MANAGING THE CHANGE IN SALES AND OPERATIONS PLANNING IN A CUSTOMER CONFIGURED BUSINESS SCENARIO IN COMMERCIAL VEHICLES INDUSTRY

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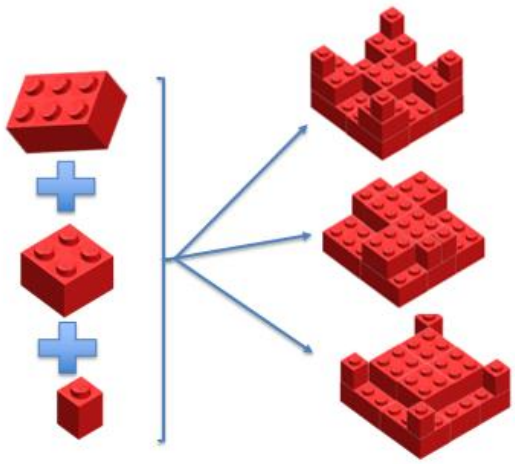
Abstract

The Indian commercial vehicles market environment is highly volatile in nature which is closely correlated with GDP growth rate. In recent times, dynamic Indian economy, development of express highways, newly evolving goods distribution models and government regulations have been the key drivers of commercial vehicle demand. Customers' needs are varied based on infrastructure development and diversified business options. The Indian commercial vehicle manufactures are focusing on increasing the number of product variants to cater the requirement of customers. While there are many changes being implemented in product portfolio through modifications in entire design architecture of Indian commercial vehicles based on customer's continuously changing need market research as a quality function deployment, the compelling need of revisiting the entire business process become vital. The emerging trends of customer configured vehicle demands the requirement of a shift from current manufacturing method of "Make to Stock" strategy based on market forecast is felt. It is important to revisit the entire business process of sales and operations planning to suit the requirements of customer configured business scenario in commercial vehicle industry.

Key words: Automobile industry, make to stock, customer configuration, sales and operations planning, etc.

1. Introduction

Modularity concept has emerged in industrial context and is undistinguishable bound up with rationalization efforts. The wish for utilizing resources in the most efficient way when several related tasks are to be solved or a range of related products are to be produced. Modularity may be used to strengthen the business performance when families of related products, i.e. variants are designed and manufactured.



The well-defined interfaces enabling the assembly of customer configured optional featuring parts over and above the basic vehicle without any hurdles.

Physical modules and parts complying interface rules and supporting multiple combinations.

Almost endless number of Lego kits can be configured and offered by using the basic shapes with well-defined interfaces.

FIGURE 1: Lego Principle in Modularity

2. Make to order - Dell

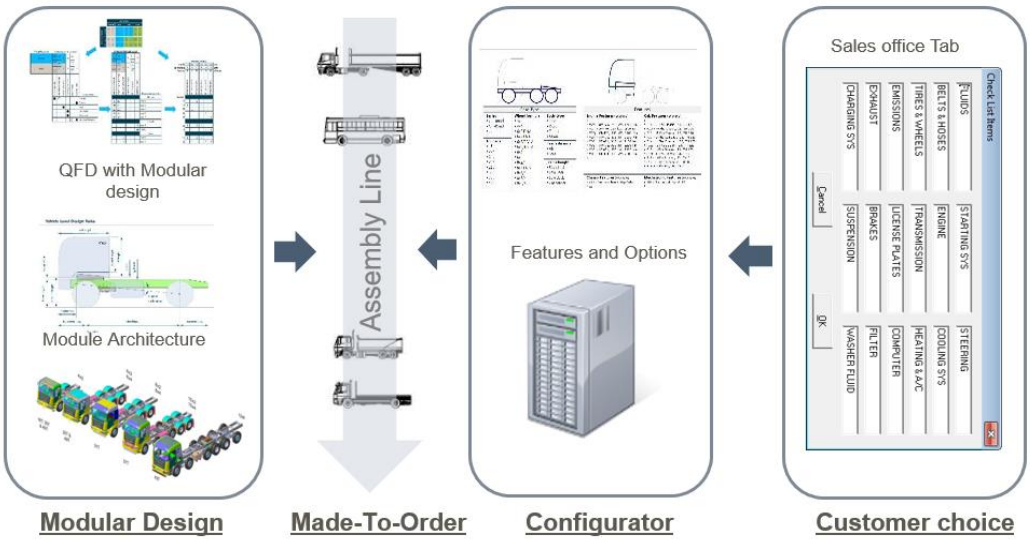
In the high-tech era, companies are turning to a make-to-order process in which a product is customized and manufactured according to specific customer requests, making just-in-time manufacturing and delivery. At Dell, the process is called "pull to order." Once the parts are delivered, the assembly-line process will begin preparing components. Dell then begins manufacturing the actual computer as per the specific requirements of the customer. Afterward, it tests and does custom integration work if any for the finished product. The make-to-order process drives one part of Dell's approach to efficiency. By further improving the manufacturing processes, Dell achieved a four-hour production cycle time using an internet-based supply chain management system. Once the order received from customer, the information flows to suppliers and the material flow will get started within one or two hours. Generally, Dell is fulfilling customer orders within five days. In addition to the manufacturing efficiencies, make-to-order is appealing because of other reasons also. For example, it helps prevent the build up of both raw material and work in progress inventory. If there's a design change to a manufactured product, there is a great chance of company can be stuck with useless non-moving inventory which need to be disposed of at a loss.

3. The future of Indian commercial vehicle business

The customer configuration approaches is based on combinations of basic modules and add on selective modules with adherence of engineering rules. This can be integrated with existing ERP or SAP systems. It is having the mechanisms to handle configuration rules which will allow users to convert their soft preferences into final product requirements. The computerized customer configuration system provides the process from customer engineering to design and production.

FIGURE 2

Customer Configuration of the Commercial Vehicles-The Future Business Way



As referred in Figure 2, the customer configuration will produce huge variants, however rapidly it is becoming unmanageable because of the alarmingly raising the complexities of product, part and process requirements. Made to order scenario in a mass production organization is very tough, as this will significantly impact the manufacturing process. When an organization suddenly shifts from MTS to other build strategy apart from manufacturing processes, sourcing and supply chain will be a major impact. In manufacturing, the production planning process and production execution process will be impacted.

4. Literature review

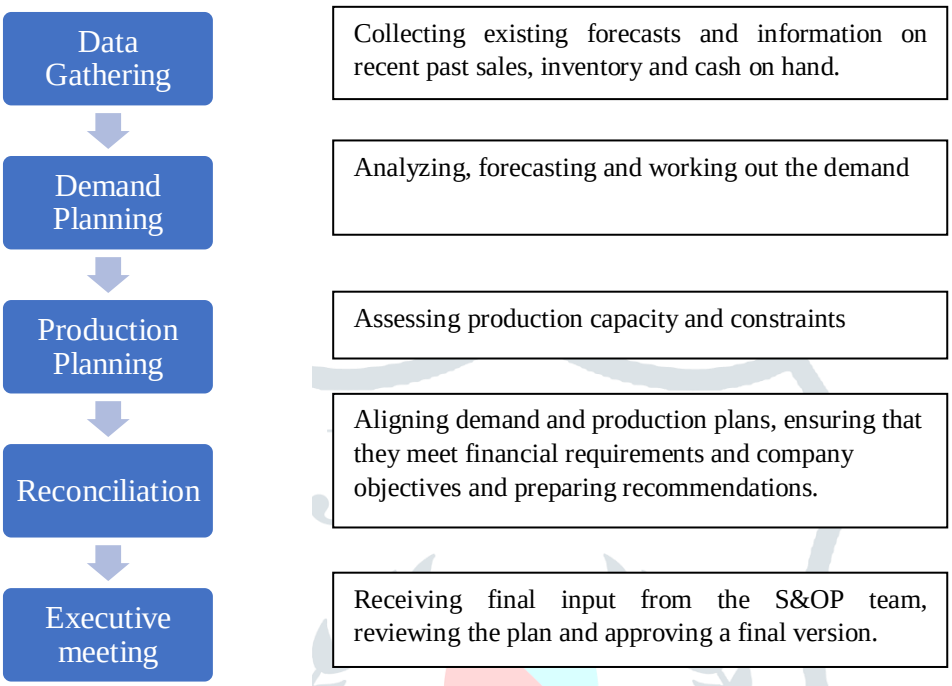
Palavesa Murugan, et al. (2018) described the complexity in multi model assembly line and need of resolving the constraints for meeting the customers' expectations in customer configured scenario.

Christoph Koch, et al. (2016) evaluated the conventional VSM method with respect for a use in a MTO environment. Based on the field of application, the logistic targets aimed at by VSM do not correspond with the logistic targets of a MTO company. From this follows that the manufacturing control functions introduced by the value stream design, which should support the target achievement, also are either incomplete or impracticable for MTO productions.

Nabil Lahloua, et al. (2018) stated that the main purpose of the S & OP is to develop tactical plans that strategically ensure businesses gain competitive advantage on a continuous basis by integrating the different levels of the company in an integrated set vertically and horizontally.

5. Sales and operations planning process

The sales and operations planning process bring these different views of sales, operations and financial requirements together for a balanced decision making process. Sales and operations planning consist of several steps, usually carried out in monthly meetings.



Make-to-stock (MTS): Standard product made to a forecast and kept as finished goods inventory before any committed orders come in. In MTS environment, products are made before receipt of a customer order based on past sales history or forecast. Customer orders are fulfilled from created stock, and then those stocks are replenished as and when required. MTS environments have no direct correlation between the manufacturing plan and customer orders. Theoretically, this enables customer orders can be filled immediately from readily available stock which keeps the customer lead time to a minimum. It allows the manufacturer to organize production in the full capacity of their manufacturing lines with minimized costly changeovers and other disruptions. When the customer does not accept long delivery times, you might be required to make some of your product to stock. As another side of the coin, there are high risks associated with placing finished goods into inventory without having a firm customer order. These risks tend to limit MTS environments to low-variety which will not be suitable for customer configured scenario. Now the "customer is king" paradigm does not have any validity in MTS scenario. If you want to make the customer the king, you need to make the product to that customer's order.

Make-to-order (MTO): Standard products not held in inventory and made as soon as a committed order comes in. In MTO environments, products are made entirely only after the receipt of a customer order. The final product assembly usually is a combination of standardized modules and custom items to meet the customer's specific needs. MTO environments are more

predominant when customers are ready to wait to get a product with unique features, usually customized or highly engineered products. Since time is required to make the products from scratch, MTO environments are slower to fulfill demand than MTS and ATO environments. But there is no risk of unwanted finished goods inventory involved with building a product when a firm customer order is in hand. There is always pressure to fully utilize the line; and that can only be done with orders resulting from a forecast. If MTS fills the line and MTO orders drop on top, they fall into backlog and the quoted lead time to the customer becomes a farce.

Assemble-to-order (ATO): Standard product where some components/ modules are held in stock and the finished product is finished after the confirmed order comes in. In ATO environments, final products are assembled from components after the receipt of a customer order. The key components in the assembly or basic modules are planned and stocked in anticipation of a customer order. Receipt of an order initiates final assembly of the customized product. This strategy is useful when huge variety of end products based on the selection of options and accessories can be assembled with respect to customer configuration. When products are too complex, or customer demand is unpredictable, manufacturers may choose to hold subassemblies or products in a semi-finished state. The final assembly operation is then held until a firm customer order is received. In this environment, manufacturers theoretically cannot deliver products to customers as quickly as MTS environments, since some additional time is required to complete the final assembly but can be delivered little early than MTO environment since the production need not start from scratch. ATO provides flexibility, speed and helps reduce waste by optimizing inventory and delivery lead time.

Configure to order: The standard product has variations; as many as not to justify the creation of a part number for every variation but not as many as to make the underlying structure too complex to handle. When a standard product has options to create varieties in its specification, whether to create a material master record number for every variation or to make use of the variant configurator. In case the VC is used, this allows one to configure a variety of one (configurable) material number based on features and options. There is also a line where it becomes more feasible to use a whole new project to build a complex product which has never been built earlier. At this juncture, to build the underlying structure with features and options and dependencies becomes far too complex. Configure to order is a strategy that closely resembles MTO or ATO for the finished product and components can be made to stock using a forecast based on probability factors maintained for options and features.

Engineer-to-order (ETO): Complex structures and customer specified projects which were never built before and make it impossible to be handled with standard variations. In ETO environments, customer specifications require unique engineering design, significant customization, or new purchased materials with common interfaces. Each customer order results

in a unique set of part numbers, bills of material, and routings based on customer's configuration abide by engineering rules. ETO environments theoretically are the slowest to fulfill since time is required not only to build the product, but to custom design it to meet the customer's unique requirements.

Assemble to order and pick to order are stocking strategies that are used by manufacturers, when they can produce a variety of finished products from a relatively small number of subassemblies and components. This stocking strategy is generally known as the "hourglass" strategy, where you maintain your inventory at the narrowest level in your bill.

6. Conclusion

ATO provides flexibility, speed and helps reduce waste by optimizing inventory and delivery lead time. It is agile and lean at the same time. Manufacturers theoretically cannot deliver products to customers as quickly as MTS environments, since some additional time is required to complete the final assembly but can be delivered little early than MTO environment since the production need not start from scratch. But ATO will eliminate the risk of finished goods inventory. ATO will support for customer configuration too since the stocks will be maintained at basic level and new features and options can be incorporated at the time of final assembly with help of the modularity benefits.

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