

A REVIEW ON DEMAND AND FORECASTING IN SUPPLY CHAIN MANAGEMENT

Veer singh chandraul
M.tech Scholar

Bansal Institute Of Science & Technology, Bhopal
Email.id –veersingh9074515231@gmail.com

Shyam kumar barode
Assistant professor

Bansal Institute Of Science & Technology, Bhopal
Email.id shyam.kr.0210@gmail.com

ABSTRACT

This study demonstrates forecasting practices in supply chain management (SCM) at various areas, particularly Life science, Retail Chain, and FMCG. The authors depicts the scenario of forecasting practices based on secondary data and represents SCM role, demand management, collaborative coordination, etc. In addition, the study reveals the limitation and few practical solutions on forecasting to be useful in the business organization. Consequently the authors describe recommendation and proposes a model on forecasting management model. Though this paper highlights in intensive analysis, however, it unlocks further frontiers for the prospective researchers as well as practitioners in order to apply forecasting techniques.

Keywords— Forecasting, Supply Chain Management, Life Science

I. INTRODUCTION

Modern companies need to deal with different issues in challenging environment. The successful companies are more adaptive and promptly follow the updated or revised concepts of business management. Gradually they apply these techniques into functions. Supply Chain Management (SCM) is one of the new concepts in the corporate sector of Bangladesh which was practiced from late 90s. Initially the Multinational Companies (MNC) incorporated Supply Chain Management in their structures and later on other privates and local conglomerates embraced the concepts. Since beginning purchase and materials management were the main functions of SCM, but later on SCM took the integrated shape i.e. consists of sourcing, materials management, manufacturing support, and distribution management.

Considering the competitive market scenario, SCM becomes the prime functioning area among the companies. SCM deals with direct, indirect, and services from the origin (as input materials) to end customers as final products.

A Supply Chain is a network among the supply chain partners such as suppliers, manufacturers, distributors, retailers, transporters etc. who shares information, deliver goods, ensure services and perform other intermediate activities to meet customer demand [1]. Forecasting is far most beginning activities of SCM which initiates the all other actions of SCM. However forecasting plays an important domain in inside as well as outside of the company [2]. Forecasting is the key driving factor in planning and making decisions in SCM as well as enterprise level. Companies are, truly perform professional way, highly depends on true numerical value of forecasting to take major decisions such as capacity building, resource allocation, expansion and forward or backward integration etc. The exploratory study focus the following objectives:

- Extensive literature reviews on forecasting, demand management based on secondary data.
- Understanding the practice, management and application of forecasting in the three industrial growing sectors of Bangladesh such as lifesaving industry, Retails Chain, and FMCG.
- Limitation and solution of demand forecasting
- Propose forecasting management model in Supply Chain Management.

Forecasting Management

Forecasting plays an important role in business process of a company. This is considered as far most beginning input in SCM dept. and within the organization. Forecasting as part of SCM functions attracts the attention of the companies gradually which time line evolution is close to that of SCM evolution in Bangladesh. Within the organization, marketing dept. submits the forecast in rolling fashion that may be aggregate form, SKU basis, and in SKU basis with place and date of delivery.

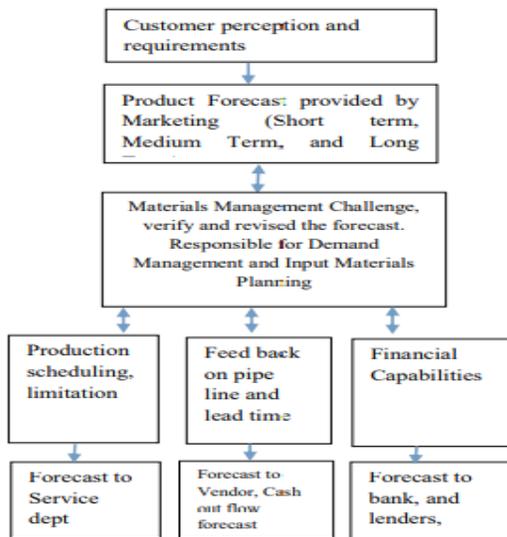


Figure 1 General flow of forecast

II. LITERATURE REVIEW

S gilania et al. [6] In this study, researchers tried to identify of economic factors in the supply of Iranian tourists. In this regard 20 tourist destinations in the time period 2007 to 2011 were reviewed. with linear logarithm function and panel data estimation method was determined that there is significant relationship between per capita income of urban households and the number of tourism supply from Iran and also there is significant relationship between exchange rate and the number of tourism supply from Iran and income has been most important factor.

HaixiaSang's et al. [8]this paper presents a simulation approach to analyze the rental housing supply chain's inventory problem. Unlike most products, the rental housing unit is a "circulation type" product, and the

inventory problem is complicated. In this paper, a systematic and flexible process is proposed that efficiently provides critical decision-making support to managers to help them understand and validate the inventory problem in the rental housing supply chain. The proposed procedure considered inventory impact factors, such as the forecasting method, the lead time, the initial inventory level, and the inventory filling indicator.

A Nasiri Pour et al. [11]In this study based on the characteristic of lumpy demand patterns of spare parts a hybrid forecasting approach has been developed, which use a multi-layered perceptron neural network and a traditional recursive method for forecasting future demands. In the described approach the multi-layered perceptron are adapted to forecast occurrences of non-zero demands, and then a conventional recursive method is used to estimate the quantity of non-zero demands.

F. Saleheen et al. [13] the paper represents a comprehensive study of retail operation. The paper elaborates a broad perspective of a demand and supply chain which interacts with macro and micro environmental factors and translates it into a customer requirement. The authors describe on different techniques and tools on demand and supply planning which leads to an optimized level of inventory, less cash outflow, higher product varieties and a greater customer satisfaction. Eventually fulfilling all these ensures increase in sales and profits to stakeholders; an ultimate objective of a firm. This paper demonstrates a holistic view on how a firm's supply chain operates as a whole. In addition, this study also highlights some retail examples in the US as well as in Bangladesh which unlock further frontiers for the practitioners and prospective researchers to replenish their practices as well as expertise in the retail industry respectively.

III. SPARE PARTS FORECASTING

Normally the maintenance or production department control the inventory of spare parts. Thus they prepare requisition for spare parts. Though recently limited number of forecasting method on spare parts have been developed, there is no use of these techniques in spare parts forecasting. The issue of spare parts hardly discussed in monthly coordination meeting. Products'

character classification and demand pattern are the deciding factors for forecasting of spare parts. The life cycle of spare parts is a deciding factors as final product life cycle is related to it. Most spare parts shows the intermittent demand that is happened at any moment and then remain long time without any demand. It is difficult to predict the intermittent demand. Researchers developed few models based on the industry, duration, mathematical and statistical method.

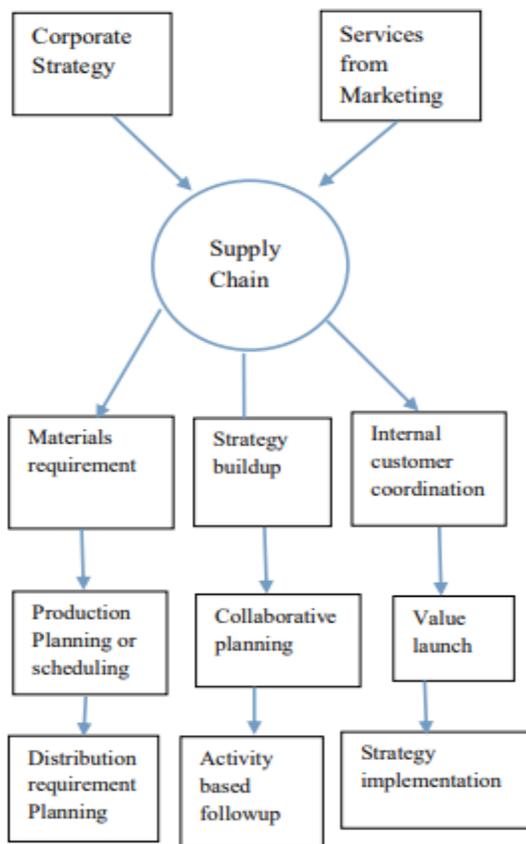


Figure 2. Proposed forecasting management model

IV. ROLE OF FORECASTING IN A SUPPLY CHAIN

- The basis for all strategic and planning decisions in a supply chain
- Used for both push and pull processes Examples:
 - Production: scheduling, inventory, aggregate planning
 - Marketing: sales force allocation, promotions, new production introduction

- Finance: plant/equipment investment, budgetary planning
- Personnel: workforce planning, hiring, layoffs
- All of these decisions are interrelated

V. COMPONENTS OF A FORECAST AND FORECASTING METHODS

A company must be knowledgeable about numerous factors that are related to the demand forecast. Some of these factors are listed next.

- Past demand
- Lead time of product
- Planned advertising or marketing efforts
- State of the economy
- Planned price discounts
- Actions that competitors have taken

A company must understand such factors before it can select an appropriate forecasting methodology. For example, historically a firm may have experienced low demand for chicken noodle soup in July and high demand in December and January. If the firm decides to discount the product in July, the situation is likely to change, with some of the future demand shifting to the month of July. The firm should make its forecast taking this factor into consideration. Forecasting methods are classified according to the following four types.

1. Qualitative: Qualitative forecasting methods are primarily subjective and rely on human judgment. They are most appropriate when little historical data is available or when experts have market intelligence that may affect the forecast. Such methods may also be necessary to forecast demand several years into the future in a new industry.

2. Time series: Time-series forecasting methods use historical demand to make a forecast. They are based on the assumption that past demand history is a good indicator of future demand. These methods are most appropriate when the basic demand pattern does not vary significantly from one year to the next. These are the

simplest methods to implement and can serve as a good starting point for a demand forecast.

3. Causal: Causal forecasting methods assume that the demand forecast is highly correlated with certain factors in the environment (the state of the economy, interest rates, etc.). Causal forecasting methods find this correlation between demand and environmental factors and use estimates of what environmental factors will be to forecast future demand. For example, product pricing is strongly correlated with demand. Companies can thus use causal methods to determine the impact of price promotions on demand.

4. Simulation: Simulation forecasting methods imitate the consumer choices that give rise to demand to arrive at a forecast. Using simulation, a firm can combine time-series and causal methods to answer such questions as: What will be the impact of a price promotion? What will be the impact of a competitor opening a store nearby? Airlines simulate customer buying behavior to forecast demand for higher-fare seats when there are no seats available at the lower fares.

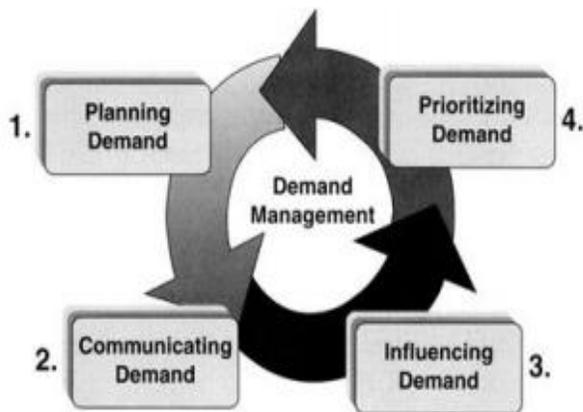


Figure 3 Broad view of demand management

VI. BASIC APPROACH TO DEMAND FORECASTING

The following basic, six-step approach helps an organization perform effective forecasting.

1. Understand the objective of forecasting.

2. Integrate demand planning and forecasting throughout the supply chain.

3. Understand and identify customer segments.

4. Identify the major factors that influence the demand forecast.

5. Determine the appropriate forecasting technique.

6. Establish performance and error measures for the forecast.

1) Understand the Objective of Forecasting

Every forecast supports decisions that are based on the forecast, so an important first step is to identify these decisions clearly. Examples of such decisions include how much of a particular product to make, how much to inventory, and how much to order. All parties affected by a supply chain decision should be aware of the link between the decision and the forecast.

2) Integrate Demand Planning and Forecasting Throughout the Supply Chain

A company should link its forecast to all planning activities throughout the supply chain. These include capacity planning, production planning, promotion planning, and purchasing, among others. This link should exist at both the information system and the human resources management level. As a variety of functions are affected by the outcomes of the planning process, it is important that all of them are integrated into the forecasting process. In one unfortunately common scenario, a retailer develops forecasts based on promotional activities, whereas a manufacturer, unaware of these promotions, develops a different forecast for its production planning based on historical orders. This leads to a mismatch between supply and demand. Resulting in poor customer service.

3) Understand and Identify Customer Segments

A firm must identify the customer segments the supply chain serves. Customers may be grouped by similarities in service requirements, demand volumes, order frequency, demand volatility, seasonality, and so forth. In general, companies may use different forecasting methods

for different segments. A clear understanding of the customer segments facilitates an accurate and simplified approach to forecasting.

4) Identify Major Factors That Influence the Demand Forecast

A firm must identify demand, supply, and product-related phenomena that influence the demand forecast. On the demand side, a company must ascertain whether demand is growing, declining, or has a seasonal pattern. These estimates must be based on demand-not sales data.

5) Determine the Appropriate Forecasting Technique

In selecting an appropriate forecasting technique, a company should first understand the dimensions that are relevant to the forecast. These dimensions include geographic area, product groups, and customer groups. The company should understand the differences in demand along each dimension and will likely want different forecasts and techniques for each dimension. At this stage, a firm selects an appropriate forecasting method from among the four methods discussed earlier-qualitative, time-series, causal, or simulation. As mentioned earlier, using a combination of these methods is often most effective.

6) Establish Performance and Error Measures for the Forecast

Companies should establish clear performance measures to evaluate the accuracy and timeliness of the forecast. These measures should be highly correlated with the objectives of the business decisions based on these forecasts. For example, consider a mail-order company that uses a forecast to place orders with its suppliers up the supply chain. Suppliers take two months to send in the orders. The mail-order company must ensure that the forecast is created at least two months before the start of the sales season because of the two-month lead time for replenishment. At the end of the sales season, the company must compare actual demand to forecasted demand to estimate the accuracy of the forecast. Then plans for decreasing future forecast errors or responding to the observed forecast errors can be put into place.

The practice of forecasting in the mentioned three sectors is limited though there are enormous opportunities to use this managerial technique along with the SCM strategy. Competitive situation always ask for change rapidly and this would be the continuous process for sustainable growth. Forecasting could be used in other than direct materials requirement such as spare parts, office stationary etc. which are untapped area in the organization. Organization can be more effective by eliminating non value added activities from the concerned department.

REFERENCE

- 1] Chopra S., Meindil P. Supply Chain Management, 4th ed., Dorling Kindersley Pvt. Ltd, 2011
- 2] Dr. M. Habib, Supply Chain Management (SCM): Theory and Evolution, Intech 2011
- 3] Lindsay R. Berry, Paul Helman “Probabilistic forecasting of heterogeneous consumer transaction-sales time series” August 2018
- 4] S Gilaninia, Raya Sharifi, “ Economic Factors affecting Tourism Supply”, International Journal of Business and Behavioral Science” Vol 3, No 10, Oct 2013
- 5] HaixiaSang's “A dynamic modeling simulation for supply chain management inventory service: a case study on a rental housing unit manufacturing and logistics company”Conference: the 2018 International Conference August 2018
- 6] A Nasiri Pour, B. RostamiTabar and A Rahim Zadeh, “ A Hybrid Neural Network and Traditional approach for Forecasting lumpy demand”
- 7] F. Saleheen, MH Mirza, Md M. Habib, Z. Hanafi,“ Challenges of Warehouse operations: A case study in Retail Super market”, International Journal of Supply Chain Management, Vol 3, No 4, pp 63-67, 2012
- 8] F. Maon, A Lindgreen, J. Vanhamme, “ Supply Chains in Disaster relief operations”, Cross Sector Socially Oriented Collaborations ISBN 978-1-906422-09-7

VII. CONCLUSION