

# A Survey on Organisational Supply Chain Performance Measurement

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## Abstract

A supply chain is the network of businesses and people that work together to move raw materials into finished goods and eventually to the end-user. In an industry which employs supply chain management, it is difficult for every single person to be involved manually. Hence in this day and age it is essential for the stakeholder's daily tasks to be automated. By this paper, we investigate several reputed articles to provide a better judgement on the management on performance in supply chain.

**Keywords** - supply chain management; performance measurement; scorecard; industries.

## I. INTRODUCTION

Supply chain management involves a wide range of activities required to plan, control and execute a product's flow, from acquiring raw materials and production through distribution to the final customer, in the most streamlined and cost-effective way possible. For large complex supply chain networks, performance measurement is an important aspect to be considered. To use suitable supply chain performance systems and tools in industries, it is mandatory to clearly understand the current supply chain measurement system and performance processes. Performance measurement is critical to the success of any organization because it creates understanding, moulds behaviour and improves competitiveness [1]. Performance measurement provides the means by which a company can assess whether its supply chain has improved or degraded.

This paper is intended to provide a literature review on supply chain performance measurement. The review study covers articles coming from major journals related with the topic and explores more on the detailed methodologies that is provided in each article. This survey examines the solutions that have been explored in the past and provides a comprehensive study of the performance measurements used in the new supply chain era.

## II. LITERATURE REVIEW

The research of performance management has been popular for years. There were numerous publications emphasizing the need for relevant, balanced, strategic and improvement-oriented performance measurement systems [2].

In an article [3] on the supply chain performance by Kuhner, he begins his views on the performance measurement with the necessary requirements needed for a supply chain-oriented analysis. In the paper, the authors evaluate the performance with the help of 3 phases: Identification of goals, measurement of performance and the future work that can be developed in the performance measurement. In the identification phase, the customer-supplier relationships are studied exclusively. The measurement phase includes crucial activities such as to monitor, control and direct certain logistic activities. Here, the authors use the analogy of the balanced scorecard approach. Using this approach, the enterprise business is categorized as 4 different perspectives: financial perspective, customer perspective, internal business perspective and learning and growth perspective.

The financial goals of an organization mainly include improving profits, increasing the revenue and cost reduction [4]. The inspection of potential customers, what they need, how to achieve customer satisfaction is dealt with in the customer perspective [4]. The internal business perspective deals with improving the existing business systems by implementing new business strategies [4]. The learning and growth perspective are applied in the final phase and aims at providing a continuous improvement in the industry's performance.

The table below represents the various supply chain measures and the techniques used by them in detail.

**TABLE I**

SNO.	AUTHOR	PUBLICATION	SUPPLY CHAIN PERFORMANCE MEASURE	METHODOLOGY
1.	Xia LXX, Ma B, Lim R[5]	AHP Based Supply Chain Performance Measurement System, 2007 IEEE Conference on Emerging Technologies and Factory Automation (EFTA 2007)	Cost, Re-configurability, Reliability, Flexibility, Responsiveness	Based on the characteristics of a supply chain, relationships among attributes will be decided whose priority will be decided based on Analytic Hierarchy Process (AHP). AHP is a method for formalizing decision making where there are a limited number of choices but each has a number of attributes and it is difficult to formalize some of those attributes. AHP adopts 6 generic steps: Structure a problem, Elicit judgments that reflect ideas, Represent those judgments with meaningful numbers, Use these numbers to calculate the priorities of the elements, Synthesize these results to determine an overall outcome and Analyze the sensitivity to changes in judgment.
2.	MARCUS BRANDENBURG[6]	Design and Implementation of a Measurement and Management System for Operational and Supply Chain Performance, IEEE Engineering Management Review, Vol. 46, No. 3, Third Quarter, September 2018	Operational Performance	<p>Information is obtained from the internal experts employed in the firm. Further analysis is made on their existing performance tools used (if any). Based on the obtained information, the Performance Measurement System is mapped in accordance with the organizational structure. Rather than involving all local units for the implementation stage, only a few entities were chosen to implement the PMS. The implementation stage is split into pilot phase and roll-out phase.</p> <p>The pilot phase aims at establishing and coordinating an effective reporting process which helps in determining how the affiliates participate in the PMS implementation which further helps in identifying and resolving difficulties in the PMS implementation. After the pilot phase, the PMS is rolled out to all local units and propagated from business unit level to single affiliates.</p>

SNO.	AUTHOR	PUBLICATION	SUPPLY CHAIN PERFORMANCE MEASURE	METHODOLOGY
3.	Yaling Wang[7]	Research on Performance Evaluation of Supply Chain Based on Improved BSC,2011 International Conference on Transportation, Mechanical, and Electrical Engineering (TMEE) December 16-18, Changchun, China	Supply chain performance measures four perspectives of finance, customer, internal business process, and learning and growth	In addition to the four perspectives of the Balanced Score Card methodology as mentioned by Kuhner[2] the author thinks that the respect of learning and growth of BSC should contain the content of organization relationship and environment when the performance evaluation of supply chain is done by BSC. Evaluation index based on external factors reflect appraisal of supply chain given by the outside organization and staff. Utilising evaluation index, the improved BSC can be implemented using <i>Market share, Customer return rate, On time delivery, Production-sale rate, Knowledge-style staff rate etc.</i>
4.	Changrui Ren, Jin Dong, Hongwei Ding, and Wei Wang[8]	A SCOR-Based Framework for Supply Chain Performance Management, 2006 IEEE International Conference on Service Operations and Logistics, and Informatics	SCOR	The supply chain operations reference (SCOR) model is designed to help maintain the business processes and evaluate them. Using the SCOR model, businesses can judge how advanced or mature a supply chain process is and how well it aligns with business goals. SCOR consists of 5 basic processes: plan, source, make, deliver and return. SCOR provides 4 main levels: <i>Build Performance Model</i> which helps to measure dependencies and map the relationships between performance measures, <i>Measure Supply Chain Performance</i> deals with attaching value weights to various measures of performance, <i>Performance Analysis</i> helps in analysing the importance of each Dimension and the <i>Improvement</i> phase analyses the importance and causal relationships of performance measures, in order to rationalize the measure structure, i.e., adding/deleting measures or adjusting their relationships and improve the supply chain performance to a more ideal level.

SNO.	AUTHOR	PUBLICATION	SUPPLY CHAIN PERFORMANCE MEASURE	METHODOLOGY
5.	Pacharaporn Yanpirat, Akrapong Choatheitmanut[9]	Supply Chain Cost Reduction by Implementing Integrated Activity Based Costing and Data Envelopment Analysis: A Case Study, 2014 International Conference on Engineering, Technology and Innovation (ICE).	Activity based Costing	Activity-based costing (ABC) identifies and assigns costs to overhead activities and recognizes the relationship between costs, overhead activities, and manufactured products. By employing ABC the supply chain cost (SCC) is reduced and the supply chain performance is improved. <i>Activity Analysis and Cost Object Identification</i> deals with identifying the cost pools in terms of the activities performed to make cost objects. These activities can be categorized as main-activities, sub-activities, and detailed activities pertaining to supply chain. Cost objects are products or services to which costs are assigned in providing value to the customers in the supply chain. <i>Determination of Activity Cost</i> involves resource cost classification, resource cost allocation, determining the activity cost drivers that correspond to the particular cost hierarchies of the supply chain, calculating the activity rate for the particular activities. <i>Product Costing, Efficiency Measurement of the Activities in the Supply Chain.</i>
6.	Whitten GD, Green Jr. KW, Zelbst PJ[10]	Triple-A supply chain performance. Int J Operations & Product Manage 32: 28-48 (2012)	<ul style="list-style-type: none"> <li>• Marketing Performance</li> <li>• Financial Performance</li> </ul>	Triple-A (Agility, adaptability and alignment) supply chain management is a specific supply chain management strategy aimed at improving the performance of the supply chain. It helped in analyzing that although the financial performance is connected to the supply chain performance, the marketing performance of the firm has a higher priority.  Gaps: Does not consider the other performance measures related to the supply chain performance.

### **III. CONCLUSION**

Performance measurement in supply chain is important as it provides a means by which the organization can assess whether their performance has improved or degraded. This paper gives an overview of different performance measurement tools and strategies that can be applied to measure and improve the supply chain performance of an organization. The various approaches discussed in this paper can be applied only with regards to the improvements as required by the organization. The organization's willingness to give in to new changes also plays a major role in determining the performance metrics to be improved in the organization. As the needs of the organizations keep changing over time, further studies are required to satisfy their needs thereby improving their performance.

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