

## Performance Measurement for “Es Puter Bang Karim” use Supply Chain Operation Reference

Christofora Desi K, M Kumroni Makmuri

Departement of Industrial Engineering, Bina Darma University

---

### Article Info

#### Article history:

Received Jun 21, 2015

Revised Sep 18, 2015

Accepted Okt 26, 2015

---

#### Keyword:

Supply chain

Supply chain operation  
reference

Performance measurement

Index productivity

Good performance

---

### ABSTRACT

“Es puter Bang Karim” is the one company that produces ice cream in the city of Palembang. This company does not have a good performance measurement. Performance measurement systems in use today are not able to measure the actual value of the company's performance, because the valuation is only based on the perspective of the production output. Supply chain operations reference is one of the performance measurement tool used to streamline material and machinery. Supply chain operations reference is considered more complete, systematic and more integrated. The purpose of this study was to determine the value of the performance of companies using supply chain operations reference. Results of this experiment showed that the value of the highest performance occurred in June with a value indicator (60.3) and lowest values in April with a value of (58.2) so that the average indicator 59.3. This value includes the category average performance indicators. Need to improve performance in order to better index future.

*Copyright © 2015 Institute of Advanced Engineering and Science.  
All rights reserved.*

---

### Corresponding Author:

First Author,

Departement of Industrial Engineering,

Bina Darma University,

Ahmad Yani Road number 12 Palembang South Sumatra Indonesia

Email: desi\_christofora@mail.binadarma.ac.id

---

## 1. INTRODUCTION

Recent years, the benefits of supply chain optimization and integration became the focus of some corporate organizations. Business competition in a globalized world requires companies to devise a better business strategy

Essence of competition is how to make the services rendered for the better, cheaper, and faster than its competitors. For that a company must improve its performance in order to compete and progress. Key to the performance of the company, lies in the ability of the company to work together with its business partners.

Ice cream company that became the object of study is a food company that actively producing ice cream in the city of Palembang. So far, the company has not had a Supply Chain performance measurement, performance measurement applied only on the production performance indicators such as material efficiency and machine efficiency. With this measurement model, the results obtained are still not complete and integrated. Performance measurement system is currently not able to reflect the actual value of the company's performance, because the performance value is measured only from the perspective of production output. SCOR performance measures are needed in order to become more complete, systematic and integrated. In this study will be discussed supply chain operations reference as performance measurement.

The main objective concept of supply chain performance measurement is not the only success of the business but the overall success of entire supply chain, especially activities related to the links that connect businesses with each other to form a supply chain. That requires a special method that can be used to measure

the performance of a supply chain. The objectives of this research was to determine some value of ice cream company's performance is measured by the supply chain operations reference.

## 2. RESEARCH METHOD

The study was conducted at the famous ice cream company in the city of Palembang. The method used to measure the performance of this company is the c (SCOR). In 2002, the Supply Chain Council (SCC) to introduce and develop a supply chain performance measurement framework, which was known as the Supply Chain Operations Reference Model (SCOR). This model was developed to describe the processes associated with the management of all phases involved to meet customer demand. There are five major supply chain management process defined in this model are: Plan, Source, Make, Deliver, and Return. [1]

Stages scor measurement method are:

1. Establish key performance indicators based on interviews with management
2. Test the validity and reliability of the measuring instrument
3. Data collection by questionnaire
4. Calculate the weight of key performance indicators with Analytical Hierarchy Process methods
5. Calculate the score normalization with *Snorm of De Boer* equation

$$KPI = \frac{SI - S_{min}}{(S_{max} - S_{min})} \times 100 \quad (1)$$

On these measurements, each weight indicator converted into interval specified value is 0 to 100. Zero (0) means bad and one hundred (100) is best interpreted. Thus the parameters of each indicator is the same so that the results can be analyzed.

**Table 1.** Performance Indicator Monitoring System

Monitoring System	Performance Indicators
<40	Poor
40-5	Marginal
50-70	average
70-90	Good
>90	Excellent

### 2.1. Supply Chain Operations Reference Model

Supply Chain Operations Reference - model (SCOR) is developed and supported by an independent, non - profit , independent named Supply Chain Council ( SCC ) . SCC Institute was founded in 1996 by Robin Todd Pittiglio consulting firm PRTM and McGrath from AMR Research. SCC be developed due to the formation of the consortium by 70 practitioners from companies located in the American West. In general, industry practitioners define the supply chain is a pendefinisikan of the process and the desired measurement between consumers and suppliers. SCOR model is a standard model that can be used as guidelines in the expansion of information between elements within the supply chain as a whole. As several advantages in the use of the use of SCOR models:[3]

1. SCOR models that can show the relationship between general purpose company (tactics and strategies) with overall supply chain operations .
2. SCOR models can identify, evaluate, and memonitoring the performance of the supply chain.

The main difference that distinguishes SCOR model and the other models in the supply chain is the ability to define relationships SCOR Model between the process and what elements are influential in the process covered by the scope covers all elements of the existing demand. SCOR model based on the description that occurred in the supply chain approach to inter-organizational, industry and geographical segments. Each element in the organization of a series (chain) has plan, source, and deliver activity. Plan activity balance resources/supplies with the organization. Source activity related to raw materials and linking organizations with their suppliers. Deliver activity associated with order management and finished goods process delivery. This activity connects with consumers.

Most of organizations have other activities, ie make, which change raw materials into finished materials. But in certain companies, such as distributors, this activity is not required. The scope of the SCOR

model has been expanded to include the activities of the return (the return of finished goods from the consumer).

Fifth management process is broken down into three levels of detail. At the level of the supply chain performance can be directly applied to the organization's business objectives. Level two and three elements explain in more detail the process of the activity in order to give a wider turn into supply chain operations. Because this model encompasses the organization and each organization is unique, then the model should be extended up to level four.

SCOR model describe the supply chain into five dimensions namely reliability, responsiveness, flexibility, cost efficiency and asset utilization. As the hierarchy which has the structure of the process, the hierarchy also allows us to describe the supply chain and measurements to test specific elements of performance within the supply chain elements [3].

Table 2. Attributes and Metrics Performance Level

Attribute	Definition	Performance metrics Level 1
Delivery	Supply performance in the delivery chain: the products on time, in good condition and packaging.	Delivery performance in exact order fulfillment
Realibility	The exact amount, complete documents, to consumers	
Responsiveness	Speed in providing performance products for consumer	Lead time for order fulfillment
Flexibility	The ability of the supply chain in responding to marketplace changes to gain and maintain a competitive level.	The response time of the supply chain
Cost	The costs associated with supply chain activities	flexibilitas production Cost of product (GPP) the total cost of the supply chain management process value-added productivity costs warranty / returns
Asset Management Efficiency	Effectiveness of the organization in managing assets to support demand fulfillment. Including the management of all assets, fixed capital and working capital.	Cash-cycle time to cash replacement time for asset inventory

## 2.2. Analytical Hierarchy Process

Analytical Hierarchy Process (AHP) is a way of making the most effective decisions over a wide range of complex issues by simplifying and speeding up the search path solutions to problems that we experienced. Analytical Hierarchy Process is a flexible model that provides an opportunity for individuals or groups to develop ideas and define problems in a way to make their own assumptions and obtain her desired solution. Analytic Hierarchy Process is a flexible model that allows us to make decisions by combining judgment and personal values logically [2].

Table 3. Pairwise comparison of assessment scales

Importance	Definition	Specification
1 (same)	equally important elements.	Both elements contribute equally
3 (weak)	one element is more important than the other elements of	the experience of states slightly favor the one element
5 (strong)	One element is actually more important than the other elements	It is shown a strong experience in favor of a single element
7 (very strong)	One obvious element is more important than another element	Experience suggests strongly favored and dominated a very clear element is more important
9 ( Strong absolut)	One absolute essential element of the other elements of the experience	very clearly the more important elements

2,4,6,8

Source ; [2]

Application of AHP in an issue to be trial and erro or repeated all the time. It is difficult to get the best solutions for complicated problems. Because this process can allow for some revision. Each repetition of

this process like make a new hypothesis and every reason fill for final result. In general, the steps that must be done in using AHP to solve the problem is:

1. Defining the problem and determine the desired solution.
2. Creating a hierarchical structure of complex decision making problems can be viewed from the side detail
3. Set priorities for each element of the problem at the level of the hierarchy. This process will result in weight to the achievement of the goal, so the element with the highest weight has priority handling.

### 2.3. Comparative Assessment Scale

Pairwise comparisons had a relative scale that can be seen on Table 2.1. The table shown some interest rate scale with attention to the human ability to distinguish the amount of grading scale comparison. The more grading scale comparison, the more difficult the manager to make his choice. The number of comparisons grading scale there are five. This amount is considered to be proportional to the managers / respondents to distinguish between the existing criteria. The grading scale between the existing scale is shown as even the value of both the existing scale.

### 2.4. Previous Research

Previous research has become a reference for carrying out research using Supply Chain Operations Reference (SCOR) in the company manufactures.

1. Supply Chain Performance Measurement at PT. Madura Guano Industri. [4]
2. Submission of Performance Parts PT Toyota-Astra Motor With Supply Chain Operations Reference Model. [5].

## 3. RESULTS AND ANALYSIS

Validity test is done with the help of the computer program SPSS version 17.0. This test aims to determine the correlation coefficient (rxy) with r table. With the number of samples (N) of 50 respondents, it can be determined that the magnitude of r table 0.2353. Validity of test results obtained Table as follows.

Table 4. Validity test

No	Question	$r_{hitung}$	$r_{tabel}$ (df=50, $\alpha=5\%$ )	Explanation
1	Accuracy Of Engineering Material	0.342	0,2353	Valid
2	Accuracy Of Production Planning And Schedule	0.252	0,2353	Valid
3	Finished Goods Inventory Levels In Company	0.443	0,2353	Valid
4	Internal Relationships With Employees	0.509	0,2353	Valid
5	The Reliability Of The Company's Employees	0.238	0,2353	Valid
6	The Performance Of Suppliers Of Raw Materials	0.319	0,2353	Valid
7	Reliability Performance Of Employees	0.375	0,2353	Valid
8	Raw Material Suppliers Performance	0.512	0,2353	Valid
9	Employees Performance Improvement	0.525	0,2353	Valid
10	Packaging Products Process	0.285	0,2353	Valid
11	Goods Production Flexibility	0.326	0,2353	Valid
12	Delivery Of Products On Time	0.459	0,2353	Valid
13	Percentage Of Products From Suppliers	0.684	0,2353	Valid
14	Customers Service	0.609	0,2353	Valid

Reliability test is used to measure the reliability of the questionnaire. Reliability test results showed that the alpha cronbah of variable is reliable because the Cronbach alpha coefficient value is greater than the value of r table (0.6). Thus the questionnaire can be used to measure the research data.

Analytical Hierarchy Process (AHP) is used for weighting the 14 Key Performance Indicators. Weighting is done by comparing the 5 elements of which Plan, Source, Make, Deliver and Return. Variable return gets the highest weight to the value of 0,332 and the lowest weight value is variable with a value of 0.062 plan. Among the 14 KPI KPI highest value is 14, with a weight value of 0.221 and the lowest is the KPI 1 and 2 with a weight value of 0.005.

Evaluation phase is used for controlling and monitoring performance. By using the traffic light system managers will be easier to evaluate its performance. Traffic light system uses a three-color indicator,

the color green for satisfactory performance (performance score > 80), yellow for good performance (performance score ≤ 80) and red for poor performance (performance score <60). If the calculation of performance marked with red color, it should be a concern for managers to do repairs.

The full results of weighting by ahp can be seen in the table below:

Table 5. Weight value Key Performance Indicator

Level 1	Weight	Level 2	Weight	Level 3	Weight
Plan	0,062	Reliability	0,062	The accuracy of estimates of engineering materials	0.0050
				The accuracy of production planning and scheduling	0.0425
				Finished goods inventory levels in company	0.0159
				Internal relationships with employees	0.0151
				The reliability of the company's employees	0.0206
Source	0,2	Reliability	0.0498	The performance of suppliers of raw materials	0.0117
				Responsiveness	0.15
		Reliability	0.0666	Reliability performance of employees	0.0659
				Suppliers send the raw materials in a timely	0.0282
				The process of improving the performance of employees	0.0333
Make	0,159	Flexibility	0.0666	Product packaging process	0.2058
		Deliver	0,319	Responsiveness	0.319
Return	0,332				

Scoring System serves to equalize the value scale of each Key Performance Indicator .So the company is able to measure and determine the level of achievement of each of the Key Performance Indicator (KPI). Scoring System using normalization process Snorm of De Boer. Scoring results in the index used to calculate the supply chain from April to June. The result can be seen in the following figure:

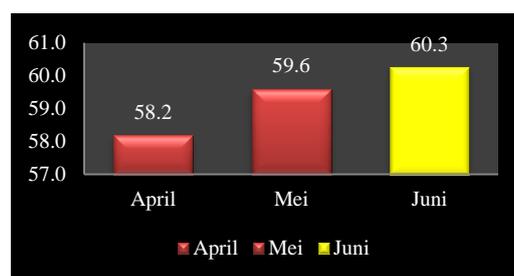


Figure 1. Supply chain performance charts

#### 4. CONCLUSION

Conclusions from measurements with SCOR method is the highest performance values in June with a value indicator (60.3) and the lowest value of the performance took place in April with the indicator value (58.2). So that the average value of the indicator is 59.3. Category is an average result. Management still needs to be improved so that the performance index increases in future

**REFERENCES**

- [1] Vanany, Iwan; , “Performance Measurement Model dan Aplikasi, “ Putra Media Nusantara Surabaya. 2009
- [2] Saaty, T.L.”The analytic hierarchy process for decision in complex world “, 1993
- [3] Supply Chain Council. “Supply Chain Operation Reference model. Overview of SCOR ,”Supply Chain Council. 2001
- [4] Sumiati/<http://ejournal.upnjatim.ac.id/index.php/tekmapro/article>, 13-14 November. 2013
- [5] Mardiyah, Nisaa.” Submission of Performance Parts PT Toyota-Astra Motor With Supply Chain Operations Reference Model. <http://repository.ipb.ac.id/handle/123456789/18090>. 2008

**BIOGRAPHIES OF AUTHORS**

Born in Jakarta 12 Dec 1972. Completing an undergraduate in 1996 Atmajaya Yogyakarta university at Industrial Engineering Departemen. Post-graduate at ITB 2004 in the course Industrial Engineering. Now the author work as lecturer in Bina Darma University. Email : [desi-christofora@yahoo.com](mailto:desi-christofora@yahoo.com) or [desi\\_christofora@mail.binadarma.ac.id](mailto:desi_christofora@mail.binadarma.ac.id).

Born in Palembang 15 November 1962. Undergraduate from Sriwijaya University in Economic course, Post graduate at ITB 2004 in the course Industrial Engineering and Management. Now the author work as lecturer in Bina Darma University. Email : [kumroni@mail.binadarma.ac.id](mailto:kumroni@mail.binadarma.ac.id).