

Collaborative planning forecasting and replenishment commerce essay



Consider a company XYZ which produces various automotive parts. One such part is ABC, for which there is a rise in inventory level. The marketing team decides to launch a promotional campaign to boost the sales and ABC and curtail this rising inventory level. This promotional campaign was a great success and there was an increase in the sales of product ABC. The production department noticed this rise in sales of product ABC and they started producing more of ABC in anticipation of rising demand. This again resulted in an increase in inventory level (negated the entire motive of the campaign). This is a perfect example of the importance of information sharing (collaboration and Communication). A similar kind of issue occurs, when we do not share information in a supply Chain, resulting in “ Bullwhip Effect”.

In an organization, if different departments have different owners with different views and goals, they all try to maximize their individual profits. In the path of achieving this, they get deviated from their common goal of maximizing the overall profit of the entire Supply Chain. This deviation from the true goal leads to lack of coordination

Inappropriate flow of information

Due to incomplete sharing of information between stages (inter-organization and intra-organization), information is distorted. Today, for a given organization, there are a thousand of products. This increase in variety of products makes it next to impossible for the companies to exchange all information among all its suppliers

Such inappropriate flow of information results in BULLWHIP effect. Here, fluctuations in orders increase as we move up the supply chain from consumer to retailer to wholesalers to manufacturers.

Proctor and Gamble was the first to observe the bullwhip effect in its supply chain for Pampers diapers. They found that the raw material replenishment order at the supplier side had huge fluctuations as compared to fluctuation in demand at retail stores. Same way, HP also found that the fluctuations varied significantly with being very little at resellers point and increasing as moving up in the chain towards integrated circuit division (ICD). Here also, while the variation in product demands were very little, replenishment orders placed with ICD saw much more variability. A similar phenomenon can be seen in apparel and grocery industry.

Lack of Coordination and its effects on Performance – The Bullwhip effect

A supply chain is said to be lacking in coordination if each stage (level) is concerned about optimization of its own objective. In doing so, various individual entities get deviated from a common objective or organizational goal – to satisfy consumers by satisfying their needs and there by generating maximum profit for the organization. Information distortion is also one of the causes of Lack of Coordination, as in the case of diaper supply chain of P&G.

Areas affected by Bullwhip effect

Manufacturing cost

Inventory cost

Replenishment lead time

Transportation cost

Labor cost

Levels of product availability (service level)

Relationship across the supply chain

Manufacturing Cost

As a result of Bullwhip effect, Manufacturing unit of P&G have to produce to satisfy the demand of diapers with much more variability. P&G can respond to such variability by either holding of excess inventory or by producing more capacity, both of which leads to increase in manufacturing cost.

Inventory cost

The Bullwhip effect also results in increase in inventory cost. With increased variability in demand, P%G has to carry a higher level of inventory than would actually require in absence of Bullwhip effect. Thus, we can see a major increase in Inventory cost. A higher level of inventory will also mean an increased warehouse space requirement (again an increase in cost).

Replenishment Lead Time

The Bullwhip effect results in increased replenishment lead time. With the increase in variability in demand due to Bullwhip effect, scheduling at suppliers and P&G are much more difficult as compared to a level demand.

There are situations when the available resource (inventory) is not enough to meet the demand and there by resulting in higher replenishment lead time.

Transportation cost

The Bullwhip effect results in higher transportation cost. With the increased fluctuations in demand due to Bullwhip effect, there is a proportional fluctuation in the requirement of transportation. This results in a rise in transportation cost

Labor Cost

Labor cost increases in presence of Bullwhip effect. Labor cost at P&G and its suppliers increase due to fluctuations in demand. Also, labor cost for receiving at retailers end increases due to this increased uncertainty. Now all these stages have option of either operating at excess labor or variable labor, both of which results in increase in labor cost.

Level of Product availability

One of the major outcomes of Bullwhip effect is the Out Of Stock situations. As we know, with increase in fluctuations in orders, P&G is not capable of satisfying the needs of all its retailers on time, which in turn increases the likelihood of retailers going OOS – resulting in a sales loss in the supply chain.

Relationship across the supply chain

The Bullwhip effect, having a negative effect on performance at all levels of supply chain results in bitterness in the relationship between these various stages of supply chain. Since each stage is working independently and is trying to achieve its individual goal, they are under an impression that they are doing it in right way. They start blaming other department of inefficiency and there by resulting in loss of trust.

Performance Measure

Bullwhip effect

Manufacturing cost

Increase

Inventory Cost

Increase

Replenishment Lead Time

Increase

Transportation Cost

Increase

Shipping and Receiving Cost

Increase

Level of Product availability

Decrease

Profitability

Decrease Thus, we can say that the Bullwhip effect has a significant effect on the overall profitability of the supply chain. There is an increase in cost and decrease in responsiveness.

Obstacles to achieving coordination in Supply Chain

Factors leading to local optimization at various stages of supply chain or increase in information delay are the root cause of difficulty in coordination in supply chain. The five major categories of obstacles are

Incentive obstacles

Information processing obstacles

Operational obstacles

Pricing obstacles

Behavioral obstacles

Incentive obstacle

When there is a variation in incentive offered at different stages in a supply chain, there is an increase in variability in the productivity and reduction in total supply chain profits.

Local Optimization: Suppose that the incentive of a floor manager at a local grocery store depends up on the profit they generate for that particular

store. Here, the managers take all their purchasing and inventory decisions to achieve this goal only and not for the benefit of the entire supply chain. Buying and stocking decisions which are based on single stage optimization can never result in over all supply chain profitability.

Improper sales force incentive: Very often, sales force incentive are designed in a manner to achieve local goals. Sales force incentive are based on the quantity sold to the distributors and not the end consumers. For example, consider an umbrella manufacturing firm, which offers its sales force an incentive on the sales target achieved in off season. To maximize their bonuses, sales force convinces distributors to buy more umbrellas even though there is no demand. This results in order variability with more demand in off season and less demand when actually there are sales. This kind of sales forces incentive result in order variability more than customer demand variability.

Information processing obstacles

Information processing obstacles occurs in a situation when there is a distortion in information regarding demand as it moves from customers to retailers to distributors to manufacturers.

Forecasting based on orders and not on customer demand

When there is a Bullwhip effect in a supply chain, the only communication between different stages is the orders they receive. Each stage sees its responsibility as fulfilling orders to its downstream. In such a scenario, a very small change in customer demand will result in large variability in orders

placed by the distributors. The fact that each stage in a supply chain forecasts demand based on the stream of orders received from the downstream stage results in a magnification of fluctuations in demand as we move up the supply chain from the retailer to the manufacturer.

Lack of information sharing

Suppose a retailer increases the size of order for a particular product due to its planned promotion. Now, if the manufacturer is not aware of this planned promotion, it will see this increase in order as increase in customer demand and place orders with suppliers accordingly. So, when the retailer finishes its promotion, both manufacturer and distributor has a piled up inventory.

Operational obstacles

Operational obstacles occur at the time of placing and filling of orders. There are a number of fixed costs associated with placing of order, receiving or transportation of an order. Different retailers may prefer orders in lots to minimize such costs. Thus at the suppliers end there is large variability in order as compared to demand variability at retailer's end. Now, if there a number of retailers associated with the same supplier, and due to placement of orders in lots, there might be some days when order may be erratically high as compared to other days as compared to demand. Such situations may also lead to large replenishment lead time.

Pricing obstacles

Lot size based quantity discounts occurs when there are discounts offered on large lots of order placed. These resulting large lots magnify the Bullwhip
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effect. There are a number of trade promotions and short term discounts. Such offers always boost orders, which are nowhere in sync up with the real demand. Such forward buying result in large orders during promotional activity or special discount rates but very small orders after that.

Behavioral Obstacles

Behavioral obstacles are problems in learning within organizations which later on contribute to the Bullwhip effect.

Each stage of supply chain acts locally and is not aware of the consequences of its action on others.

Different stages of the supply chain react to the current situation locally rather than trying to identify the root cause.

Due to lack of common understanding and mutual trust, each stage plays a blame game on each other with no one taking the responsibility of these fluctuations.

Lack of trust with in supply chain makes them all opportunistic at the expense of the overall supply chain profitability. This also results in duplication of efforts. Since individual entities do not share ideas and work in isolation, many a times they turn up doing the same task.

Means to Overcome obstacles of Collaborative information sharing – Collaborative Planning, Forecasting and Replenishment

Means to overcome these obstacles

Improved information accuracy

Alignment of goals and incentive across the channel

Building strong partnership and mutual trust

Improving Operational Performance

All these efforts can be achieved by Collaborative Planning, Forecasting and Replenishment. So what exactly is Collaborate Planning, Forecasting and Replenishment (CPFR)? Here, both sellers and buyers at all the levels come together and collaborate along all or few of these activities.

Strategy and Planning

Demand and Supply Management

Execution

Analysis

At strategy and planning stage, all the partners involved discuss upon the scope of collaboration and assign roles and responsibilities and define checkpoints. They align all their activities including promotions, new product introduction, store opening and closing and inventory policies. Then, at demand and supply management, sales forecast using point of sales data

give an accurate picture of demand. Now, as the forecasts become firm, they are converted to actual orders. Then, processes like production, shipping, receiving and stocking are executed. Now the last but most important task is analysis of KPI. There is always a need for identifying exceptions and evaluating metrics that are used to assess performance.

One successful CPFR implementation has involved Henkel, a German detergent manufacturer, and Eroski, a Spanish food retailer. Prior to CPFR, Eroski saw frequent stock outs of Henkel products, especially during promotions. At the inception of CPFR in December 1999, 70 percent of the sales forecast had an average error of over 50 percent and only 5 percent of the forecasts had an error below 20 percent. But, just within four months of CPFR implementation, the numbers changed drastically. Forecast errors above 50 percent reduced to 5 percent and more than 70 percent of the time, forecast error was below 20 percent. Customer service level also increased to 90% with an average inventory of just 5 days.

CPFR implementation Scenarios

Mentioned below are the most common CPFR implementation scenarios

CPFR scenario

Where applied in Supply Chain

Industries where applied

Retail event collaboration

Highly promoted channels

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All industry other than those that practice EDLP

DC replenishment collaboration

Retail DC or distributed DC

Drugstores, hardware, grocery

Store replenishment collaboration

Direct store delivery or DC to store delivery

Mass merchants, Club stores

Collaborative assortment planning

Apparel and seasonal goods

Specialty retail

Common CPFR Scenarios

Retail event Collaboration:

In any retail supermarket, there are a number of events such as promotional activities and they affect demand very much. OOS and excess inventory, unplanned logistics cost and order placement costs are sometimes very high and may affect the overall profitability in the supply chain. Here the two parties involved identify specific brands that are to be included in collaboration. Each and every minute detail like promotion time and place,

display tactics, advertisement are shared. Once, information sharing is done, a demand forecast is prepared and shared with in the two parties.

P&G is one such example which has implemented Retail event collaboration with many big retail chains including Wal-Mart.

DC replenishment Collaboration

This is one of the simplest and mostly used collaboration scenarios, where partners need to collaborate for forecasting on demand and DC withdrawals. This collaboration is comparably easy to implement since this collaboration requires aggregate forecast and does not require sharing of point of sales data. And slowly, with due course of time, this collaboration can be moved up to all other storage points in supply chain (from retail shelves to Inventory warehouse)

Store Replenishment collaboration

Store replenishment collaboration is one step ahead of DC replenishment collaboration. Here, collaboration is on store level point of sale forecast.

These forecasts are used placing store orders. Benefits of store

Replenishment collaboration is increased replenishment accuracy, improved service level and less Out of Stock situations, reduced inventory and greater visibility of point of sales data.

Collaborative Assortment Planning

For fashion apparels and seasonal products, demand follows a seasonal pattern. Thus, collaborative planning in these categories follows seasonality

Hence, the forecasts rely more on collaborative understanding of industry trends, customer tastes and less on horizontal data.

Why is CPFR important?

Consider a consumer walking in to a retail grocery outlet to find that the product which he is looking for is not available (out of stock). For the consumer, it is great inconvenience and for the store owner, it is a loss of revenue. Such a situation is not only a plague in retail industry, but also a nightmare for manufacturing sector. Out Of Stock of one particular inventory in the manufacturing line can lead to zero overall production (bottlenecks). Mostly (70% to 75%), out of Stock occur at retailer level.

Reasons for Out of Stock at retailer level:

Lengthy Ordering Processes/Cycles

Underestimated demand

Un stocked shelves even though the products are at the store

So, what is required to tackle such problems?

End to end information channel – Point of Sale information coming from retailer to the supplier. CPFR is one such process where we use common tools to capture data at all stages in the supply Chain. Pioneers to this practice are Wal-Mart and Tesco. They first linked their Point of Sale data from Retail stores to their Warehouses. This laid down the bricks to the building of an open information infrastructure. The second and more critical task in implementation of CPFR is managing cultural change. There has to be

a willingness to share information. A mutual trust between different stakeholders is a must, since the required information to be shared is confidential most of the time.

Benefits of Collaborative Planning, Forecasting and Replenishment

Lower inventory levels

Increased sales

Less overhead

Reduced human errors (data exchange)

Better insight in customer demand resulting in better resource utilization, reduced inventory requirements.

Improved and direct communication with customers

Opportunity to provide category management

Reduced replenishment time

Less redundancy

Increase service level and reduced stock outs

Lower Inventory Level

By having knowledge of exact inventory status of customer, the supplier has better control on lead time of his inventory. He knows his exact inventory requirements due to lower uncertainty. A better forecasting leads to lowering
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the need for safety stocks (also termed as buffer stock – is the level of extra stock maintained to mitigate the risks of stock outs due to uncertainties in forecasting). All these factors combine to result in lower inventory.

Increased Sales

CPFR in place ensures the product availability at any given point. This results in a better customer experience and customer satisfaction. A satisfied customer becomes your loyal customers. A loyal, regular customer generates more revenue than a first time customer. Also, less stock outs at outlets result in less customers returning without any purchase. This results in increased sales.

Better Resource Utilization

Proper knowledge of customer demand due to end to end information sharing, results in a better forecasting. An improved forecasting numbers result in more planned decisions, clarity of mind in terms of inventory requirements and so a better RU plan.

Increased Service Level

Collaborative Planning, forecasting and Replenishment builds up a better forecasting model. In CPFR system, at each level, a supplier has access to real time sales and inventory data of a customer. As soon as the inventory goes below the safety level, a replenish order call is triggered. It helps customers to operate at higher service levels and lower inventories. Now, these are the benefits every supplier aspires for.

Challenges in implementation of CPFR

It is a universal truth that no benefit comes without a cost. Same way, with so many benefits associated with Collaborative Planning, Forecasting and Replenishment, there are also few risks and hurdles to its implementation. With sharing of information at such a large scale, its misuse is one such risk. Often, one entity may have relationship with various competitors. Another risk involved is viability of change in technology. If one of the partners in collaboration changes its technology, the other is forced to do so or it may lose its collaboration. Thirdly, with the requirement of close interaction of the partners, a variation in their cultures can also play a very important role in making decisions of CPFR implementation. The inability to foster a collaborative culture across the partner organizations can be a major hurdle to the success of CPFR. However, one of the biggest challenges is that the demand information which is shared between the partners is often not used in an integrated manner within the organizations. It is imperative to have integrated supply and demand, logistics and corporate planning within the organizations. This will help in maximizing the overall profit generated in the supply chain.

Factors affecting Distribution Network design

Elements of customer service influenced by network structure:

Response time

Product variety

Product availability

Customer experience

Order visibility

Return ability

Supply chain costs affected by network structure:

Inventories

Transportation

Facilities and handling

Information

Supply Chain Costs affected

With a better visibility due to information sharing, the inventory requirement decreases, thereby reducing overall inventory cost. Also, a common supplier may have information (real time) of all its customers and can very easily club in various orders. This can be achieved by using MILK RUN model of distribution – One truckload stopping at multiple points to replenish various customers. This helps him to reduce his transportation cost also.

Implementation of centralized information systems (ERP, SAP) may eliminate the hassles of manually data entry and transfer. Though, the onetime cost of implementation of such systems might be very high, they reduce the human error probability. Such errors may result in inaccuracy in forecasting which will again result in higher inventory costs and out of stocks (loss of sales).

Elements of Customer Services influenced

Response time and Product availability

CPFR builds up a better forecasting model. The actual demand information is used to generate replenishment orders. This helps vendors to improve their response time and less out of stock situations in the retail outlets.

Customer Experience

When a customer walks in to a retail store, there is a lesser chance of him finding an out of stock situation. Product availability (right product at right place) helps to increase customer satisfaction.

Order Visibility

With CPFR in place, the supplier can see the customer demand in actual and can anticipate the orders. This helps in reduction in errors in forecasting. A well informed and collaborated partners increases order visibility. All this is possible only due to Collaborative information sharing in the system.