The concept of supply chain management performance measurement with the supply chain operation reference model (Journal review)

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Abstract. In the era of globalization requires companies to start revolutionizing supply chain performance measurement system for their businesses. Supply chain management is one of the important issues that are a concern for companies that want to continue to increase consumer satisfaction, increase payment utility, and save expenses. For this reason, a supply chain performance measurement system is needed. The purpose of this paper is to build a supply chain performance measurement framework using the supply chain operation reference (SCOR) model as a tool for supply chain performance measurement. One of the causes of various failure of improvement programs in the supply chain is the inability to obtain an overview of the current condition of the company, including its cultural aspects. The use of the SCOR model in building the concept of supply chain performance measurement makes companies able to evaluate supply chain performance holistically in monitoring and knowing where an organization is relative to competitors. This paper focuses on the application of the SCOR model for supply chain performance measurement in manufacturing companies. Some tools are described in this paper as a proposal to build a performance measurement framework in optimizing value in the supply chain.

1. Introduction
Companies must have competitive advantages in similar industries so that the company is able to capture market share and gain profit. Competition lies in how companies implement processes in producing products or services that are better, cheaper and faster than their competitors. Therefore, in facing business competition in various industries, a strategy is needed in the form of efficiency and effectiveness.

According to Anas, (2011). Increasing the company's competitiveness in the form of efficiency, one of which can be done with the integration of the company's supply chain activities [1].

Integration of all elements of the company in meeting consumer demand, which is the unity of suppliers, manufacturing, delivery processes, and customers. This is something very complex because so many parties are involved and incorporated in the supply chain management chain [2].

One fundamental aspect of a company's operations is performance management and continuous improvement. This needs to be done because the supply chain does not only involve internal companies, but suppliers must have good performance [3].

Assessment of supply chain management performance between suppliers, companies, and customers can be measured by one of the supply chain management performance measurement models, namely the supply chain operation reference (SCOR) model. Basically SCOR is a form of
supply chain operation model that undergoes renewal to become three intact entities, namely business processes, benchmarks, and cross-functional frameworks in the supply chain [8].

The use of the SCOR model in building the concept of supply chain performance measurement based on the process, makes the company able to evaluate supply chain performance holistically to conduct monitoring and control, communicate organizational goals to functions in the supply chain and find out where an organization is relative to competitors, and determine direction of improvement for the creation of competitive advantage.

This paper focuses on the application of the SCOR model to the concept of supply chain performance measurement in manufacturing companies with the right approach to solving problems. Add to this a number of relevant literature from journals and literature studies that show several approaches from researchers to solve supply chain problems. The approach used is the supply chain operation reference model.

2. The concept of supply chain
The main focus of supply chain management processes synchronization for customer satisfaction. All supply chains essentially compete for customers from the products or services offered. One of the keys to effective supply chain management in meeting the growing market is by making suppliers part of the company’s strategy [5].

The concept of supply chain management (SCM) emphasizes integrated patterns in the process of production flow from raw materials to products arriving in the hands of consumers. Activities that occur throughout the process area unit that needs to be ensured that the flow is smooth without boundaries/dividers so that the information mechanism takes place transparently without the reduction in one of the links [12].

The implementation of supply chain management will reduce operating costs that occur along the chain, ensuring product quality is maintained, which will ultimately contribute to providing value to consumers in terms of product availability and service speed. Thus the supply chain management will provide a competitive advantage both directly and indirectly, especially in the value of the product.

The scope of the supply chain management is far broader than the logistics concept. According to [13] understanding of supply chain management is a unity of business process ranging from initial suppliers whose activities provide product services and information to provide added value to consumers to end users.

3. Measurement of supply chain performance
Supply chain performance measurement is a measurement system that is able to evaluate supply chain performance holistically. In designing a performance measurement system based on the process, the critical step that must be done is to define the core processes in the supply chain, describe the core processes into smaller parts, and calculate the resources involved in each of these process elements [4].

One of the causes of various failures in sustainable improvement programs is the inability to obtain an overview of the current condition of the company, including its cultural aspects.

Anatan (2012) conducted research on manufacturing companies in Indonesia. The purpose of the study was to determine the relationship between supply chain management practice and the performance of its chain eyes by moderating the variables of environmental uncertainty in the supply chain. The results showed that supply chain management activities affect the performance of the supply chain, as well as the role of environmental uncertainty factors that play a role in moderating the relationship between supply chain management practices and their performance. With an understanding of the factors that influence supply chain performance, companies are expected to be able to prepare their technical and practical supply chain management practices. It is hoped that research that focuses on this manufacturing industry contributes to improving the competitiveness of companies in terms of supply chain management so that it is competitive and performs well [9].
Pretorius (2013), provides recommendations for the SCOR model in measuring performance by looking at perceptions of customer-facing and internal facing [10].

Customer facing, which is to measure the performance attributes of reliability, responsiveness, agility to customers and suppliers. Internal facing is to measure supply chain cost and asset management efficiency [11].

4. SCOR model for supply chain performance measurement

The SCOR model was created by the supply chain council in order to provide a self-assessment method and comparison of supply chain performance activities as a cross-industry supply chain management standard. In the SCOR model, there are also 5 process namely plan, source, make, deliver and return. In addition, there are 3 process levels, namely the level 1 process type, level 2 process configuration, level 3 element of the SCOR process which can be seen in figure 1 [8].

| Level | Description | Examples | Comments |
|-------|-------------|----------|----------|
| 1     | Process Types (Scope) | Plan, Source, Make, Deliver, Return and Enable | Level-1 defines scope and content of a supply chain. At level-1 the basis-of-competition performance targets for a supply chain are set. |
| 2     | Process Categories (Configuration) | Make-to-Stock, Make-to-Order, Engineer-to-Order Defective Products, MRO Products, Excess Products | Level-2 defines the operations strategy. At level-2 the process capabilities for a supply chain are set. (Make-to-Stock, Make-to-Order) |
| 3     | Process Elements (Steps) | • Schedule Deliveries • Receive Product • Verify Product • Transfer Product • Authorize Payment | Level-3 defines the configuration of individual processes. At level-3 the ability to execute is set. At level-3 the focus is on the right: • Processors • Inputs and Outputs • Process performance • Practices • Technology capabilities • Skills of staff |
| 4     | Activities (Implementation) | Industry-, company-, location- and/or technology specific steps | Level-4 describes the activities performed within the supply chain. Companies implement industry-, company-, and/or location-specific processes and practices to achieve required performance |

Figure 1. Hierarchy of SCOR models [11].

Figure 1 explains that from each level the company can find out the location of the problems that hinder the company's performance. SCOR consists of two parts, namely performance attributes and metrics. Performance attributes relate to company strategy, each performance attribute will have their own benchmarks in the metrics. grouping metrics used to express strategy, SCOR recognizes five performance attributes namely, reliability, responsiveness, agility, costs and assets management. A metric is a measure that can be verified, embodied in quantitative or qualitative forms, and defined against a particular reference point. One of the main requirements for this performance measurement is reliable and valid [8].

Several companies have proven that the SCOR model has been tested in measuring the level of supply chain performance in a company that can be used as a reference for further improvement of business processes. Companies that have applied the SCOR model to measure the supply chain performance of a company include Schlumberger, Tokyo Gas Co., Ltd., Chevron, and many other companies [6].
Caro and Cavazos (2012) state that to get the best strategy in the SCOR model, performance indicators are determined to analyze and compare with the company’s objectives to improve supply chain performance.

Gap analysis is done if there is a gap between actual data and benchmark data. Gap analysis is intended if the gap is a negative result which means the next mapping must be done. According to Peter Bolstroff (2012), there are 3 methods in gap analysis, namely:

1. The Lost Opportunity Measure is calculating lost income before order entry due to lack of product availability.
2. The Canceled Order Measure is calculating lost revenue after an order entry because the canceled order is due to poor delivery performance.
3. The Market Share Measure is an attempt to project revenue increases based on achieving competitive advantage in the customer-facing metric category.

Based on previous research the advantages and disadvantages of the SCOR model are compared with other methods, namely:

1. The advantage of this SCOR model is as a process reference model with its ability to integrate business processes, benchmarks and analysis of best practices into the supply chain framework in various dimensions [11].
2. Analysis of the Weakness of the SCOR model. This weakness analysis is based on the use of the SCOR model in previous research. This is done so that the supply chain performance measurement model developed in accordance with the problems in the object of research. The weaknesses of the SCOR model first do not do an alignment between the performance measurement system and the business strategy and functional strategy. Secondly, it does not translate the vision, mission, and strategy of the company into the determination of the objectives and size of the scorecard, and the three key performance indicators that exist remain tailored to the needs of the company not based on the existing supply chain strategy.

5. Techniques In Performing Performance Measurement

In carrying out the initial performance measurement carried out is the mapping of the supply chain with the SCOR model, with the aim of obtaining material, information and financial related activities in the supply chain process.

According to Rouli (2008) The purpose of the supply chain mapping process with the SCOR model is to gain a comprehensive understanding of the supply chain, facilitate the process of supply chain performance analysis so that the process of connecting between activities is easier [7].

In addition to mapping the company's supply chains, data collection is done in the form of a supply chain performance assessment questionnaire. Processing in this research generally consist of several stages which start by identifying SCOR matrix, validity test and reliability of questionnaire, calculation of normalization value (score), weighting of key performance indicator (KPI) with analytical hierarchy process (AHP) method, and calculation of total supply chain performance value. The last step is to analyze the indicator that has the lowest weight on each variable [14].

There are tools in measuring supply chain performance, namely analytical hierarchy process, fuzzy AHP and analytical network process. AHP is the most effective way of making decisions on complex issues by simplifying and accelerating the search for solutions to the problems we experience [15].

Fuzzy AHP is intended to establish the uncertainty associated with the assessment of the weighting of each performance measurement metric [16].

ANP is a tool capable of weighting not only on the basis of hierarchical relationships between perspectives but also able to accommodate the nature of interrelated relationships between the supply chain perspective used as a benchmark design and measurement of company performance.
6. Conclusion
A successful company is a company that is able to meet consumer demand in terms of providing products in the right place, the right quality and on time. In this case, supply chain management is the key determinant of the company’s competitive advantage. Currently, companies that have better supply chain performance are more likely to win the competition.

The approach used to measure performance is by using the SCOR model. The supply chain performance measurement system will produce output in the form of total performance value and level of the company’s supply chain performance indicator category.

The main cause of the supply chain performance is less efficient lies in the low performance of the material management process (source). The low performance of the source process is caused by several things, including inaccurate forecast, unintegrated supply planning, weak coordination between parts of the company, inadequate supplier performance, poor inventory management, and no inventory checking in the warehouse. In implementing the SCOR Model, it is expected that real participation from all components of the company, especially at the top management level. As in previous research, supply chain management involves many parties and functions within the company (internal) or outside the company (external). The parties involved are not only those within the scope of operations and production but also the marketing, finance and other parts [19].

This paper presents several analytical techniques that can measure supply chain performance that needs to be evaluated. The SCOR approach is expected to be a solution to solve supply chain problems and is able to provide value for the achievement of the company’s overall supply chain performance.

Thus in the next research is developing a measurement model of supply chain performance derived from the supply chain strategy. The development of this model deploys business strategies into the supply chain strategy so that a key performance indicator is produced that matches the needs of the company’s strategy.

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