

An Optimum Way to Evaluate the Performance of Outbound SCM through Process Evaluation

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Abstract -- Today, most of the companies are focusing on cost reduction to ensure that there is an effective supply chain in the organization where performance measurement and metrics are the key parameters which have received the attention of researchers and practitioners recently to use for measurement. To survive in a highly challenging and competitive environment, an efficient and effective way of measuring supply chain performance is a must to improve profitability and efficiency of an organization. There are several performance measures for evaluating the process of Supply Chain Management since it is important to make the system robust. In this paper an attempt has been made to evaluate outbound SCM mainly by focusing the whole process by evaluating the performance measurement parameters and metrics which are involved in the process and keeping the total cost of SCM in control with the help of simple methodology and model building with cost parameters. The performance can be measured in terms of Inventory turnover ratio, logistics cost and linking inventory control methods with respect to total cost of supply chain.

Keywords: Supply Chain, Cost Reduction, Total Cost, Inventory control, Metrics Measurement, Unit Cost, Knowledge cost

1. Introduction:

Performance Measurement of Supply chain Management involves multiple dimensions [1]. The performance can be measured both in terms of inventory turnover ratio at the organizational level and logistics cost at the economy level. The inventory turnover ratio is the most important measurement for any outbound supply chain. Inventory is commonly used in day to day life as manpower inventory, inventory of documents, inventory of raw materials, inventory of spare parts, inventory of semi-finished items, inventory of finished goods, inventory of vehicles etc. The objective is to ensure continuity of uniform quality of goods at lowest cost. There is a need for us to maintain necessary inventories. The investment in inventories should be just sufficient in the optimum level. The excessive inventories can cause loss of profit, excessive carrying cost, the risk of liquidity. On the other hand, a low level of inventories may result in frequent interruptions in the production schedule resulting

in under-utilization of capacity and lower sales. Efforts should be made to place orders at the right time with right source to purchase the right quantity at the right price and quality. In order to maintain balance, the challenge faced by management can be they have to maintain inventories for smooth production and sales operation. Hence we have the term inventory control and is mainly concerned with the acquisition, storage, handling and use of inventories.

There are many methods to control inventory and this is required because of many factors which causes increase in inventory costs. Some of the methods available for segregation or classification of material depending on cost, usage etc., Some of the methods are like ABC analysis, VED analysis, FSN analysis, XYZ analysis, JIT method, EOQ method, Minima-maxima system[6].

Inventory control technique ABC analysis is based on the principle that a small portion of the items may typically represent the bulk of money value of the total inventory used in the production process, while a relatively large number of items may form a small part of the money value of stores [4]. According to this approach to inventory control high value items are more closely controlled than low value items. Each item of inventory is given A, B or C denomination depending upon the amount spent for that particular item.

A – Category – 5% to 10% of the items represents 70% to 75% of the money value.

B - Category – 15% to 20% of the items represents 15% to 20% of the money.

C - Category – The remaining number of the items represent 5% to 10% of the money value.

Material control necessitates the maintenance of inventory of every item of material as low as possible ensuring at the same time. This requires proper planning of inventory levels. There are other methods like in case of uncertainly; the probabilistic approach may be applied to determine the safety margin. Setting up of ordering level is another method of calculation wherein the level is set between the maximum and the minimum level in such

a way that before the material ordered for or received into the stores, there is sufficient quantity in hand.

The quantity, which is ordered when the stock of an item falls to the reorder level which is known as reorder quantity or Economic reorder quantity (EOQ). EOQ is nothing but the order size that will result in the lowest total of order and carrying costs for an item of inventory. Together all these tools provide the means for determining an optimal average level of inventory for the firm.

2. Literature Review:

Based on the available scanty literature the following are some of the papers related to the work and corresponding description: [1] The Paper provides a focused review of literature on performance measurements and metrics in SCM. The metrics and measures are discussed in the context of the following supply chain activities / Processes: (1) plan, (2) source, (3) make / assemble, and (4) delivery / customer. Traditionally supplier performance measures were based on price variation, rejects on receipt and on time delivery. For many years, the selection of suppliers and product choice were mainly based on price competition with less attention on afforded to other criteria like quality, reliability, etc., The work has dealt the traditional way of dealing. More recently, the whole approach is used to evaluate suppliers performance has undergone drastic change. Keeping the work in the mind an attempt has been made to model the SCM costs as parameters.

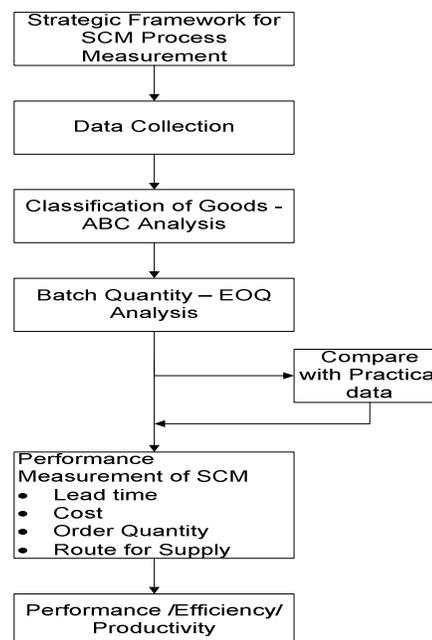
[2] In the second paper the authors made an objective, that the key to successful way to improve supply chain performance is to focus on those areas that are not only under-performing but also those that are aligned with the overall supply chain strategy. The Logistics Performance Gap analysis can be used to compare key performance indicators with world-class, or best-in-class, indicators. Several types of indicators have been developed to measure many supply chain and logistics activities. Choosing the type of indicator to measure can be daunting, and it could be dangerous to simply focus attention on one area. The work has come handy for optimizing the supply chain performance with key parameters.

3. Methodology:

In the paper an attempt is made to evaluate outbound supply chain using theoretical models mainly to find the cost of supply chain in ideal situation. The same cost will be compared with the actual supply chain cost to compare and take necessary steps to improve the value of

chain. In this paper ABC analysis and FSN analysis are combined and used to know the fast moving components in the organization. The analysis has given three categories component in which 'A' category item are considered for the study. 10% of the items in the organization with 75% money value are taken and used for EOQ analysis. EOQ is used mainly to know optimum quantity to be shipped from one place to another place by keeping cost and quantity in the mind. For this quantity the analysis has been done to find out supply chain cost using key cost drivers like transportation cost, order cost, carrying cost and information cost [8].

The detailed methodology has been represented using flow chart and is as follows: The framework starts with all relevant data collection, analysis using ABC analysis, calculating ideal batch quantity and distributing to the customer by calculating the performance [10].



4. Proposed Model:

To achieve the objective like meeting the deadlines for the supply of products in right time, and quantity needs effective supply chain which has to be measured and compared with the benchmark or set of standards to keep SCM cost within the limits[4]. In order to control the process, process parameter values need to be kept within a set limit. Even the several conceptual frameworks are available in the literature; however there is a lack of empirical/ analytical analysis. In this scenario an attempt has been made to bring empirical analysis to evaluate the SCM process.

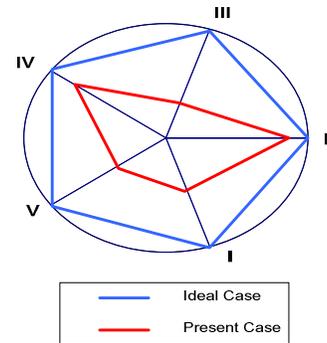
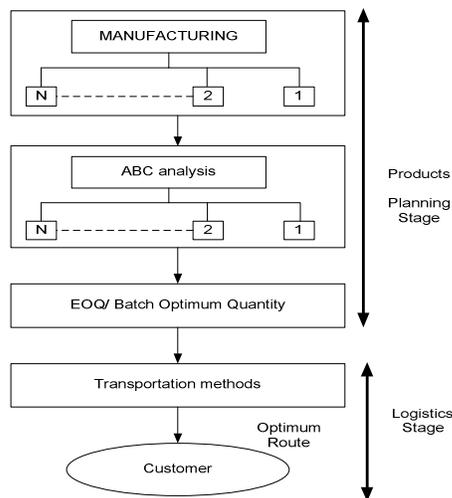
4.1 Key cost drivers:

Care has been taken to identify the true performance measurement parameters which meet the organizational goals. Based on the literature the following metrics like plan, source, make or buy and delivery has been identified. The parameters like order entry method, (which takes care of customer specification and information collected from the customer), order lead time (total time required between the receipt of order until the delivery of finished goods to the customer), the customer route map (the path in which order transships from source to destination) are some of the measures which affect the performance.

The performance measures evaluated based on capacity utilization, scheduling techniques productivity, delivery link evaluation based on technical point of view. Similarly based on cost the SCM performance is measured based on total distribution cost, ordering cost, Return on investment and information on SCM cost. In addition to this SCM is also measured based on the time, like Customer query time, total duration [3].

4.2 Development of Model:

The below model clearly illustrates strategy for the successful implementation of SCM in the organization. As it is known fact that all the organizations are manufacturing more than 2 products, automatically the ABC analysis will be helpful to identify the high value items. After identifying the high value items, batch ideal quantity is calculated with the help of EOQ. At the end the gap has to be measured and reasons to be identified for fixing the same [7].



- I -- Planning Cost
- II -- Logistics Cost
- III -- Customer Satisfaction
- IV -- Lead Time
- V -- Order Cost + carrying cost

The optimum cost of the supply chain can be calculated as follows [8]. Optimum Z = Planning cost + Transportation Cost + Ordering Cost + Carrying Cost + knowledge Cost

5. Discussion:

Model validation involves running the algorithm for the model in order to ensure:

- Input data is free from errors mainly to get the realistic total cost which will be used for benchmarking.
- Results from the algorithm seem reasonable, mainly it takes care of all the cost elements. It is also useful to enter historical data to compare the output with the historical results.

6. Conclusions:

An attempt has been made in the paper to review the available scanty literature mainly to propose the algorithm to streamline the procedure for evaluating our bound supply chain. The process starts with ABC Analysis and ends with the Inventory control method mainly by keeping the customer satisfaction in the mind. The systematic procedure will avoid the errors in the system and makes the calculation simple.

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