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Managing distribution chain: Is there a better way than gazing the crystal ball?

by **Vector Consulting Group**

Living with the chronic problem and associated conflicts

Managing the supply chain of a distribution company (like a consumer goods company or a retail chain or a spare parts distribution for automotive/industrial applications) is extremely challenging. The challenge is inherent in the frequent conflicts that the managers face in handling the day to day decisions for the supply chain. For example the chronic conflict between sales and logistics about inventory while sales always want higher inventory for protecting sales, logistics and finance want to limit inventory to control costs. Sales is more than willing to start a discount scheme and push out inventories or counter competition, while finance is wary of such drops in product margins. Production wants schedules (based on forecasts) to remain stable, while marketing would want production to be more flexible to the changes in market requirements. Sales would want more budgets allocated for marketing and advertising expenses while others may insist on growth of sales to fund the extra allocation for marketing and advertising expenses.

These conflicts manifest in seemingly contradictory supply chain issues like having significant stockouts despite having high overall inventory (inventory turns of around 3 or 4) OR price pressure from the supply chain intermediaries while the price to the end consumer is not affected OR new products introduced when the old ones still clog the pipeline. The problem is further aggravated for hightech products, where the total inventory in pipeline for most companies is usually much more than the life cycle of the product itself – this leads to significant price discounts and subsequent negative impact on profitability of companies. The same problem with fashion products – too many SKUs and all the SKUs need to be available much before the fashion season. During the season, there are stockouts on about 20 to 30% of the items (those that sell well) after few initial weeks of the long fashion season. Towards close of the season, there are many slow movers which have to move to the "factory outlet" for discount sales.

The ramifications of dealing with such supply chains are significant for the end retail shop. A retail shop is always constrained on cash and/or space. Most of the shop inventory is skewed towards the slow movers. Since the slow movers block cash and space, the sales efforts and space are allocated more towards the slow movers. This in turn takes the opportunity away to clock more profitable sales from the fast movers. At the same time shortages occur, and usually of the fast runners. With too much cash tied up in inventory, the ROI for retail shop is less than what is desired.

With such chronic conflicts, significant growth in sales (about 30% over previous year) is never targeted in the annual business plan because many believe such rapid growth in sales will invariably come at cost of very high growth in expenses, lower margins or high inventory. The targets are grudgingly set at less than 10% growth over last year in many distribution organizations. Is there a way out? As an answer, a manager of a large distribution company once remarked, "We can set and meet any ambitious target, if we are able to be 100% accurate on the sales forecasts. An accurate forecast will ensure we make all the right SKUs, and distribute it to the right location of demand and do not feel the pressure to drop prices as inventory matches the forecast." Direction of solution which isn't! An accurate forecast! This looks like a good direction of solution. No doubt many of the distribution companies are struggling hard to improve the accuracy of their forecasts.

Many have invested in expensive software tools to improve the forecasts. Despite all the investments, the problem remains with forecasts – they are not as accurate as one would want them to be. However, the fundamental question is "can forecasts be ever accurate"? We may be able to provide a "reasonably" good forecast for a product at the national level, but forecasting at SKU and location level for a long horizon is as reliable as weather forecasting. Chaos theory does

validate that it is almost impossible to predict accurately the outcome of a chaotic system, like demand in a market. A small change in any demand variable can lead to disproportionate outcome, making it difficult to predict the outcome. For example supply of the competitor gets affected in one location, leading to sudden surge in demand, further aggravated by scarcity driven purchases or a sudden surge in demand of a fashion SKU after a local hero is seen wearing the product in a public event. The sales at SKU and location level are highly fluctuating and unpredictable and it is impossible to predict the impact of all variables on demand. Any attempt to bring sanity at this level is a futile exercise.

Many organizations have moved to minmax replenishment system to get over the forecasting problem. An order is placed to the max level when inventory reaches the min level or the reorder point. The min inventory is supposed to take care of fluctuations in demand during the lead time of replenishment.

However in a growing demand market, the min inventory can vanish before the next supply comes in or during the scenario of reduced market demand, one need not procure when the inventory reaches the min because the company can afford to wait further. In case of high demand fluctuations, like at the end of the supply chain, minmax does not seem to provide the adequate protection while can it also lead to higher inventory from time to time. In many organizations, the min inventory is set based on a sales target which in any case is also a forecast.

In some other companies, global inventory policies are defined. For example a dealer has to carry so many weeks of inventory. Such policies are even more damaging as demand of one SKU, in most cases, has nothing to do with demand of the other. The total cap on overall inventory policy leads to decision where for some SKUs, the inventory is inadequate while for others it is more than adequate.

This leads to situations where a distributor is few hours away from the company warehouse but has few weeks or even few months' stocks while still suffering from stock outs. In most organizations, the inventory is set thinking only about the demand and without any consideration of supply lead times. Theoretically inventory norms should be set based on both demand fluctuations and supply times, however many ignore the supply lead times and set inventory norms only based on demand fluctuations.

The Solution: simple yet powerful!

The starting point of building a good solution is to go back to basics of inventory management. One needs to understand that inventory is kept for products where the customer tolerance time is much less than the time to produce, hence there is a need to keep inventory so as not to lose the customer.

The inventory at any location has to account for the following variables

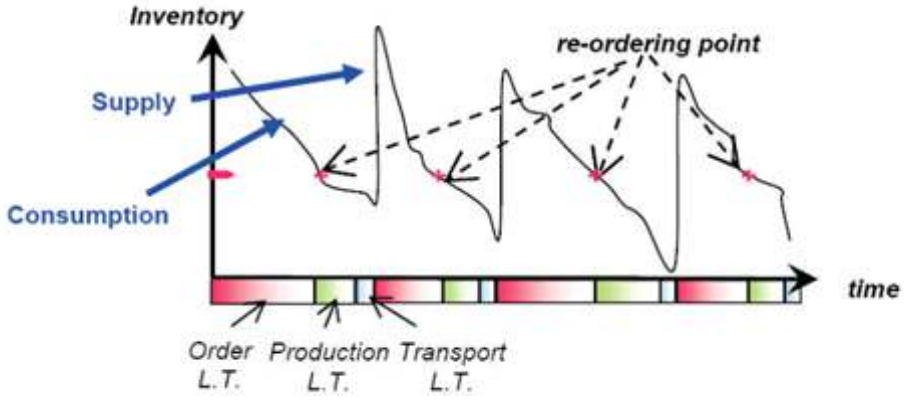
- Replenishment lead time
- Demand during lead time
- Variation in supply time
- And variation in demand

Of all the above variables, replenishment lead time is the most important as it impacts all other variables. For example the supply lead time is highly variable when it is longer. The demand is also highly variable for a longer lead time.

So if one wants to improve the forecasting, it is important to focus on one variable – the replenishment lead time. If we are able to reduce the replenishment lead time significantly, we can manage with much less inventory and forecasting accuracy will improve significantly with the lower lead times.

To reduce supply lead time, one needs to understand the components of the replenishment lead time. The components are:

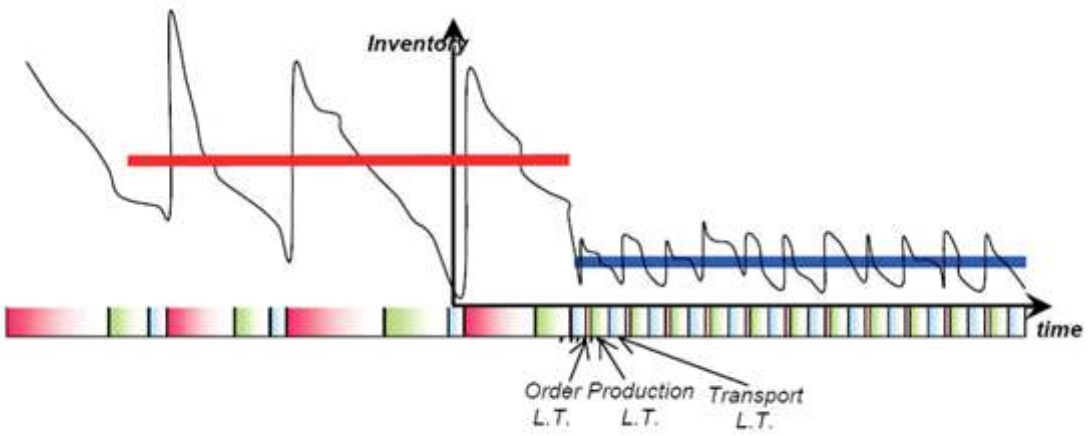
- Order lead time (time till an order is placed for a SKU)
- Production lead time
- Transportation lead time.



Reducing the order lead time

Looking at the above diagram, we see that the order lead time is a significant part of the total lead time. The minmax ordering systems, increase the ordering lead time, as one has to wait till the level reaches the reorder point before placing orders. Many organizations take orders from distributors, once a month or twice a month per SKU even though they might be taking many orders throughout the month. For an SKU, the lead time goes up. Can we reduce the order lead time? Yes, in era of interlinked computers and EDI systems, we can go for daily ordering per SKU – we need not optimize on clubbing orders per SKU. Does it mean that the supplier has to ship out more frequently with partial loads? No. If there are frequent shipments, each shipment will now have a larger assortment of SKUs rather than single SKU.

The change is as depicted in the diagram below:



Managing with lower inventory

Now that the supply lead time has been reduced significantly, one needs to stock enough to cover any demand during the supply replenishment time. Then next step is to focus on fast replenishment to the actual consumption from the stocks. The need of forecasting just goes away – the entire supply chain just reacts to a very objective data – the consumption. For every item, at every location, a target inventory is set based on "paranoid" consumption during replenishment time (the maximum forecasted demand during the replenishment time factored by the fluctuations in the replenishment time). The stock is replenished at the pace of the sales.

Managing exceptions with buffer management

Even though there is supply based on consumption, there is a chance that between 2 supplies, the inventory might fall down to dangerous levels which in turn can lead to stock outs. The target inventory is a planning decision – we need a system to manage exceptions during execution. Buffer Management is an execution control method that provides priorities based on the actual consumption of the buffers.

- The Target Level of every item, at any location, is a buffer.
- Buffer status measures how much of stock as compared to the target level does NOT reside at the location.
- It is defined as the percentage of (Target Level – On hand) to the Target Level.
- What is missing from the on hand stock should be somewhere in the pipeline from the source to the target.

What is missing from the on hand stock should be somewhere in the pipeline from the source to the ? target. When the stock at the target is more than 2/3 of the target-level, the buffer is considered to be Green. This means having too much stock. When the stock at the target is between 1/3 and 2/3 of the targetlevel, the buffer is considered to be Yellow which means that the stock level is OK.

When the stock at the target is less than 1/3 of the target-level, the buffer is considered to be Red which means things are NOT OK. There is a real risk of running out of stock. There is a need to bring in quickly some of the replenishment that should be already on the way.

Changing the target levels

If the stock stays continuously in red throughout the replenishment period, there is a need to look at changing the target levels. Similarly when the stock stays in green for multiple replenishment periods, there is a time to look at reducing the norms. This way of dynamic buffer management helps in aligning stocks based on demand situation per SKU per location. The decision is much better than current practice of just arbitrarily cutting stock norms. When one cuts arbitrarily the stock norms, people usually reduce the fast runners and leading to more stock –outs. Dynamic buffer management prevents such adhoc decisions.

Benefits of aggregation – the plant warehouse

In most push based supply chain, bulk of the inventory is close to the demand point where demand fluctuations are most erratic. Sales target based on primary sales, pushes inventory close to the demand point. This leads to stock outs of a SKU in one location which is available in excess in another location.

Many organizations have tried to solve the problem by inter-warehouse transfers but rising costs of logistics and temptation to hold on to inventory at local points has not made this solution effective.

We can solve the problem by having skew of inventory at a point close to supply where demand is flat and stable. A plant warehouse with bulk of inventory feeding the regional warehouse should solve the problem to a large extent. The plant warehouse will decouple the regional warehouse from production fluctuations. The inventory at plant warehouse will account for production lead time, while the regional warehouse need to stock only to account for the transportation lead time. The plant warehouse will reduce the overall inventory levels in supply chain, as fluctuations are less at mother warehouse level than regional or the retail level. The demand points are free from production fluctuations, so they can manage with much lower inventory than they have currently.

The supply to each inventory location will be based on consumption. For example plant warehouse will supply the regional warehouse based on consumption, similarly the plant will produce based on consumption in plant warehouse.

The expected benefits

The stock outs should drastically reduce as replenishment is reacting to pace of sales much faster than before. In most environments, we see sales jump of around 30 to 40% after implementation of the replenishment solution. The inventory drops down drastically while the ROI of dealers go up significantly as they manage business with much wider spread of SKUs without any stock-outs.

Vector Consulting Group **(www.vectorconsulting.in)**, is the largest Theory of Constraints (TOC) consulting firm in Asia. The firm has been working closely with well-known companies across industries to help them build unique operations and supply chain capabilities that can be leveraged as a competitive edge in the market. Vector now has the highest number of success stories in Theory of Constraints Consulting and has also won several national and international awards for their work.