Demand Management: A Critical Component in Supply Chain

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Received Jul 16, 2024, **Revised:** July 31, 2024, **Accepted:** Aug 20, 2024, **Published Online:** Aug 28, 2024
Reviewers: Anonymous Peer Review
Citation: Pitnerová, I.K. (2024). Demand Management: A Critical Component in Supply Chain. *International Journal of Supply Chain Management, 13*(4), 11-15, https://doi.org/10.59160/ijscm.v13i4.6260

***Abstract*— Effective planning is one of the tools that affect not only the profitability of the services/goods offered, but also the very existence of the company. In recent years, there has been a steady increase in the number of books published on the subject. It is also possible to observe the use of advanced techniques for forecasting demand. This paper analyses in detail demand shaping strategies and their impact on supply chain efficiency and presents possible tools for its management. The analysis concludes that the best tolls of demand management rely on specific needs and circumstances of a business.**

Keywords— *supply chain, critical component in SC, demand in SC, demand management*

1. Introduction

Demand management focuses on managing, planning and forecasting of the demand for services as well as products. it is considered as a crucial process in the entire supply chain management. The primary objective is to maximize customer satisfaction and minimize cost by aligning the demand with the supply chain operations. In order to reduce cost, maintain a balance between demand and supply, improve customer satisfaction and minimise waste, it is essential that demand management be implemented. A strong process of demand management can increase its competitiveness; improve the company's responsiveness to market instability and result in overall growth of the business [1].

These paper intents to explore the critical points of supply chain while focusing on demand. Key components of demand management, customer relation management, synchronization of demand and supply, demand shaping strategy and tools for demand management have been extensively discussed in this paper as part of the critical analysis. The analysis concludes that the best tolls of demand management rely on specific needs and circumstances of a business. Selection of the demand tools and strategies consider certain factors such as complexity and size of the supply chain. The nature of services and customer needs should be well aligned with the business strategy and goals.

2. Components of Demand Management

2.1 Demand Shaping

Demand shaping is defined as a strategy for influencing demand to be in line with planned supplies in terms of supply chain management. Demand shaping is defined as something dynamically inducing demand whereas demand planning and forecasting are about anticipating and preparing for demand, Basically, it comprises different sales and marketing strategies for increased demand in the conditions where there is an abundance of supplies or decrease supply when there are shortages. In addition to demand forecasting and planning, demand shaping is often used. For improving the supply chain management, companies can benefit from these strategies by reducing costs and maximising profit. A variety of strategies and tactics can be used to shape demand [2]. Demand can also be influenced by reaching different customer segments or markets through various channels of sales, e.g. online, retail store, direct sale. The offer of products in a pack can stimulate customers to buy more than they would otherwise, which will have an impact on the demand for various products. The demand for a product or service may be stimulated by advertising and marketing campaigns. It may include promoting the unique features and benefits of a product, providing customers with an urgent feeling or making them feel welcome. Demand may shift among different parts of a company's product portfolio, especially when new or already marketed products are introduced. Demand for a

product or service can be stimulated by promotional activities such as sales, discounts and exclusive offers. They are frequently employed to increase demand in an off-peak period or move the surplus stock. One of the efficient ways of shaping demand can be to change the prices of a product or service. Such as, a reduction in prices can encourage demand while increasing it will lead to reduced demand. One method of shaping demand is dynamic pricing, in which prices are adjusted on a real time basis according to existing market conditions [3].

2.2 Synchronizing Supply and Demand

The company can be operated effectively, maximise profits and ensure good customer satisfaction if it supplies products in line with demand. Synchronization of demand and supply is a fundamental concept of supply chain management. Research has shown that a number of components can be broken down in the synchronisation process [4]. In order to ensure that the supply and demand balance is maintained, companies have to keep a close eye on their supply chain's performance and make necessary changes. Revision of forecasts, adjustments to production schedules or changes in distribution strategies could be part of this. Companies need real-time information on demand and supply circumstances to make educated decisions and make adjustments as needed. Effective communication and information exchange underlies the synchronisation of demand and supply [5]. Thus, the goods are transported from the manufacturing facility to a location where customers can purchase them. Efficient logistics and distribution systems guarantee that commodities arrive in the appropriate quantity, at the appropriate time, and in a good shape. At all times, the correct inventory management ensures an optimum level of stock. Excessive stock can raise expenses, while too little might result in a shortage or a loss of revenue. Once demand forecasts have been made, the company can plan its production activities [6]. It entails establishing the number of commodities to be produced, establishing production schedules, and planning resource allocation. CRM is essential for developing and maintaining customer connections, understanding their requirements and preferences, and providing tailored solutions (figure 1). This can result in better customer service, higher satisfaction with customers and their loyalty. In addition, a CRM strategy can provide an organisation with strategic advantages that contribute to increased revenues and profitability [3].

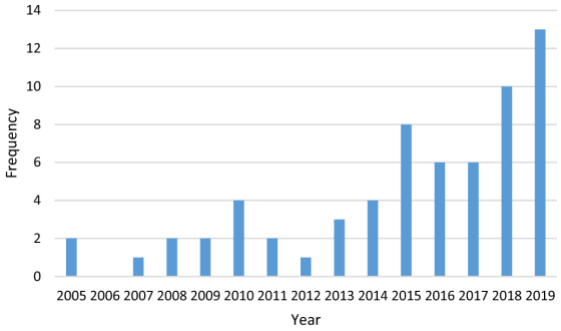

Figure 1 Literature on supply chain demand [7]

2.3 Customer Relationship Management

The system of Customer Relationship Management (CRM) collects customer data from different channels, such as the social media, email, marketing materials, live chat, company's website, phone, and so on. Organisations gain a better understanding of their intended customer base and how to best address their demands by implementing a CRM strategy and supporting technology. To drive sales growth, the goal is to improve relationships with clients and aid in client retention [6]. CRM, in its most basic form, alludes to all the methods, methods, and technology used by businesses to manage and evaluate interactions with clients and information across the customer lifecycle. The main components of CRM have been investigated in this research [10] Several CRM systems are merging with marketing technologies to assist organisations in managing their marketing operations, such as promotional emails or posts to social media. CRM solutions assist firms manage their sales operations from lead generation to transaction closure. This includes the monitoring of sales activities, the management of pipelines, and the forecasting of sales [8]. To assist you in making data-driven choices, extensive analysis and reports on numerous elements of your business, such as sales patterns and consumer behaviour, are available. Many tasks, such as sending follow up email or updating contact information, are repeated. These tasks may be automated by CRM systems, enabling the staff to focus on more complicated tasks. The CRM records all interactions with customers, whether they're meetings, calls, emails or service tickets. This helps to establish the context for future interactions. All customer data is stored in CRM systems, hence it is easier to manage and access [9]. Customer relationship management is essential to build and maintain relationships with customers understand their needs and preferences as well as provide them with tailored solutions. In addition, the CRM strategy may also provide an organisation with strategic advantages that help to increase revenue and profit.

Better customer service, greater satisfaction with customers and their loyalty can be achieved through this approach [2].

3. Demand Planning

SCM or Supply chain management involves demand planning as an imperative step. It serves to make accurate demand forecasts. Businesses utilise these estimates to guide their supply chain strategies. It entails more than just predicting; it also includes business planning and communication among organisations such as distributors, users, and advertising companies. Demand planning aims to reach agreement upon a single operating strategy [9]. In addition to improving the accuracy of revenue forecasts, anticipating demand peaks and troughs can help businesses better manage their stock levels with a view to ensuring product availability and customer satisfaction. The first stage in the collection of sales history is to collect data. Information relating to sales, shipments, promotions and any relevant events that impact the last sale may be included in this data. A baseline forecast is generated by statistical forecasting techniques on the basis of historic data obtained [10]. The following phase is collective collaboration, in which various divisions, including marketing, finance, sales, and processes, analyse and make contributions towards the baseline prediction [11]. They consider potential occurrences including advertisements, introductions of novel products, retirees, and macroeconomic factors that may impact demand. Consensus building involves combining disagreements and settling on an integrated or single operating plan [4]. This is essential to make sure that the organisation is working and well aligned with common objectives. Finally, on the basis of new data and information, this forecast shall be periodically updated and evaluated. Variations in feedback and market conditions along with sales data from customers could form part of this. The periodic review ensures that the demand plan continues to be precise and valid. By successfully predicting demand, a firm may assure a smoother supply chain, reduce distribution costs and inventory holding to enhance customer service, and make better informed tactical and strategic choices [6].

3.1. Demand Forecasting

In order to meet customers' needs, demand forecasting seeks to ensure that there is sufficient stock available while minimising the costs of carrying out a high number of stocks. The demand forecasting is a vital component of supply chain management. This prediction assists businesses in managing inventory levels, estimating possible sales, and planning for future resource requirements. In this process companies foresee future demand for their products and services [9]. Literature has identified several methods of demand forecasting that fall in two major categories; qualitative forecasting and quantitative forecasting. Businesses may employ an array of both quantitative and qualitative techniques, depending on the type of their market circumstances, products and data availability. In order to effectively manage the supply chain, accurate demand forecasts are essential. It's helping businesses plan their production, inventory management, delivery schedules and strategic decisions on prices and sales [11], [4]. In order to forecast demand, companies take a number of factors into account. Table 1 represents demand forecasting in supply chain through big data analysis.

Rank	Technique	Frequency
1	Neural networks	30
2	Regression	27
3	Time-series forecasting (ARIMA)	13
4	Support vector machine	8
5	Decision tree	8

Table 1 Machine learning techniques for supply chain demand forecasting [7]

This includes market trends, seasonality, historical sales data, promotional activities and economic factors. Unexpected variables like external events, competition, consumer behaviour and natural disasters or pandemics can all have a big influence on demand. Qualitative forecasting is frequently used while developing new goods or entering a new market. If historical data are not available, these methods shall be applied [12]. They are based on market research and expert judgement [10]. The opinion polls, market surveys and the Delphi Method are used. For existing products with predictable demand, quantitative methods are often used. These strategies are employed when previous data can be quantitatively evaluated to forecast demand over a period. Time series analysis, regression analysis, and exponential smoothing are the employed techniques Nevertheless, it is crucial to understand that no prediction is completely precise; therefore, it is frequently required to create a certain level of adaptability to deal with unforeseen variations in demand [8].

4. Demand management tools in supply chain

Businesses can benefit from a number of tools and technologies for effective management of demand within their supply chains [4]. In order to respond to changes in demand, these tools can be used for tasks such as setting inventory and production n levels, forecasting demand, adjustment and monitoring of operations. Literature identifies several key tools [8]. Collaboration and communication between different departments and external partners can be improved through tools such as Microsoft Teams, shared cloud-based platforms or Slack that are essential to effective demand management [11]. Machine Learning and Artificial intelligence methods can increase demand forecasting accuracy by learning from past data and finding complicated patterns and trends. In addition, they can automatically perform routine tasks and offer timely insights and recommendations [9], [12]. Figure 3 shows a web of demand management tools employed in supply chain

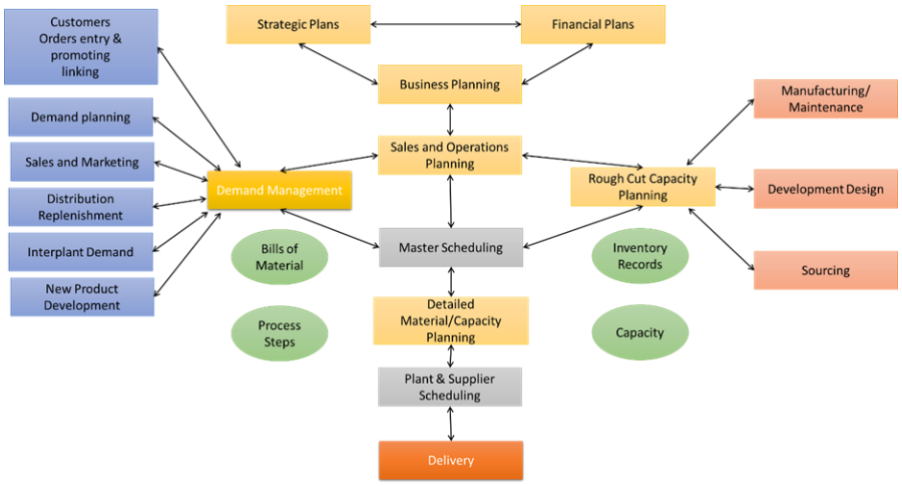

Figure 2 Demand management tools from planning to delivery in supply chain

5. Conclusion

In order to enable businesses to anticipate demand peaks and troughs, manage stock levels effectively as well as make informed decisions, planning and forecasting are essential steps in the management of supply chains. The importance of tools and technologies, including collaboration platforms, artificial intelligence and machine learning, for improving the accuracy of demand forecasts and overall demand management is also highlighted in the paper. Taking into account factors such as supply chain complexity and size. The choice of demand management tools and strategies should be adapted to each enterprise's particular circumstances and needs. A well-implemented process of demand management can improve the responsiveness of a company toward market change, stimulate economic growth and enhance competitiveness.

This paper has provided a critical analysis of demand management within the context of supply chain management, focusing on key components such as demand shaping, synchronization of demand and supply, customer relationship management (CRM), and demand planning management.

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