

Demand Management by Auto Component Manufacturers'-A Study of Strategies

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Abstract: Demand for most of the consumer products fluctuates over a year due to various competitive reasons. In such scenarios, demand management is an important tool for meeting the demand. In automobile sector, the role played by auto component manufacturers (ACMs) is very important as they have to keep the assembly lines of the automobile manufacturer(s) running under varying demand scenarios. With huge investments, the industry provides varied economic dividends. Being a single source of supply or a supplier to many segments, the responsibility of the ACMs is very high. Both in the short term and long term, they need to adopt sales and manufacturing strategies to manage the fluctuating demand. The paper apart from identifying the role, principles and mechanism of demand management also provides the results of the research study undertaken to find out the strategies adopted by ACM's for managing the demand in India. The results show that their strategies revolve around capacity, workforce, price discounts, sub-contracting and plant closures, depending on the severity of the situations.

Keywords: Auto component, Capacity, Demand, Strategies, Sub-contracting, Supply.

1. Introduction

Indian auto industry is among the top ten in the world production, holding 2nd position in two wheelers, 6th largest in cars, 8th in commercial vehicle and largest in tractors segment. It is also home to 15 companies manufacturing passenger cars(PC) and multi-utility vehicle(MUV), 9 companies of commercial vehicle(CV), 16 companies of 2/3 wheelers(2/3W), 14 companies of tractor and 5 engine manufacturers (Kakkar, 2010 and ACMA, 2015)

India has produced around 23.3 million vehicles during 2015-16 covering PC/MUV, CV, 2/3W and tractors. Over 70 % of automobile manufacturers known as original equipment manufacturers' (OEMs) are located in North, West and South of India. In terms of component usage by various segments, it is seen that the major consumption is by PC/MUV segment at 45%, followed by 2/3W at 22%, CV's at 19%, tractors at 8% (ACMA, 2015). The importance of auto-component industry could be understood from the fact that it contributes 7.1% to GDP and generates around 2 million direct and 27 million indirect employment with a FY2015-16 turnover of Rs 2,55,600 Cr (\$39 billion)(ACMA, 2016).

Understanding the two components of demand is relevant to demand management, namely, independent dependent and dependent demand. Independent demand for a product occurs when demand for the same is not linked to any other product. On the other hand, when demand for a product is related to demand for another product, it becomes dependent demand. Independent demand usually cannot be accurately predicted due to various factors. In the case of auto-components, their demand is dependent on the demand of completely built automobiles, like, passenger cars, commercial vehicles, 2/3wheelers and tractors etc.

The manufacturing of automobiles starts with annual forecast developed by the marketing department of respective companies. After assembly, they are dispatched to dealers as per monthly sales plan. Almost all the auto-

OEM's are assembly-oriented, that is, thousands of components, forming a basket to complete a vehicle are assembled to make one vehicle. Assemblies or complete vehicles worth millions of rupees could get delayed, even if a single component in the basket is not available in time.

It is not out of place to mention that the stability of OEM production is directly proportional to the basket coverage (number of days for which all components for an assembly are complete to meet the planned production). Plant managers need to change production schedules of models depending on the availability of components for assembly (Kothekar, 2014).

It is imperative to understand a few common tipping points where in the demand shifts takes place every year in automobile markets. New Year and festival seasons bring in much wanted good tidings to the auto market when sales increase significantly. On the other hand, there is a decline in the sales during months of April and December. Year-end sales push by OEM's in the month of March dampens the sales in the April, whereas, sales in December are sluggish as customers try to postpone the purchases to New Year, as vehicle purchased in December is considered a year older, if sold in January. Additionally, unexpected demand shifts could be due to changes in micro and macro environments which could impact the performance of ACMs severely.

In such situations, ACMs cannot influence demand and can only toe the line of OEM's who have the clout due to higher volume of business that they offer. More often than not, they have a passive role and try to fulfill OEM's orders by developing strategies to address the demand fluctuations. These could differ based on the volumes and models manufactured.

Typically, an ACM could be supplying to only one OEM or many in the same segment or to different segments. For example, a supplier to a passenger car company like Maruti Suzuki could be also supplying to its competitor, Hyundai and to Ashok Leyland, which is in commercial vehicle

segment having different market dynamics. A company like MRF could be supplier to Bajaj, Maruti and Tata Motors necessitating allocation of tyres based on priority or /and importance of the customer during a surge in the demand.

Apart from the scenarios enumerated above, as more players enter the market with new launches, auto market has become dynamic and unpredictable. Coupled with the number games resorted to by some vehicle manufactures, the role of demand management for ACM's assume high importance. The study attempts to find the strategies adopted by ACM's under different circumstances and provide suggestions for a better demand management process.

2. Objective

To study the strategies followed by ACMs for managing the demand both in the short and long term.

3. Limitations

The sample size was limited to 50 ACM's in India. Both listed and private entities were surveyed using a structured questionnaire. The surveyed companies were from PC/MUV, CV, 2/3W and tractor segments. Only Tier-1 companies, who directly supply to OEMs', were surveyed to eliminate bullwhip effect. The study confined to obtain feedback on strategies of demand management of ACMs on a cumulative level.

4. Research Methodology

The study is based on primary and secondary data. The population for the study comprised all the major ACMs at Tier-1 level registered in India, numbering around 250 serving PC/MUV, CV, 2/3W and tractors. The sample size considered for the study was 50.

The primary data was collected by serving the questionnaire to the executives at the highest level - CEO, Director, VP, GM, Plant head. Further, the study was conducted by telephone and online through Google Form. A visit to Auto Expo was made to meet with the executives of the targeted ACMs. The secondary data is collected from ACMA and SIAM websites, consultancy organizations, text books and articles by researchers.

5. Literature Study

Demand management process is concerned with alignment of customers' requirements with capabilities of the supply chain. The process encompasses forecasting and synchronizing it with inputs (raw materials and components), production and distribution capabilities. It comprises sub-processes that are aimed at reducing variability, increasing operational flexibility and measuring performance (Croxtan et al, 2002).

Mentzer et al (2006) provide a comprehensive definition of demand management by describing it as the creation across the supply chain and its markets of a coordinated flow of demand and the management of relationships with supply

chain partners to match performance with measurements and reward them accordingly for overall supply success which is measured in terms of cost reduction and increased customer satisfaction.

It is believed that the goal of demand management is to coordinate all sources of demand so that the productive system can be used efficiently to deliver the product on time (Chase et al 2003) and also to meet customer demand in the most effective and efficient way (Croxtan et al, 2002). Vollman et al (1998) opine that demand management involves close coordination between manufacturing, warehouses and marketplace to improve supply chain efficiency. Krajewski and Ritzman(2000) looks at it as the process of influencing the timing and volume of demand. Heaton (2015) places the responsibility of demand management process on sales and marketing personnel due to the access and clarity they have on activities at the point of consumption.

Inventory plays a critical role in demand management, as such, it is not out of place to accept Buffa & Sarin, (2006) suggestion that to deal with uncertain markets, organizations' have to consider the trade-offs between the cost of excess inventory and the cost of lost sales. Further, as forecast accuracy is also an important component of demand management, the incremental cost of improving forecast accuracy should balance the gains achieved in customer service and savings in inventory costs (Porier,2014). As regards capacity, Heizer et al (2009), opine that a firm has few options to manage demand in terms of capacity. However, use of inventory management helps to utilize capacity effectively and efficiently.

According to Palmatier and Colleen (2012), fundamental principles of demand management are:

- 1) It is an aggregate of customer requests for products that have to be manufactured and subsequently sell.
- 2) A product requested does not ensure that it can be provided.
- 3) Customer plan changes should be discovered and communicated in advance at the demand planning and demand review meeting stages.
- 4) The demand plan is based on the assumptions about the business; hence, the same should be carefully identified.
- 5) With greater demand plan accuracy, fewer inaccuracies need to be addressed.
- 6) With shorter manufacturing lead times, the need for an accurate demand plan further out in the planning horizon is reduced.

As a good business practice, in order to have better utilization of resources and facilities, the dominant strategy of many companies in various product categories is to have counter-seasonal products-product lines that have demand pattern quite opposite to the main product lines (Verghin, 1966). But, unfortunately, most of the automobile companies do not manufacture counter-seasonal products. Hence, the demand management strategies acquire a very decisive position in meeting customer requirements.

Some of the common strategies followed by organisations in manufacturing are chase strategy, level strategy and stable-

workforce with variable-work hour's strategy which provide trade-off among the workforce size, work hours, inventory and backlogs. Heizer et al (2009) observe that when capacity exceeds demand, the company may stimulate demand by reducing prices and by promoting aggressively in the market. In case the company is saddled with inflexible

processes as in automobile sector, the low demand may lead to lay-off of workers and plant shutdowns.

Demand management forms a part of manufacturing planning and control systems (MPC). The relation between various parts in the demand management system is depicted in figure: 1

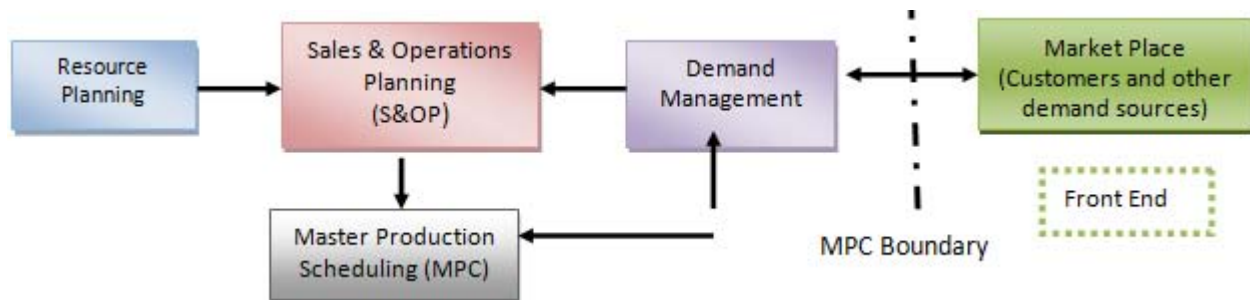


Figure 1: Demand Management in Manufacturing Planning and Control Systems

Source: "Manufacturing Planning and Control systems", Thomas E.Vollmann, William L.Berry, D, Clay Whyback, F. Robert Jacobs, Mc Graw Hill Publishing Company Ltd, New Delhi-100002, 2010.

From the illustration, it is seen that demand management triggers other activities, namely, production planning, sales and operations planning and master production planning. Sales and operations planning determine the balancing activity of demand and supply.

to the customers and 3.3% did not take any action. Please see table: 3 and figure: 2.

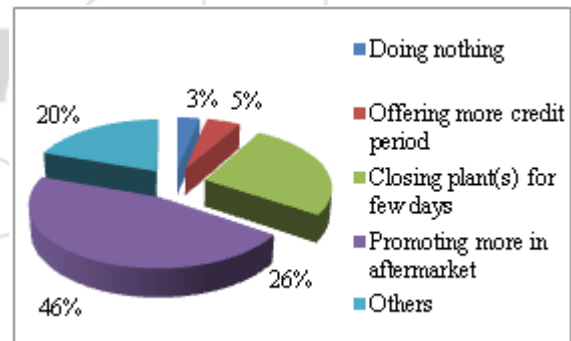
It is important to determine, additionally, order penetration/decoupling point, inventory location along with manufacturing environment while managing demand activities. In case of automobiles the penetration point for many OEM's reaches WIP, components and parts stage in assemble-to-order environment as shown in the table: 2 and this would help both OEMs and ACMs to concentrate activities at this specific manufacturing stage.

Table 3: Strategy adopted by ACMs when demand is low

Strategy	Number	Percent
Doing nothing	2	3.3
Offering more credit period	3	4.9
Closing plant(s) for few days	16	26.2
Promoting more in aftermarket	28	45.9
Other strategies	12	19.7
Total	61	100.0

Table 2: Order Penetration / Order Decoupling Point

Inventory Location	Suppliers	Raw Material	WIP, Parts & Components	Finished Goods
Order Penetration Point	▲	▲	▲	▲
Environment	Engineer-to-order (ETO)	Make-to-order (MTO)	Assemble-to-order (ATO)	Make-to-stock (MTS)



Adopted Source: Manufacturing Planning and Control systems, Thomas E.Vollmann, William L.Berry, D, Clay Whyback, Galgotia Publications (P)Ltd, New Delhi-100002, 1998.

Figure 2: Strategy adopted by ACMs when demand is low

6. Results and Discussions

The survey attempted to study the strategies used by the ACM's under varying demand variations. From the feedback received, the following practices adopted by ACMs have emerged.

b) In times of increased demand from OEMs, 57% of ACMs managed supplies by increasing production and 21% rationed the components based on customer importance. Further, another 21% of them met the demand as usual. Please see table:4 and figure: 3.

a) In times of low demand from OEMs, to meet sales/business plan, 46% of the ACMs promoted in after market and 26% closed down their plants. In case of 20% of the companies, they followed 'Other' strategies. Around 5% of the companies offered more credit period

Table 4: Strategy adopted by ACM's when demand increases

Strategy	Number	Percentage
Doing Nothing	0	0.0
Increasing production	33	56.9
Rationing based on customer importance	12	20.7
Meeting the demand as usual	12	20.7
Other strategies	1	1.7
Total	58	100.0

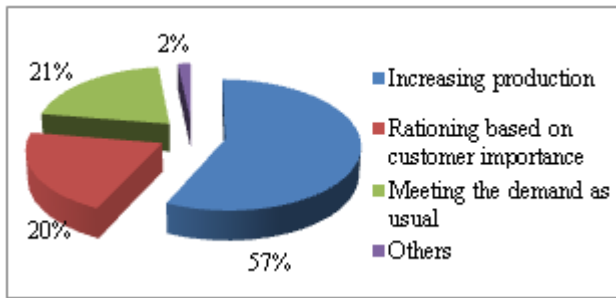


Figure 3: Strategy adopted by ACM's when demand increases

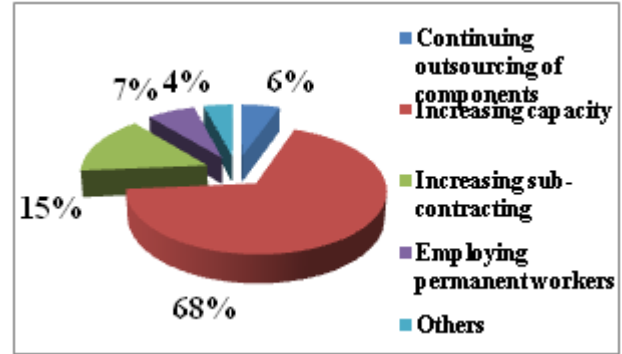


Figure 5: Strategy adopted by ACMs in manufacturing in the long term (>One year)

- c) In the short term (<one year), 47% of ACM's managed increase in sales by working extra shifts, 26% engaged temporary workers and 12% each by outsourcing components and engaging sub-contractors to do partial operations. Please see table:5 and figure:4

Table 5: Strategy adopted by ACMs in manufacturing in the short term (<One year)

Strategy	Number	Percent
Outsourcing components	11	12.1
Working extra shifts	43	47.3
Sub-contracting	11	12.1
Engaging Temporary workers	24	26.4
Other strategy	2	2.2
Total	91	100.0

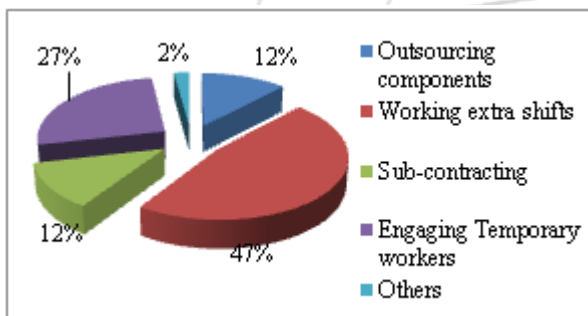


Figure 4: Strategy adopted by ACMs in manufacturing in the short term (<One year)

- d) In the long term (>one year), 68 % of the ACMs managed increase in sales orders by increasing existing capacity, 15% by increasing sub-contracting and 7% by employing permanent workers. In case of another 6%, the outsourcing of components continued. Please see table:6 and figure:5

Table 6: Strategy adopted by ACMs in manufacturing in the long term (>One year)

Strategy	Number	Percent
Continuing outsourcing of Components	4	5.6
Increasing capacity	49	68.1
Increasing sub-contracting	11	15.3
Employing permanent workers	5	6.9
Others	3	4.2
Total	72	100.0

7. Conclusions

It is seen that most of the ACMs follow similar strategies to manage demand and production. In times of low demand from OEMs, they become active in aftermarket and few prefer to close down their plants. In times of high demand they manage to increase production and also ration components based on the customer importance.

In the short term, most of the firms manage increase in sales orders by working extra shift, engaging additionally temporary workforce and outsourcing more from vendors. In the long term, most of the companies have gone for capacity expansion, outsourced non-critical operations, sub-contracted components and recruited skilled and non-skilled workers depending on the severity of the situations.

8. Suggestions and Future Research

In order to meet the varying demand, ACMs should have day-to-day interaction with the OEM's. This is popularly known as demand sensing. It encompasses real-time data, algorithms and automation to capture real time demand signals including the data generated by supply chain partners to prepare a reasonably accurate forecast which is dynamic in nature (E2open, 2016). Any changes in volumes or models could be communicated to ACMs to enable them to react in time without much lag. Further, ACMs should also develop their own forecasting if they cater to different customers in different segments so that they could have a "second opinion" on the aggregate demand of all the customers.

In order to have a comprehensive demand management process to fine tune strategies, further research could be undertaken covering different aspects, namely, forecasting process, warehousing procedures, effectiveness of distribution channels, collaboration level of supply chain partners, inventory management techniques and performance parameters.

References

- [1] Annual Report of Automotive Component Manufacturers Association of India, (ACMA) 2015.
- [2] Annual Report of Automotive Component Manufacturers Association of India, (ACMA)2016.

- [3] Buffa, Elwood .S. and Sarin, Rakesh K, , “ Modern Production/ Operations Management, Eighth Edition, John Wiley & Sons(Asia) Pte Ltd, Singapore,(2006).
- [4] Chase B. Richard; Shankar, Ravi; Jacobs F. Robert; and Aquilano, J. Nicholas, “Operations and Supply Management, Tata McGraw Hill Education P. Ltd, 12th edition, (2010).
- [5] Croxton, Keely L., Lambert, Douglas M., García-Dastugue , Sebastián J. and Roders Dale S., 2002, “The Demand Management Process”, The International Journal of Logistics Management, Volume 13, Number 2.
http://fisher.osu.edu/supplements/10/1418/demand_5.pdf. Accessed on `30.04.2016
- [6] E2OPEN, 2016, “Demand Sensing-Achieving a step-change in a challenging planning environment” white paper. <https://www.e2open.com/resources/demand-sensing-achieving-a-step-change-in-a-challenging-planning-environment>. [Accessed on 15.08.16]
- [7] Heaton, Debbie, 2016, “Demand Management-A Sales and Marketing Process” Oliver Wight EAME LLP, White paper, New London USA. file:///C:/Users/edserv/AppData/Local/Temp/Demand_Management_White_paper.pdf , [Accessed on 30.04.2016]
- [8] Heizer, Jay, Reder, Barry and Rajashekar, Jagadeesh,, “Operations Management” Dorling Kindersley(I) Pvt Ltd, 9 th Edition, NewDelhi-110117(2009).
- [9] Kakkar, Sunil, 2010 ,“Indian Auto Industry –The way Forward”, Maruti Suzuki India Ltd.
- [10] Kothekar Kothekar, Kiran, 2014, “A Practical Approach to Implement Pull Based Manufacturing”, ET auto.com, November, 2014 issue. <http://www.ihdindia.org/Formal-and-Informal-Employment/Paper-6>
<https://www.vectorconsulting.in/>. [Accessed on 23.07.16]
- [11] Krajewski, Lee.J, Ritzman Larry P., “Operations Management- Strategy and Analysis”, Fifth Edition, Addison Wesley Longman (Singapore)Pte Ltd, Delhi-110092,(2013).
- [12] Mentzer John T, Moon Mark A., Estampe Dominique, Margolis Glen , “Understanding Global Supply Chains” Sage publications (2006)
https://www.sagepub.com/sites/default/files/upm-binaries/11204_Chapter_5.pdf
- [13] Palmatier, George and Crum Colleen, “Demand Management: Lessons Learned”, (2014), Oliver Wight paper series. [Accessed on 16.11.15.]
- [14] Poirier, Charles C (2014) , “ Forecasting, Demand Management and Capacity Planning”, ACS Institute, <https://saylor.longsight.com/handle/1/9855?show=full> [Accessed on 12.08.16]
- [15] Verghin, R.C, (1966), “Production Scheduling under Seasonal Demand,” Journal of Industrial Engineering, 17(5), May 1966.
- [16] Vollmann, Thomas E., Berry, William L., Whybark D. Clay and Jacob, F. Robert, “Planning and Control for Supply Chain Management” McGraw Hill Publishing Company Ltd, New Delhi (1998).

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