, small traders, large traders and final consumers. Supply chain flow patterns at UD. The rise can be seen in figure 1.

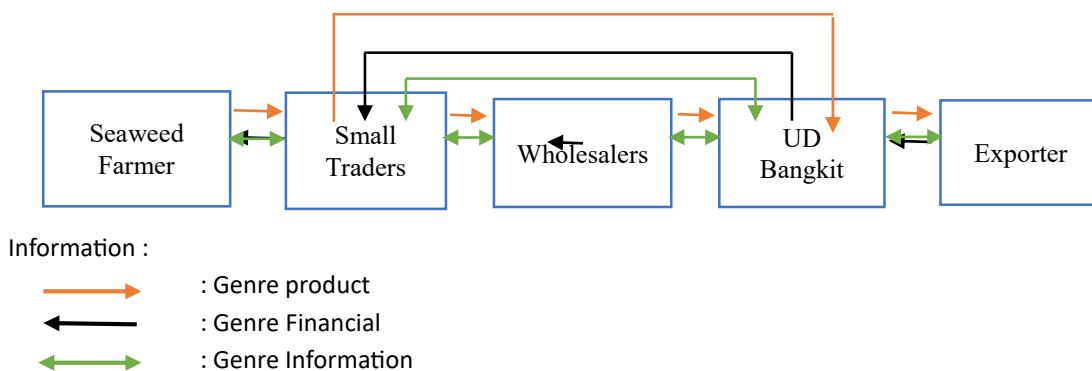


Figure 1. Seaweed Supply Chain Flow Pattern

Commodity grass sea on chains supply describes Genre products, finance and information material standard grass sea from farmer until exporter. Research result Structure chain UD Bangkit supply shown in Figure 1. There are three types of available flow chain supply grass sea. Genre First is Genre flowing products (goods). from upstream to downstream, second is Genre financial (money) flowing from downstream to upstream, and the third is Genre available information flow from upstream to downstream or on the contrary. Upstream and downstream chain supply regarding activity distribution physique grass sea, flow information and the flow of funds of the actors involved .

On Flow Patterns according to figure 1, the farmer is chain first to act as producer supplier First material standard grass sea, and can said chain supply grass sea started. Chain First will supplying goods to chain second that is trader small furthermore from trader small grass sea will supplied to chain supply third that is trader big . Grass the sea that has arrived at the merchant big will done checking quality, drying, and packaging in accordance with existing standards set, however in the field packaging No equally

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there are 60 kg, 50 kg, and 40 kg. Furthermore grass the sea that has through the process for fulfil standard quality will be supplied to chain supply fourth namely UD Bangkit. Grass sea received by UD Bangkit will done checking more strict For fulfil standard export and only define two specifications agreed standards that is content water content 15% and waste 2% p This Because standard quality Still limited material standard as long as grade 3 (three).

Furthermore, the grass sea that has fulfil standard appropriate quality will supplied to chain supply fifth that is acting exporter as the seller will send grass sea to overseas. Exporters in action as the seller will send grass sea to abroad is Sucromindo which is located in Makassar City, South Sulawesi. Analyze mechanism Genre chain supply grass sea has implemented to in three activities under This.

a. Genre Product

Genre product grass sea started from farmer grass the sea acts as manufacturer provides material standard grass sea until to consumer end ie the exporter will promote return to party consumers residing abroad. Material standard grass sea produced by farmers No there is a minimum limit on the volume quantity production so that if farmer Already want sell grass resulting sea to trader small can done any time in accordance with agreement the price has been determined. Trader small around subdistrict Kajuara, District North Sinjai and East Sinjai in general direct sell to UD Bangkit and some are selling to trader big without There is treat special. Grass the sea purchased by UD Bangkit moreover formerly collected until reach desired quantity Then distributed to company exporter . At the company exporter grass sea will through inspection quality with strict quality control as well as fulfil quota quantity For sent to overseas . Delivery grass sea UD Rise from Sinjai to Makassar with using tracking capacity of 20 MT, and directly dismantled load (*loading and unloading*) on the day that's also to the existing container prepared including documents supporter for do export to the destination country.

b. Genre Financial

Genre finance on the chain supply grass sea happens in a way: One starting direction from downstream, flowing from exporter, UD Bangkit, trader big, merchant small until to farmer grass sea. Genre finance on the chain supply grass sea each has a different price margin level holder interest. Dimensions economics (net profit unit, profit margin) is one measured dimension. For know index continuity something chain supply. Mechanism payment made through cash transactions and transactions transfer system via institution banking. During the payment process level farmer until to trader small use transaction cash while at level exporter to trader big use cash transactions or transaction through bank. Payment process exporter to UD Bangkit company done in debt with a due date of 7 days, paid through bank transfer system.

c. Genre Information

Genre information on the mechanism chain supply grass sea walk in two directions between producers and consumers, where party producer get information price, quality and quantity request grass sea from consumer temporary consumer need information about price on the market, quantity available production and quality and type grass sea. Smoothness information between holder interest chain supply grass seabased connection existing collaboration braided. Genre very important information for agreed price, quality and volume of demand.

Manufacturers who want to sell grass the sea will contact trader small via telecommunications media For offer grass sea . If There is request so trader small will meet manufacturer and do transaction sell buy, next trader big will come trader small after get information from company exporter related price, quantity and quality request grass sea. The determination price of grass sea is influenced by the quality and handling of grass sea post-harvest.

Genre information in general use system chat communication or phone , so system information between holder interest limited and frequent happen information that is not accurate so that happen misconceptions . Study Duwila et al. (2022) that delivery information about orders (reservations) still done through means communication electronic if happen information change price and quantity order only obtained through announcement through application Whatsapp and telephone.

Chain Performance Supply Grass Sea

Chain performance supply is A tool measuring from a business process in the chain supply. Measurement performance aim for see level efficiency and effectiveness from something chain moderate supply run, for the measurement Alone can use various tool analysis. Measurement performance chain supply grass sea at UD Bangkit use Supply Chain Operation Reference (SCOR) method with measure metric performance on the chain supply grass sea in do activity UD Business Rises.

a. Chain Performance Metrics Supply

Management performance in chain supply to industry can be measured by the indicator use metric. Metric is size degrees quantitative contained in something system, component or process with size certain.

Election metric measurement performance in structure hierarchy chain supply UD Bangkit is known for the business processes being carried out. Business processes refer to 5 activities that covers planning, procurement, processing, delivery and

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returns. Design metric performance covers performance shipping, fulfillment order, suitability with standard quality, cycle time fulfillment order, cycle time processing, flexibility amount supply, cost chain supply, cost processing. Weight numeric in every element hierarchy can optimize performance chain supply.

Metrics from every SCOR model always meet two indicators, namely external and internal. Indicators external from side customers and internal from the company. Company. The customer side covers reliability and responsiveness, while in the company includes agility, costs and assets. Study This measure attributes performance reliability chain supply, responsiveness chain supply and flexibility chain supply. Metrics used in the SCOR method can seen in Table 1.

Table 1. UD Bangkit Performance Metrics In the SCOR Model

Score Matrix	Performance				
	External		Internal		
	Reliability	Responsiveness	Agility	Cost	Assets
Perfect Order Fulfillment	√				
Order fulfillment cycle time		√			
Upside Supply Chain Flexibility			√		
Upside Supply Chain Adaptability			√		
Total Cost to Serve				√	
Cash-to-cash cycle time					√

Source: Research data after processed (2024)

Table 2. Metric Code Explanation

Performance Attributes	SCOR Metrics			
	Level 1	Level 2	Level 3	
Reliability	Perfect Order Fulfillment	% of orders delivered in full	Delivery Item Accuracy	
			Delivery Quantity Accuracy	
		Documentation Accuracy	Delivery Performance to Customer Commit Date	Delivery Location Accuracy
			Perfect Condition	Payment Documentation Accuracy
Shipping Documentation Accuracy				
% Orders/Lines Received Damage-Free				
Responsiveness	Order Fulfillment Cycle Time	Source cycle time	Orders Delivered Damage Free Conformance	
			Make Cycle time	Warranty and Returns
				Delivery cycle time
		Select supplier and negotiate cycle time		
		Transfer product cycle time		
		Produce and test cycle time		
Agility	Upside Supply Chain Flexibility	Upside Supply Chain Adaptability	Release finished product to deliver cycle time	
			Package cycle time	
Cost	Total Cost to Serve	Cost of Goods Sold	Receive product from source or make cycle time	
			Direct material costs	
			Receive product from source or make cycle time	
			Ship product cycle time	

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	Indirect costs related to production	
Assets	Cash to Cash Cycle Time	Days sales outstanding
management	Return on Supply Chain	Fixed

Source: Processed data, 2024

b. Normalization of Metric Values

Every calculation metric own scale different values so that must done normalization for get diversity of value Scale. For the value of results normalization, there is mark best (maximum) and value specified worst (minimum). through interview with experts and the data obtained from companies in some metric, so results normalization form score obtained. Normalization results or scores can seen in Table 3.

Table 3. Normalization Results Metric

No	Metric	Best	Actual	Worst	Score
1	Perfect Order Fulfillment	100%	99.50%	98.20%	72
2	Order Fulfillment Cycle Time	15	33	50	48
3	Upside Supply Chain Flexibility	12	28	58	65
4	Upside Supply Chain Adaptability	65%	35%	20%	26.4%
5	Total Cost to Serve	247400	254500	265000	53.30
6	Cash to Cash Cycle Time	8	12	23	62.40
7	Return on	0.99322	1.00159	0.96824	51.70

Source: Processed data,2024

c. Weighting With AHP

Measurement performance chain supply started from designing a model that consists of from attribute performance, matrix performance, and the alternatives formed to in AHP hierarchy. Draft The basis of AHP is use matrix comparison in pairs (*pairwise comparison*) for produce weight relatively between criteria nor alternative (RMS and Purba 2019). Comparison between criteria priority with criteria priorities and criteria alternative with criteria alternative. Criteria priority here is a chain process supply (*plan, make, sources, deliver, return*). Result of calculation comparison criteria priority will produce weight criteria priority. Criteria alternative to weighting This are performance attributes (*reliability, responsiveness, agility, cost, and asset management*). The calculation results comparison criteria alternative will produce weight criteria alternative. Comparison results can seen in table 4.

Table 4 . AHP Weighting Results

No	Attribute Work	Weight
1	Reliability	0.13
2	Responsiveness	0.14
3	Agility	0.12
4	Cost	0.21
5	Asset Management	0.33

Source: Processed data, 2024

d. Final Value Calculation

Multiplication result between results normalization (score) and results AHP weighting is is mark final result obtained. Through mark end indicator UD Bangkit's performance can determined Good or bad, and metrics *attributes performances* company the can is known best and worst metrics. The calculation results mark end in full contained in table 5.

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Table 5. Final Value Calculation Results

Performance Attributes	SCOR Matrix	Normalized Value Every Metric	Normalized Value Each Performance Attribute	Weight	Each Performance Value Multiplied matrices with weight	Performance Value of each Multiplied attributes with weight
Reliability	Perfect Order Fulfillment	72	72	0.13	9.36	9.36
Responsiveness	Order Fulfillment Cycle Time	48	48	0.14	6.72	6.72
Agility	Upside Supply Chain Flexibility	65	45.70	0.12	7.80	5.48
	Upside Supply Chain Adaptability	26.40			3.17	
Cost	Total Cost to Serve	53.3	53.3	0.21	11,19	11,19
Assets management	Cash to Cash Cycle Time	62.40	57.05	0.33	20.59	18.83
	Return on Supply Chain Fixed	51.70			17.06	
of Chain Value UD Supply Rises						51.58

Source: Processed data, 2024

The calculation results mark end obtained of 51.58. That is performance at UD Bangkit classified *average* as indicator performance show that Indicators in the Indicator Monitoring system Performance at 50 – 70 is categorized **Average**, Meaning performance the comparable with most organization or system in the same category. Although performance is adequate, a value of 50 – 70 indicates that There is room for repair. UD Rises must identify specific areas of need enhancement to reach more performance tall.

CONCLUSION

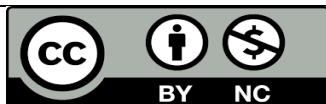
Measuring UD Bangkit's Performance Attributes using the SCOR and AHP approaches obtained a value of 51.58, it can be said that supply chain performance is in the *average category*. Based on the SCOR calculation, the lowest final attribute value is the performance value attributes reliability and metrics *are perfect order fulfilment* of 72 with a performance value of 9.36, and a *performance value attributes responsiveness* and its metrics *Order Fulfillment Cycle Time* is 48 with a performance value of 7.2. The highest value was obtained for *Asset attribute Management*, with a result of 18.83.

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