

Demand Driven Approach to Combat Nervousness of Auto Supply Chain in India

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Abstract

Indian automotive market is heading for one of the lowest sales over the last eight years. Entire industry is in the state of confusion due to various factors like BS1V to BSV1 migration, electric vehicle, GDP decline, NBFC crisis and this led to overall negative consumer sentiment. Globally retail numbers are reported by government agencies, however in India retail numbers are neither reported nor considered for Sales and Operations Planning. There is urgency and necessity to incorporate retail numbers for planning for auto manufacturers in India. There are 3P's of demand sensing and shaping which are Position, Protect and Pull. This paper emphasises on theoretical framework for application of 3P's which includes strategic inventory positioning, Strategic buffers & its adjustment and real demand-based planning and execution. Strategic inventory positioning helps to identify and position decoupling points to protect and promote the flow of relevant information and material.

Proposed framework of 3P's will help to mitigate nervousness, supply continuity variability and bullwhip effect. This means current situation of overproduction, overstocking and lack of adequate working capital for India auto industry can be tackled.

Keywords

Demand sensing, Strategic inventory positioning, Decoupling points, Buffer levels, Indian auto industry

1.Introduction:

Year 2019 has witnessed continues decline in auto sales in India. Month on month basis passenger cars were among the worst performers in the category (-41%) in the month of August. Sales of heavy commercial vehicles and two wheelers also fell on a monthly basis. Although demand has shown some positive indication in the month of September as well as October, month on month basis passenger vehicles have registered degrowth of 5.64%, whereas commercial vehicles and two wheelers have registered degrowth of 15% and 12 % respectively.

Almost after 10 months, the system inventory is at 30 to 45 days which is much improved and trending towards normal level. Dealers are facing an acute liquidity crunch due to slowdown in demand. Manufacturers have cut down their production quantity to ease inventory level in the pipeline. Entire Industry is in the state of confusion due to various factors like migration from BS4 to BS6, Electric vehicle strategy, GDP decline and NBFC Crisis

All these factors have impacted overall cash flow and consumer sentiments. Even pointers for decline in demand were evident, however it was ignored in anticipation of demand. Automakers do not report retail sales and complete

planning was based on wholesales numbers. In general retail numbers are the real representation of consumption and it helps in monitoring the inventory levels across the supply chain. Globally for auto industry retail numbers are reported by government agencies, however in India RTO manages retail numbers through vehicle registration records but there is no official publication of retail data at either gross or elementary level. Recently industry captains have echoed that current automobile crisis is largely due to overproduction and stocking. This in turn raises question that overproduction happened due to wrong reference number for planning which is wholesales number.

Industry stalwarts are now advocating in favour of retail monthly sales numbers over wholesales numbers, a view that is slowly gaining momentum for discussion as well as consensus in an otherwise fractious industry community. Wholesales numbers are meaningless. Companies try and show high sales numbers by building inventory at the dealer end. Auto Industry apex body SIAM is yet to take a firm stand on this issue.

2.Reasons for current slowdown and excess inventory levels:

As per researchers, acquisition cost of new vehicles has increased due to upfront insurance premium for three to five years. Input material costs have also gone up. Due to on-going change in emission norm from BS IV to BS VI, there is anticipation of further increase of vehicle cost.

Overall slowdown of Indian economy has impacted consumer sentiments. Spending power and Job confidence index has reduced in last one year. Also, there is increase in non-performing assets (NPA) of non-banking finance sectors (NBFC), which has impacted their liquidity and in turn loan availability to the customers has become a big issue. NBFC has deep penetration in auto sector. All above factors have contributed to reduce demand in the auto sector.

3.Literature Review

A white paper on “ build to demand “by one network enterprise is focussed on leveraging real time data across an automotive manufacturer value chain. This paper covered the complexity of auto industry and benefits of real time value network. Real time continuous capturing and sharing of data on demand changes helps supply to align accordingly and improves responsiveness of supply chain.

In 2012, Tompkins International published an article on demand driven supply chain. This explains the ability to transform the existing business to demand driven business model. It also shares the stages of S&OP maturity model, shift in performance measures using demand driven model and the guidelines for implementation.

Cecere M. Lora & Chase W. Charles explained the role of supply chains in building market driven differentiation in paper titled “ Bricks Matters “. They explained market driven demand management using various terms like demand sensing, demand shaping, demand translation, demand orchestration, demand shifting, demand signals and also mentioned stages involved to become market driven.

In 2013, Tompkins supply chain consortium published an article explaining the importance of demand driven supply chain in omnichannel marketing. Benefits have been quantified and compared. Qualitative benefits have been covered in the literature.

Cecere Lora of supply chain insights LLC in 2012 write paper on “building market driven value networks “in which market drivers were identified and five stage evolution model of supply chain processes were described. Carol Ptak & Chad smith explained about variability and uncertainty in Demand Driven Material Requirement planning text book, they highlighted flaws in the traditional planning approaches and also provided guideline to become adaptive.

Almost all above article emphasized on the need of demand driven supply chain and its benefits. Auto Industry has been addressed to the extent of benefits of real time demand driven data. In the current paper, implementation guideline of demand driven real time supply chain has been suggested with a framework.

4.Shift from forecast to real demand sensing:

Need of the hour is to create a capable network that senses and translates demand with minimal latency to shape demand and drive a near real time response. Currently auto manufacturers rely on efficiency and economics of scale to be competitive in Indian market, however there is need to rely on product differentiation or specific customer

segments and this will lead to demand driven planning. Even in the current slowdown, new entrants in Indian markets like KIA and MG motors are doing well, due to the values they are offering in their products. Hyundai and Maruti Suzuki have been very successful to either maintain or marginally improve their market shares mainly because they have been very successful in identifying changing customer needs and also the threat from new entrants, accordingly they adapted the inputs and acted on them.

Sensing-----Interpretation -----verifications-----Actions

Table 1. Forecast based vs demand based

	Forecast based	Demand sensing based
Goal	Focus in on efficiency to maximize production	Focus is to balance between efficiency and effectiveness
Operation	Upstream to downstream	Downstream to upstream
Planning	Forecast based	Consumption based
Demand	Forecasted	Sensed on real time basis

In order to be competitive in today’s volatile market, organisation has to move from traditional make and sell to demand driven, which means have to become efficient and responsive or adoptive to changing customer needs. It also reminds a scenario where true demand is different from customer placed orders.

In this case auto manufacturer selling to dealers is just inventory replenishment from factory to point of sale but the real demand is offtake from dealer end. In order to optimize inventory in auto supply chain, it is advisable to take retail sales numbers into consideration rather than wholesale numbers.

To move from wholesale planning to retail based planning, most important step is to sense the real demand. Demand sensing is the action of capturing demand signals into analytic and intelligence processes to identify short term sales demand pattern and demand changes. Next step would be to respond to real demands by agile product development, demand shaping and automated replenishment programs. Demand shaping is the use of marketing mix tactics to influence baseline demand volume considering responsiveness and constraints in the supply chain.

5.Tool: 3P’s of demand sensing and shaping

At this juncture of demand sensing necessity, we would continue to struggle even if we decide to move from wholesale numbers to retail numbers because of conventional forecast-based planning. It is very important to sense right demand signals and systematically break down the distortion to demand signals and material supply.

Efforts would be to focussed to create ability to sense changing customer demand and adapting planning and production in line with changing demand while pulling from suppliers on real time basis. Real time demand sensing based planning is a formal multi echelon planning to protect and promote flow of relevant information and materials through execution of strategically placed decoupling point stock buffers. This encompasses features of theory of constraints, lean and Six sigma. This concept includes three basic steps. First step deals with selection of strategic inventory positioning where decoupling will be done throughout the chain. Second step is about the creation of buffer profiles and its levels will be determine the shock absorption capabilities between decoupling points. Dynamic adjustments of buffer levels based on operating parameters & market condition makes it more optimum & viable in real time. Last step is more of maintaining visibility and collaborative execution among supply chain stakeholders.

Current state of Indian automotive sector which has volatile demand and real demand sensing issues, this state may be improved by application of above mentioned three steps. This may not only help to optimize inventory across supply chain but also improve service level by capturing and transferring right signals. This will further increase visibility and trust among supply chain partners.

Theoretical framework for application of 3P’s:

5.1 Strategic Inventory positioning:

This step helps to identify & position decoupling points. Decoupling enables a bidirectional flow, i.e demand signal distortion and supply continuity variability. In order to find the right strategic position, following points should be investigated:

- a) Customer tolerance time: The amount of time customer is ready to wait for delivery of their vehicle. This may be understood from dealers as well as sales & marketing team. Best way to understand directly from customers.
- b) Market potential lead time: Potential lead time is the balance between potential order increase versus cost. Sometimes competition strategy also pushes for reduction in potential lead time. In Indian market Maruti Suzuki has done proper segmentation & penetration of market to reduce potential lead time. This company is leading the complete car market strategy in India.
- c) Sales order visibility horizon: In auto sector, there is decoupling between dealers and auto manufacturer plant by maintaining buffers near to point of consumption. It is advisable to check sales order visibility between dealer vs manufacturers and customer tolerance time. This may help to optimize inventory.
- d) External variability: This includes both upstream and downstream of supply chain. Recently in India, auto sector has experienced external variability due to macro-economic factors as well as inaccurate demand signals considered for planning. Supply variability is mainly depending on supplier base and their origin.
- e) Inventoryand critical operational process .This is purely for auto manufacturer company operation where integrated /matrix bill of material and distribution network provide most available options as well as best lead time compression to meet business needs.

5.2. Strategic buffers and its adjustment:

Buffer acts as protection at the decoupling points. It dampens both supply and demand variability. This also reduces lead time by decoupling. All relevant demand information, supply information and on hand information are combined at the buffer to provide a net flow equation which determine supply order generation. Buffer levels are determined by summing the zones that comprises them. Zones are stratifications or layers in the buffer that serves specific purposes and have unique calculations.

Table 2. Buffer Zones and Calculation

Zones	Methodology to Calculate
Green	Desired minimum order cycle Using a lead time factor Minimum order quantity
Yellow	Decoupled lead time (DLT) *Average daily usage (ADU)
Red	Decoupled lead time (DLT)*Lead time factor (LTF) + DLT*LTF*Variability factor

The Green Zone: This is the heart of supply order generation process. It determines average order frequency and typical order size

The Yellow Zone: The yellow zone is the heart of the inventory coverage in the buffer

The Red Zone: The red zone is embedded safety in the buffer. The higher the variability association with the part, the larger the red zone will be.

Based on the buffer profiles, the familial connection is made based on the three specific factors like item type, lead time and variability.

Recalculated buffer adjustments allow the buffers to recalculate their respective level based on key attribute changes of which most important is average daily usage (ADU). Second adjustment to buffer levels can be related to planned events. These are based on certain strategic, historical and business intelligence factors. Planned adjustment includes followings:

1. Rapid buffer adjustment
2. Product introduction, deletion and transition
3. Seasonality
4. Promotional campaigns

5.3 Real demand-based planning and execution:

Supply order generation based on forecasted demand are known to be inaccurate & wrong. The real time demand will provide the demand input into daily planning calculation for each buffered equation. This equation is called net flow equation.

Net flow equation (NFE)= On hand + On order -Qualified sales order

On hand – Physical stock On order- Ordered but not received

Qualified sales orders- The sum of past due sales order due today and qualified spikes

NFE combined with the decoupling point positioning and buffers means that nervousness, supply continuity variability and the bullwhip effects are mitigated. The net flow equation and net flow position allow for quick, intuitive and informative views across group of items.

Execution is the management of open supply orders against relevant criteria. These criteria are defined in two basic categories necessary to protect and promote flow. There are four concepts and alerts for supply order management:

1. Buffer status alerts
2. Challenging priority by due dates
3. Planning versus execution delay
4. Current on hand alerts /Projected

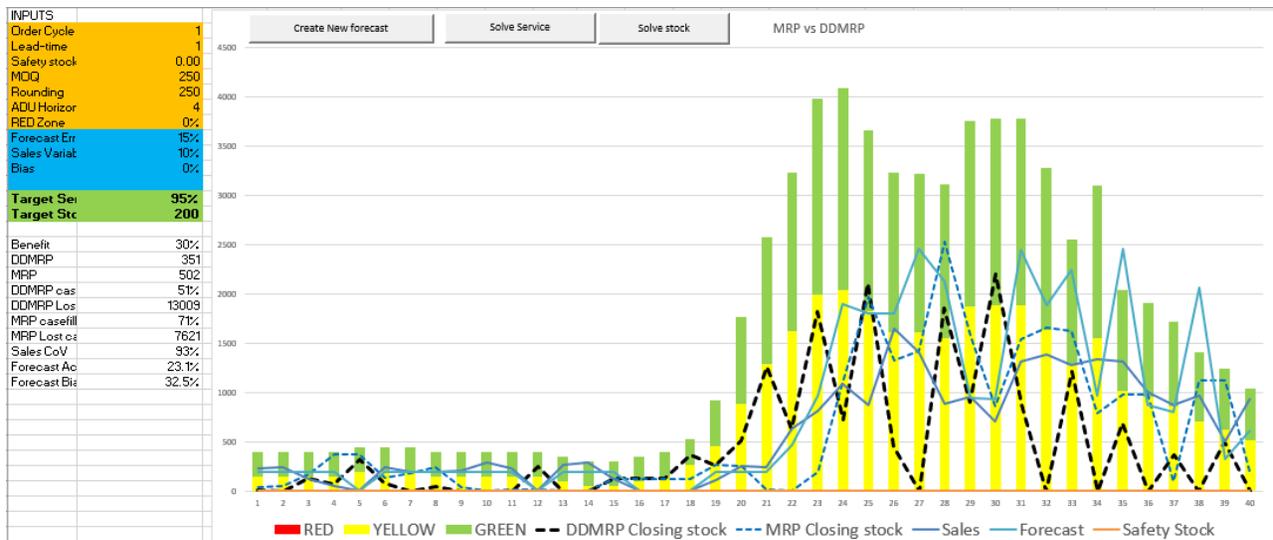
This uses two types of execution alerts to promote visibility and management to synchronization alerts

1. Material synchronization alerts
2. Lead time alerts

There is nearly limitless permutation of these concepts based on the circumstances of individual environments.

Proposed concept vs MRP simulation, with a target service level of 95%, we ran several scenarios varying lead-time, sales variability and forecast variability. The results echoed our findings of 3P approach over traditional MRP

Table 3. Simulation for real business case with forecast accuracy of 85%



1. Inventory reduction of 30% achieved with forecast accuracy of 85%
2. Increased service levels without more inventory

6. Proposed Framework for implementation of demand sensing based Planning in automobile industry:

In order to transform from traditional make and sell to demand based, automotive companies must view the value network from dealer to assembly plant to supplier as a network of interdependent entities including component suppliers for service and after market, vehicle assembly, carriers, dealers and end consumers. Continuous information flow of real time data on changes in demand and supply to increase the supply chain responsiveness determines the agility of the network as a whole. In below mentioned diagram, it has been shown that how 3P's can be deployed in automotive eco system to implement flow-based supply chain. Interdependencies between tiers can be minimized by maintaining adequate buffers at the strategic nodes in the entire supply chain.

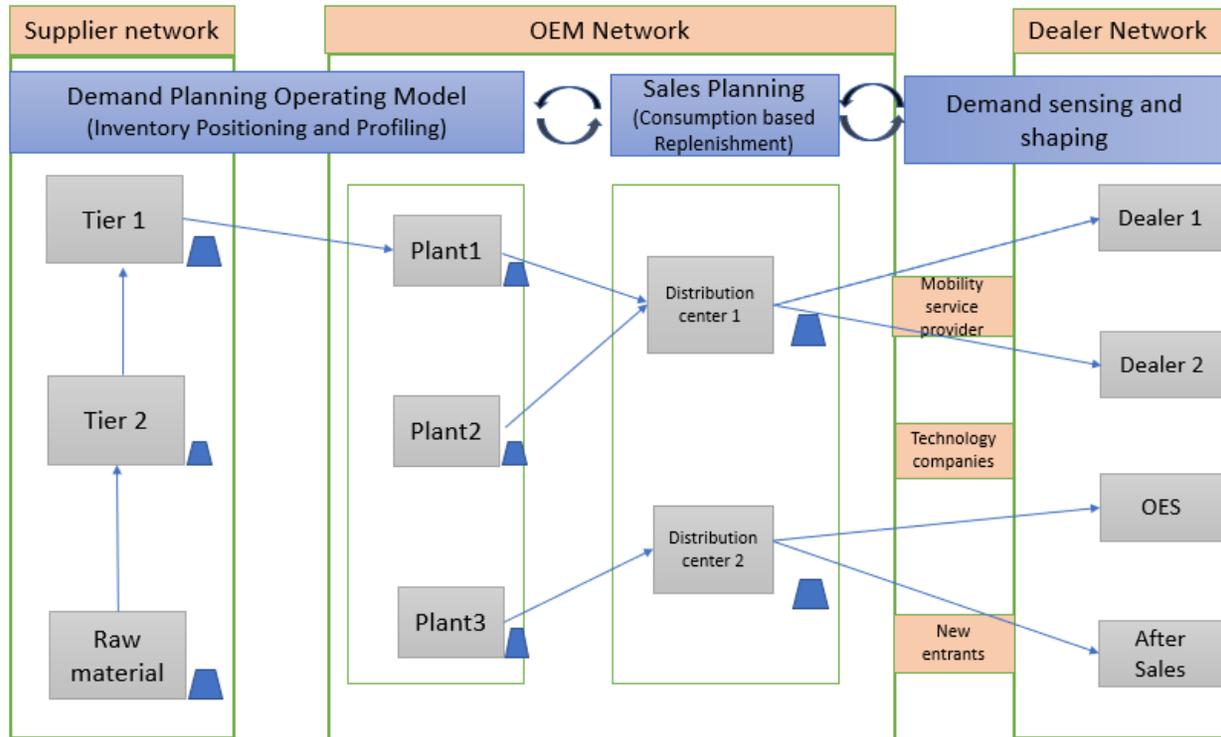


Figure 1. Demand Sensing Based Supply chain network

It starts with demand sensing and shaping, where in actual dealer point of sales data gives appropriate information, regarding customer needs and their behaviours. Analysing Point of sales (POS) data will help OEM's to sense shifts in demand as it happens and can be very useful for future demand shaping opportunities.

Sales planning involves generation of delivery orders from dealer network to distribution network which are netted against real time inventory positions and vehicle production plans across multi-tier supply network of yards, in transit and dealers to meet end customer demand. This further helps dealers to have the necessary information to plan and deploy their inventory and vehicle assembly plants have demand signal for their production planning, and further suppliers will have planned order visibility for supplies.

Demand based Operational model is all about availability of right material and information at right place and time across the supply chain. strategic inventory positioning and buffer management result in moving inventories from downstream finished goods locations to upstream raw material component inventories. This shift brings lot of flexibility and inventory optimization opportunities across the supply chain.

7. Conclusions

Considering the current sluggish market condition and future potential for auto sector in India, 3P approach may be very beneficial to optimize cost and service levels across the supply chain among all stakeholders. This concept has been deployed in other industries across the globe and it has brought significant improvements in inventory turns and service levels. To gain agility, changes in demand and supply signals need to be timely propagated across the value network where sales channels have the visibility to the upstream supply signals and at the same time suppliers have visibility into downstream demand signals. As explained in the beginning of this paper that industry captains are emphasising on the need to consider retail sales numbers for the planning, this approach may be considered as the enabler for the same.

8.Future scope

Proposed theoretical framework may be deployed as pilot case. This study can be extended by incorporating real cases outcomes. This may further help practising managers to take it forward.

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Biography:

Mr. Aman Sinha is a seasoned supply chain professional. Over a period of 14 years he has worked in the area of supply chain design, warehouse management, inventory planning, New Project management, SAP implementation, Business acquisition, Cost Optimization, Order management etc. He has also worked in Accenture Consulting in the area of Sales Transformation for automotive clients. He holds Bachelor's degree in the Mechanical Engineering, followed with Two Master's degree, one in area of Master of Engineering in CAD/CAM & Robotics and Second in Post Graduate Diploma in Industrial Engineering.

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