Design of Suply Chain Performance Measurement in Tawes Fish Breeding Procurement with SCOR Method

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Abstract
Tawes fish is a freshwater fish that has a slightly flattened body shape, a relatively high body, and a short head. Tawes fish or java carp is a fish that is high in animal protein. Tawes has a high enough nutritional content for every 100 g of ingredients such as air (66 g), calories (198 cal), protein (19 g), fat (13 g), and contains calcium, phosphorus, iron, vitamin A and B1 which the human body needs. PT. XYZ is a company that participates in activities in the procurement of goods/services by ministries, institutions or regional apparatus. Suppliers are one of the business partners who play a very important role in ensuring the availability of goods needed by every company when shipping requires a support system, so it uses the Analytical Hierarchy Process (AHP) method and the SCOR method to measure supplier performance. There are 20 key performance indicators (KPI) in this study. Of the 20 KPIs, there are 6 KPIs that get performance in the red category in the traffic light system. These six performances need to be a priority for improvement to improve supply chain performance.

***Keywords*:** *Tawes, SCOR, KPI, AHP*.

Abstrak
Ikan tawes merupakan ikan air tawar yang memiliki bentuk tubuh sedikit gepeng, badan relatif tinggi, dan kepalanya pendek. Ikan tawes atau java carp tergolong ikan bersumber protein hewani yang tinggi. Tawes memiliki kandungan nutrisi yang cukup tinggi untuk tiap 100 g bahan seperti air (66 g), kalori (198 kal), protein (19 g), lemak (13 g), serta mengandung zat-zat kalsium, fosfor, besi, vitamin A dan B1 yang dibutuhkan tubuh manusia. PT. XYZ merupakan perusahaan yang mengikuti kegiatan di bidang pengadaan Barang/Jasa oleh Kementerian, Lembaga, atau Perangkat Daerah. Supplier adalah salah satu mitra bisnis yang berperan sangat penting untuk menjamin ketersediaan barang pasokan yang dibutuhkan oleh setiap perusahaan saat pengiriman membutuhkan sistem pendukung, sehingga menggunakan metode Analytical Hierarchy Process (AHP) dan metode

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SCOR untuk mengukur kinerja pada supplier. Terdapat 20 key performance indicator (KPI) pada penelitian ini. Dari 20 KPI terdapat 6 KPI yang memperoleh kinerja pada kategori merah di traffic light system. Keenam kinerja tersebut perlu menjadi prioritas perbaikan untuk peningkatan kinerja supply chain.

Kata Kunci: *Tawes, SCOR, KPI, AHP.*

1. Introduction

Indonesia as a developing country is trying hard to spur its industry to be able to produce quality products, so that it can compete with products from other countries. Competition in the business world raises several problems and the industry is required to improve Science and Technology (Science and Technology). The high business competition is increasing rapidly resulting in increasingly fierce competition between companies. This condition shows how important it is for the company to improve its performance, improving performance is not only important for the company's internal but also important for all stakeholders, called employees, customers, suppliers, investors, the community, and the government, of course, have an interest in a company. Related to the main company related to the supply chain.

According to Pujawan (2010), there are still many companies that still find it difficult to be effective in evaluating supply chain performance. The development of practices related to supply chain performance in Indonesia is currently not in a mature condition. The supply chain is a very important thing to pay attention to because the supply chain is a process that is very influential on company performance related to internal and external problems of the company. Currently, the competition is no longer between companies and other companies, but between one supply chain and another. Measurement of supply chain performance is needed to evaluate supply chain performance in companies.

In business companies at PT. XYZ is engaged in the procurement of goods/services. Procurement of goods starts from taking takes fish seeds, for taking tawes fish it is certain to take them at an affordable, cheaper price. The process of procuring tawes fish seeds involves several suppliers in East Java, such as Kediri and Lamongan. Then the process of sorting takes seeds is carried out based on the quality level determined by the company.

In July PT XYZ placed an order for 5,000 Tawes fingerlings. Of the 5,000 ordered, 2,507 survived while 2,493 died for shipment from Pare to Lamongan. Because of this, the company suffered losses, and consumers were disappointed by the large number of dead fish. So that customers are satisfied, the company remains responsible for what happened late, so the company orders fish seeds that match the number of dead and increase the number of workers to measure fish seeds so it doesn't take a long time.

Based on the description above, the formulation of the problem from this research is how to measure the performance of PT. Kunsari Jaya Utama Sidoarjo using the SCOR method.

A supply chain (procurement chain) is a system in which an organization distributes its goods and services to its customers. This chain is also a network or network of various

interconnected organizations that have the same goal, namely to organize the procurement or distribution of goods as best as possible. The supply chain concept is a new concept in looking at logistics issues. In this new concept, logistics problems are seen as a wider problem that stretches very long from basic materials to finished goods that are used by end consumers, which is the supply chain of goods. Therefore, it can be said that supply chain management is a logistics network. In this connection, there are several main players who are companies that have the same interests, namely suppliers, manufacturers, distribution, retail outlets, and customers. Supply Chain Management is essentially an organizational network that involves upstream and downstream relationships, in different processes and activities that produce value that is embodied in goods and services in the hands of the ultimate customer (R.E. Indrajit, R. Djokopranoto, 2002). The supply chain is a network of companies that work together to create and deliver goods to the end user, it can be said that the supply chain is a physical network of companies involved in supplying goods, producing goods, and sending them to end users (Pujawan, 2010). To improve and achieve an effective supply chain, companies must collectively make decisions regarding the 5 (five) main supply chain driving processes, namely the production process, inventory management, transportation selection, location, and information flow (Hugo, 2003).

In 2002, the Supply Chain Council (SCC) introduced and developed a supply chain performance measurement framework known as the model (SCOR) which was developed to describe the management process associated with all the phases involved in fulfilling customer requirements. According to Li et al., (2011), one supply chain performance measurement model is the SCOR (Supply Chain Operation Reference) which was developed by a professional institution, the Supply Chain Council (SCC) in 1996. SCOR is a method that companies can use to communicate a framework that describes the supply chain in detail, defines and categorizes the processes that build the metrics or measurement indicators needed in the measurement of supply chain performance. Thus, integrated measurements are obtained between suppliers, internal companies, and consumers (A. Setiawan, et al, 2010).

There are five main supply chain management processes defined in this model, namely: plan, source, make, deliver, and return. These five management processes are broken down into three levels of detail. In SCOR, these supply chain processes are defined into five integrated processes, namely planning (Plan), procurement (Source), production (Make), distribution (Deliver), and return (Return). The assessment metrics in the SCOR model are expressed in several levels including level 1, level 2, and level 3. Thus, apart from supply chain processes being modeled in the fotakes a process hierarchy, the assessment metrics are expressed in the form of an evaluation hierarchy. The number of metrics and levels of metrics used are adjusted to the type and number of processes, as well as the level of supply chain processes implemented in the company concerned (United States and Europe, 2010).

This research was completed using the SCOR method and the analytical hierarchical process. Analytical Hierarchy Process or hereinafter referred to as AHP, is a decision support model developed by Thomas L. Saaty. This decision support model will describe complex

multi-factor or multi-criteria problems into a hierarchy. AHP has the advantage of being able to combine objective and subjective elements of a problem. According to Wibisono (2006) in his book, the preparation of AHP consists of three basic steps, namely

a. Hierarchical design. What AHP did for the first time was to solve complex and multi-criteria problems into a hierarchy.
b. Prioritize procedures. After the problem has been successfully resolved into a hierarchical structure, priority procedures are selected to obtain the relative significance of each element at each level.
c. Calculating results. After forming the preference matrix, the mathematical process begins to normalize and find the priority weights in each matrix.

Apriyani, et al (2018), conducted research that aimed to analyze supply chain performance achievements for organic vegetables in each chain member in order to meet consumer needs and make improvements. Another study was conducted by Nurhandayani and Noor (2018) which aimed to measure supply chain performance using 26 Key Performance Indicators (KPI). In addition, there is research conducted by Wati, et al (2017) which discusses measuring the performance of catfish suppliers due to delays in stock.

2. Method

The research steps include:

a. Literature review

This stage is carried out in order to be able to examine the initial problems in field studies conducted with several references and previous thesis reports related to the supply chain with the application of the SCOR Method.

b. Field Study

Observations and interviews aim to obtain direct information and be able to find out about complaints felt by consumers regarding the delay in sending alum fish seeds so that many fish seeds die.

c. Research Purposes

The aim of the study was to find out about the delay in sending alum seeds to the company so that many died and to analyze them using the SCOR method to reduce the number of dead alum fish.

d. Data Collection

The first data collected is demand data for fish fingerlings which can be seen in Table 1. There are two suppliers that fulfill the demand for tawes fingerlings, namely suppliers in the Pare area and suppliers in Blitar.

Table 1. Tawes Fish Seed Sales Data

Month	Order Amount (Tail)	Live Fish Seeds (Tail)	Dead Fish Seeds (Tail)	Suppliers	Delivery Location
March	4000	3910	90	Blitar	Mojokerto

Month	Order Amount (Tail)	Live Fish Seeds (Tail)	Dead Fish Seeds (Tail)	Suppliers	Delivery Location
July	5000	2507	2493	Pare	Lamongan
September	5000	4202	798	Blitar	Sidoarjo
December	4000	3705	295	Blitar	Pasuruan

e. Supply Chain Performance Measurement Model Design

The next step is to determine KPI which can be seen in Table 2. The preparation of KPI is based on 5 perspectives on SCOR including plan, source, make, deliver, and return.

Table 2. Key Performance Indicator

	Key Performance Indicator
PLAN	**Reliability** 1. BP (Meet Customers) 2. IKK (Employee Performance Identification) 3. PPBI (Planning for Delivery of Fish Seeds) **Responsiveness** 1. PJWP (Scheduling of Stock Period) 2. IWSBI (Time Identification for Fish Seed Specifications)
SOURCE	**Reliability** 1. PSBI (Fulfillment of Fish Seed Stock) 2. PBI (Shipping of Fish Seeds) **Cost** 1. BOPS (Order Fee at Supplier) **Asset** 1. PSH (Daily Stock Inventory)
MAKE	**Reliability** 1. KSP (Error During Packaging) 2. WPBI (Time to Stock Fish Seeds) **Responsiveness** 1. TBIC (Total Defective Fish Seeds) 2. TMPB (Responsiveness in Making Large Orders)
DELIVERY	**Reliability** 1. PTPBI (Fulfillment of Stock Level of Ready-to-Send Fish Seeds) 2. PT (Documented Order) 3. TSH (Out of Stock Rate) **Responsiveness** 1. LTBISS (Lead Time of Ready Fish Seeds)
RETURN	**Reliability** 1. TKP (Customer Dissatisfaction Rate) 2. WMBIM (Time to Replace Dead Fish Seeds)

3. Results and Discussion

After designing KPI, weighting is then carried out, the results of which can be seen in Table 3. The weighting is obtained from pairwise comparisons of each indicator.

Table 3. PT XYZ Level Weight

Process (Level 1)	Weight	Dimensions (Level 2)	Weight	KPI (Level 3)	Weight
Plan	0,290	Reliability	0,116	BP	0.024
				IKK	0,090
				PPBI	0,002
		Responsiveness	0,174	PJWP	0,094
				IWSBI	0,080
Source	0,094	Reliability	0,066	PSBI	0,047
				PBI	0,019
		Cost	0,005	BOPS	0,005
		Asset	0,023	PSH	0,023
Make	0,053	Reliability	0,006	KSP	0,002
				WPBI	0,004
		Responsiveness	0,047	TBIC	0,040
				TMPB	0,007
Delivery	0,241	Reliability	0,191	PTPBI	0,030
				PT	0,011
				TSH	0,150
		Responsiveness	0,050	(LTBISS)	0,050
Return	0,111	Reliability	0,111	(TKP)	0,021
				(WMBIM)	0,090

The following is an explanation in the column above. The first column shows the Supply Chain Operation References (SCOR) model. The second column shows the weight value of each SCOR model. The third column shows the marked name of each SCOR model. The fourth column shows the weight value of each aspect of the SCOR model. The fifth column shows the name of the KPI. The sixth column shows the weight value of each KPI of the SCOR model. The next stage is to measure performance based on the weighting that has been done. In Table 4 it can be seen the results of performance measurements along with the traffic light system.

Table 4. PT XYZ Supply Chain Performance Measurement Results

No	Key Performance Player	Weight	Target	Achievement	Unit	Scoring System	Score		Color
1	**Plan**	0,290						60,802	Yellow
	-Reliability	0,116					7,581	65,355	Yellow
	-BP	0,024	2	50	%	Lower is better	1,2	50	Red
	-IKK	0,090	100	80,71	%	Lower is better	7,263	80,71	Red
	-PPBI	0,002	1	70	%	Lower is better	0,14	70	Green

No	Key Performance Player	Weight	Target	Achievement	Unit	Scoring System	Score		Color
	-Responsiveness	0,174				Lower is better	9,78	56,25	Green
	-PJWP	0,094	1	60	%	Lower is better	5,64	60	Green
	-IWSBI	0,080	2	52,50	%	Lower is better	4,2	52,50	Green
2	**Source**	0,094						13,381	Yellow
	-Reliability	0,066					3,638	55,15	Yellow
	-PSBI	0,047	100	60,23	%	Higher is better	2,831	60,23	Yellow
	-PBI	0,019	1	50	%	Lower is better	0,95	50	Yellow
	-Cost	0,005						0,005	Green
	-BOPS	0,005	1	100	%	Lower is better	0,5	100	Green
	-Asset	0,023						0,023	Red
	-PSH	0,023	100	55	%	Higher is better	1,265	55	Red
3	**Make**	0,053						80,28	Yellow
	-Reliability	0,006					0,6	100	Yellow
	-KSP	0,002	0	100	%	Lower is better	0,2	100	Yellow
	- WPBI	0,004	0	100	%	Lower is better	0,4	100	Green
	-Responsiveness	0,047					2,846	60,56	Yellow
	- TBIC	0,040	0	21,12	%	Lower is better	0,845	21,12	Yellow
	-TMPB	0,007	100	100	%	Higher is better	0,7	100	Green
4	**Deliver**	0,241						50,535	Yellow
	-Reliability	0,191					9,754	51,07	Yellow
	-PTPBI	0,030	100	60,57	%	Higher is better	1,817	60,57	Yellow
	-PT	0,011	100	50	%	Higher is better	0,55	50	Yellow
	-TSH	0,150	0	42,63	%	Lower is better	6,394	42,63	Yellow
	-Responsiveness	0,050						50	Yellow
	-LTBISS	0,050	1	50	%	Lower is better	2,5	50	Yellow
5	**Return**	0,111						55,5	Red
	-Reliability	0,111					6,161	55,5	Red
	-TKP	0,021	0	45	%	Lower is better	0,945	45	Red
	-WMBIM	0,090	0	55	%	Lower is better	4,95	55	Red

Achievement value is obtained based on company data. Achievement value compared to the target set by the company.

4. Conclusion

There are 20 key performance indicators for PT XYZ. There are 6 indicators that show red on the traffic light system. This shows that there are 6 indicators that are a priority for improvement. These indicators include meeting customers (BP), identification of employee performance (IKK), stock inventory (PS), level of customer dissatisfaction (KKP), and time to replace dead fish seeds (WMBIM). Whereas in terms of dimensions, of the 5 dimensions contained in supply chain performance measurements, there is 1 dimension that shows red. This dimension is the return dimension which indicates that this dimension needs to be prioritized for improvement.

Based on the results of observations and interviews conducted, several causes of delays in the provision of tawes fish stocks were obtained. These causes include:

a. Delivery service

Delivery services sometimes refuse to send one type of item and see how many quantities have been ordered. The business owner does not only sell tawes fish, there are other fish species that must be sent in each period. The cost of shipping costs incurred is too large if you only send one type of item and in a small amount.

b. Limited Fish Stock

Due to the supply of fish with a large enough quantity and certain size criteria, PT XYZ has to find a supplier that can fulfill this demand. One supplier alone is usually not able to meet the demand. For this reason, it is necessary to look for other suppliers with relatively large fish ponds.

c. Tawes Fish Check

Every time PT XYZ procures tawes fingerlings, it always checks with each supplier to ensure that the size and quality of Tawes fingerlings are according to established standards. This requires a relatively long time.

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