The Benefits Of Sales And Operations Planning With Integrated Part Demand Calculation

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Sales and operation planning - when properly leveraging the following concepts and methods - can help companies optimize production costs and plan their demand right down to the part levels from multiple supplier tiers.

The automotive industry is characterized by strong, worldwide competition and an enormous diversification of vehicle options. As a result, manufacturers are continually optimizing costs to create precise sales and production planning schedules. Considering part availability as early as Sales and Operations Planning (S&OP) can result in extraordinary flexibility and planning reliability.

The automobile market has undergone an unparalleled rollercoaster ride over the last three years. The financial crisis caused the industry to go from peak demand in 2008, to an enormous shortage in demand, followed by a long-lasting period of productivity which pushed manufacturers, OEMs, and suppliers to their limits. After the downswing, recovery came faster and steeper than market observers and participants expected.

The market environment has changed dramatically. Product lifecycles are shorter and the necessity to decrease costs in all areas of production is more pressing than ever. With aggressive global competition, supply chains no longer have any buffers left. The distribution and evolution of purchasing powerin single country markets has become more difficult to gauge. Furthermore, the individualization of products and growing demand of options has led to to greater product variety. In an increasingly interconnected automobile sector with supply chains functioning with just-in-sequence and just-in-time principles, it is absolutely critical to anticipate future demand as accurately as possible. With these conflicting priorities,it is more important than ever to plan costs optimally. The challenge for every automobile manufacturer is to develop a planning system for capacity and demand at all levels, which allows the planner to identify market and production trends as well as to react appropriately to changing supply chain and market conditions.

The idea is obvious but has been difficult to realize for a long time: Why isn’t there a software solution for this challenge, something that brings together sales planning, dealer inventoryand production capacities? And not only internally but coordinated with suppliers regarding mid- and long-term volume planning in order to balance capacity and demandon all levels? Sales planning would then go so far that even the part demand would be accurately predicted and would consider the contracted capacity with the supplier network. That ensures planning reliability and forecasting accuracy. “What-if” calculations would be possible where part demand

could be aligned with volume planning.

Plan reliability by using bill of material information to predict part demand

Presently mid- to long-term volume and production planning spans up to ten years. In the near term - with a planning horizon of one to three years - options, configuration possibilities, and production capacities are planned, usually in a market-specific fashion. A primary reason for long-term planning is to decide whether new production facilities are needed to accomodate demand. In the medium term, capacities have to be determined for optional features. This is a complex process because an option may contain multiple parts from various suppliers. For example, an electronic entertainment system could consist of more than a thousand parts from dozens of suppliers. The difficulty is in calculating the capacity volume for the options. One has to determine what capacity is available from the suppliers for these individual components. It is necessary to know all the part numbers for every single option. This is significant when alternative scenarios are necessary, such as when the originally planned options are not available.

Current sales and capacity planning systems already enable extended long-term planning supported by mainframe computers. However in this scenario the forecast is based only on estimates. The planning considers the “complete piece“, and not the relevant single parts. This is because older systems are not equipped to consider calculations down to the individual part level. The consideration down to the lowest level of detail has only become possible in the last few years.

Precise planning is only possible if all vehicle components are considered down to every single part. Sales and Operations Planning offered by flexis translates planned volumes and option forecasts into part demand. For the first time an OEM can be provided witha reliable long-term forecast of the parts which can be passed on to the suppliers. It is now possible to analyze what effect an increase in volume or option demand would have on part demand. For suppliers, this means that they *can systematically and reliably align their capacity plan to this forecast*.

The difficulty in this planning phase is that customer orders are still unknown and only disconnected volume and option plans are available. Many bill of materials (BOMs), however only respond to fully specified orders. The unique capability of the flexis solution is to use the bill of material, not evaluate its rules based on fully specified orders, but rather on a unique method in which volumes and option forecasts are stochastically combined to derive part demand and then compared to available part capacity.

Using this procedure it is possible to use the capacity information of external or internal part suppliers to derive capacities on the option or vehicle level. If a serial part, for instance, is used in any car in the series, and if the capacity of the part is known, then the vehicle capacity can be calculated on the basis of the part number information. Similarly one can deal with parts which are used in a vehicle with a

certain probability: their capacity will also be converted to the automobile level. This so-called “backward calculation” is the process in which the capacity of a product is derived from the capacities of the parts it is using.

When a shortage of parts was expected by suppliers in Japan following the catastrophe last year, an emergency plan could be drafted with the aid of such a solution. This ensured that an OEM could continue to work as long as possible although only a limited number of supplier parts were available. The planners at the OEM and suppliers could jointly determine which item numbers were scarce, which options and vehicles were affected and to what degree shortages were to be expected. The planning was adapted to the altered circumstances and products which required unavailable parts were avoided so production, although stinted, could continue.

The backwards calculation concept works with all sorts of bill of material types used by suppliers and OEMs – from simple modular to complex rule-based. The primary product is a basic configuration, which is complemented by the flexibility of adding special options. Depending on the options chosen, an OEM needs separate parts in various amounts. The bill of material determines which parts are necessary for what option or option combination. The parts needed for a vehicle can be determined as soon as the model and options are known.

In such a planning environment, backward calculation can be used to determine capacities on all planning levels and to compare and align it on all levels with the relevant demand. For example, a Japanese automobile manufacturer did not have to make any subsequent changes to production plans in its American factories for more than two years. With the help of this solution, the manufacturer was able to align the sales and production plan so closely that sales only delivered buildable production programs to manufacturing. Meanwhile, production was able to accurately anticipate capacity adjustments based on sales forecasts in order to react to changes in demand.

The technological basis of the whole flexis solution portfolio is based on In-Memory technology. The Core-Engine has been created to process a large amount of data as fast as possible. Processes that used to run overnight in a batch job can now be processed online.

Harmonizing Global Planning

With an increasingly integrated global market, it is necessary to consolidate planning of sales and operations, which until now would have been done independently. The manual comparison of separate spreadsheets is not practical. Integrated planning helps to use the parts inventory in a profitable manner and enables planning to prioritize markets and factories on an as-needed basis. Sales and operation planning - when properly leveraging the concepts and methods discussed - can help companies optimize production costs and plan their demand right down to the part levels from multiple supplier tiers.

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