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Demand Management with SAP®

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Projecting demand is a difficult and sometimes elusive process. This chapter introduces you to the science of projecting demand, and discusses the SAP tools that enable this process.

2  Projecting Demand

In this chapter we’ll begin to discuss projecting (forecasting, estimating, anticipating, guessing, etc.) demand by estimating the size and shape of the market for a company’s products or services. This culminates in a sales and operations planning process.

2.1  Assembling the Parts into a Whole

Like boxes of brightly colored plastic parts strewn across a living room floor on Christmas morning, demand projections should come with a warning: Some Assembly Required. Both toys and forecasts share components that we know must fit together because there they are in the picture on the box or in the chart of last month’s sales on the wall. Some pieces are obvious, like the tall piece representing a key customer’s order forecast for a major product. But does this curvy piece of promotional uplift fit on top of the first one? Below it? Does it somehow bend it?

It’s the nature of complex assemblies that it is difficult or impossible to envision all of the parts at once, let alone how they go together. It is also inevitable that a complex problem will attract the “help” of those who have an interest in the answer. Each new “assistant” will latch on to a component or two that becomes the center of their world as they try to figure out how everyone else’s parts fit theirs. “Let me show you how your tall green customer forecast fits into my twisty blue new product launch.”

Across any sizable organization there are individuals with responsibilities and perspectives that revolve around different but critical components of the business.
Their success depends on the sales through a channel, the success of a marketing campaign, the replacement of an old product with a new one, or the efficient operation of a production facility. In their respective areas they are the experts, often passionate, always focused, and rarely possessed of an unbiased perspective on the business as a whole.

Figures 2.1 and 2.2 give a perspective on different components originating from different areas making up the whole of a demand projection. Whereas shipments from a company’s distribution centers continue to be strong over the previous month, it appears that based on the few key customers who share collaborative data, customers were shipping less from their distribution centers into their factories and retail outlets last week. Orders remain high, but consumption, whether measured by radio frequency identification (RFID) or through consumption (such as retail point of sale data) show that demand is slacking off downstream in the supply chain.

![Figure 2.1 Multiple Partial Perspectives on Demand](image-url)
This could be a very natural result of a customer finishing off a promotion or a large project and ordering enough to replenish their stock in anticipation of a lower, more regular demand pattern. But it would be very hard to determine without seeing both sets of data at once.

Marketing analysts at the manufacturer looking at consumption might see consumption flagging and cut their forecasts drastically, which would result in missing out on the last bit of demand to replenish their customers’ shelves. Sales executives might see a strong order forecast coupled with growth over the last month or two, causing them to project higher demands for the coming months. This would result in the manufacturer being stuck with high amounts of inventory that would need to be destroyed or sold at severe discounts. Whereas both of our stakeholders have a perfectly clear view of a portion of the demand, neither would be right in their projections. In Chapter 4, we’ll look at statistical forecasting and explore how information in the context of historical data can be used to forecast demand.

Spotting a divergence like this across thousands of items and hundreds or thousands of locations would be like finding a needle in a haystack without a tool like SAP APO Demand Planning. However, with Demand Planning, it is as simple as building a macro to calculate the difference between the shipment and consump-
tion-based forecasts and setting a threshold for the value above which an analyst should be notified. Whereas Demand Planning could also recommend a mathematically blended forecast, an analyst’s intuition and ability to ask questions will likely improve upon even that.

2.2 Ascertaining the Size and Shape of a Market

Although it is not a simple task, defining the market size and shape is a key component to measuring the amount of return that a company might realize if it chooses to enter the market. Given that most companies have limited capital available to invest and want to offer the best returns possible to their investors, defining the size and shape is a necessary exercise.

The market for a product is simply the amount of a product that customers will buy over a given time period. That amount determines the size of the market, which is simple to state in concept and deceptively complex to pin down in practice. Is the amount measured in dollars, euros, kilograms, pallets, cases, pieces, cubic feet, or any of a number of other units of measure? Does the amount include sales where the product is included in a larger kit, pack, mixed pallet, etc. together with other products? What about programs, activities, or occurrences that impact multiple products in a product group, a brand, a package size, or a business unit?

Then consider the details behind what customers will buy. Each sale could be described as belonging to a customer location, a geographic region, a sales channel, a country, a distribution center, an account executive, a national key account, a business unit, a price point, and so on. There are as many dimensions to the size and shape of a market as there are ways to categorize each individual sale of a product.

Unfortunately, individuals within a company tend to have partial, overlapping views of the market in varying units and across heterogeneous category groupings. So the whole needs to be understood by examining and then aggregating its disparate pieces.

Figure 2.3 shows views of portions of the market for chocolate bars in the United States. These chocolate bars can also be sold as part of a larger mixed “variety” pack or wrapped in a special promotional movie wrapper. Through market research, historical sales, and any number of methods, it’s possible to estimate the size of
the individual submarkets and even approximate the shape of the market against attributes such as price.

### Dimensions

<table>
<thead>
<tr>
<th>Item</th>
<th>Region</th>
<th>Units</th>
<th>Channel</th>
<th>Customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chocolate Bars</td>
<td>North America</td>
<td>Kilograms</td>
<td>Direct</td>
<td>All</td>
</tr>
<tr>
<td>Chocolate Bars</td>
<td>US</td>
<td>Dollars</td>
<td>Partner</td>
<td>Food Service</td>
</tr>
<tr>
<td>Mixed Chocolate Bar Pack</td>
<td>Pacific Northwest</td>
<td>Pallets</td>
<td>Direct</td>
<td>Mass Merchant</td>
</tr>
<tr>
<td>Chocolate Bars-Movie Promo</td>
<td>US Major Cities</td>
<td>Cases</td>
<td>Direct</td>
<td>All Opted In</td>
</tr>
<tr>
<td>Chocolate Bars</td>
<td>California</td>
<td>Pieces</td>
<td>Web</td>
<td>Consumer</td>
</tr>
<tr>
<td>Chocolate Bars</td>
<td>US</td>
<td>Cases</td>
<td>Direct</td>
<td>Key Customer</td>
</tr>
</tbody>
</table>

**Figure 2.3** Market Segments Can Be Both Heterogeneous and Overlapping

Many companies have traditionally approached combining all of this information into a single useful projection of demand with the construction of a two- to four-branch hierarchy of product, location, and abstract grouping.

In the three-branch hierarchy depicted in Figure 2.4, each product rolls up to a product family that belongs to a brand or business unit. Countries are divided into regions, which are split up into production facilities, each of which services multiple distribution centers that fill local customer orders. The company goes to market through different channels (i.e., direct to customers, through resellers, over the Internet for warranty or service parts, etc.) containing key customer groupings made up of individual customer locations.

### Traditional Market Hierarchies Are Fairly Limited

<table>
<thead>
<tr>
<th>Product</th>
<th>Location</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>Global</td>
<td>ALL</td>
</tr>
<tr>
<td>Brand/Business Unit</td>
<td>Country</td>
<td>Channel</td>
</tr>
<tr>
<td>Product Family</td>
<td>Region</td>
<td>Channel</td>
</tr>
<tr>
<td>Product Family</td>
<td>Production Facility</td>
<td>Key Customer</td>
</tr>
<tr>
<td>Product</td>
<td>Distribution Center</td>
<td>Key Customer</td>
</tr>
<tr>
<td>Product</td>
<td>Customer D.C.</td>
<td>Customer</td>
</tr>
</tbody>
</table>

**Figure 2.4** Traditional Market Hierarchies Are Fairly Limited

Hierarchies like this work well when all of the information falls discretely into the individual buckets. However, they struggle when trying to shoehorn information across categories, such as the market for chocolate bars with movie promotion wrappers being sold in major U.S. cities only for customers who have opted in.

This is why SAP APO Demand Planning considers the market in its lowest common denominator of discrete categories or characteristics. The solution is then
able to add up or aggregate amounts on the fly and then disaggregate any inputs or changes made to the amount upon completion.

Consider Figure 2.5, in which a number of combinations of characteristics are used to describe the market. If a marketing analyst wanted to view a demand plan for all of the items in brand alpha with a package size of one, then Demand Planning would aggregate all of the sales histories that met this criteria. The marketing analyst could then choose to increase the demand plan for this group by 10%. SAP APO would then disaggregate the new total down to each of the individual characteristics combinations. The many methods of allocating the changes made to the aggregate total down into the individual characteristics combinations will be discussed in detail in Chapter 5.

![Figure 2.5 SAP APO Demand Planning Enables Aggregation and Disaggregation](image)

By enabling an organization to store data at the lowest common denominator of market characteristics and then view and manipulate that data at any aggregation, SAP APO Demand Planning allows all of the individuals with visibility to a portion of the market to add their knowledge into the demand plan. Because Demand Planning can mathematically convert between units of measure during aggregation and disaggregation, it doesn’t make a difference if the individual stakeholders think in terms of dollars, pallets, or kilograms.

Enabling individuals with different perspectives and responsibilities across an organization to enter what they know about demand in a context that is familiar to them is a key feature of Demand Planning. A brand owner can enter a dollar
incremental lift for a brand resulting from a promotion. A sales vice president can add a percentage to those items sold to a key account that has just expanded within a region. A demand planning analyst can note and strengthen a growth trend in sales through the Internet channel. A marketing executive can model cannibalization of an existing product with a new one as it is rolled out from region to region. Chapter 10 will discuss a consensus forecasting process in more detail.

2.3 Sales and Operations Planning within APO Demand Planning

In Chapter 1, we discussed the importance of individual stakeholders contributing to the overall sales and operations plan and coming to a consensus. The overall demand plan is what the company intends to sell. It is heavily impacted by marketing plans and corporate revenue and profit targets, and it is a significant input into inventory planning that in turn drives the production and procurement plans.

However, like the ill-fated hot dog vendor in Chapter 1, the company can only sell what it can buy, make, or has already made and stored. So the capacity of the company to meet the demand plan becomes a constraint, and as the hot dog vendor realized in the end, there is no sense spending effort drumming up demand that you are unable to satisfy. This means that the marketing plan and the demand plan both must take the constrained demand plan back as an input, as depicted in Figure 2.6.

![Figure 2.6 The Sale and Operations Planning Process Constrains the Demand Plan](image-url)
SAP APO Supply Network Planning (SNP) is the main tool for developing a rough constrained plan. Further refinement of the individual components of the supply plan can be conducted in other SAP APO modules and complementary solutions. SmartOps Enterprise Inventory Optimization enhances the safety stock calculations resident in SAP APO SNP to smooth buffer inventories across the company’s network of plants and warehouses. SAP APO Production Planning and Detailed Scheduling (PP/DS) refines the production plan from a daily plant- or line-level plan down to a detailed production schedule by a constrained resource at the hourly level or lower. SAP APO Transportation Planning and Vehicle Scheduling (TP/VS) breaks demand blocks into shipments that will fit within vehicles (containers, trailers, rail cars, etc.) and tenders those loads to carriers or schedules company-owned transportation resources.

In a continual process, the demand plan is constrained more granularly by capacity over time based on operational lead times. Figure 2.7 provides examples of lead times for operational decisions that impact the capacity that a company has to satisfy its demand plan.

Looking at the constraining factors in the example (materials purchasing, capital budgets for new facilities, truck tendering), you would come to the conclusion
that these are decisions faced by most product-producing companies. Yet the multitude of individuals involved in these decisions can make it difficult to collect these capacity-impacting factors. Even more challenging is quantifying the impact of a shortage in pounds of a key raw material or of an increase in machine hours available owing to the addition of a new production line.

Demand Planning makes this collection and translation easier because of its integration to both the backbone SAP ERP system and the other SAP APO components. Bill of materials (BOM) describing how much of which raw materials, components, packaging, etc. go into a finished good are stored in the SAP ERP system as are the routings which describe the machines and activities required to convert them into a finished good. These BOMs and routings are automatically transferred over to SAP APO SNP, which then translates all of this information into capacity.

2.4 Summary

So we have seen that the challenge in projecting the size and shape of a market is compounded by the lack of a single reliable channel of complete information. Instead demand planners must compile information from multiple incomplete and sometimes overlapping sources and piece them together through a lowest common denominator. Once the demand puzzle is pieced together, it must go through a constraining process where the organization compares how much its customers are willing to buy with how much it is able to build or buy.

In the next chapter we will explore methods by which these organizations can begin to follow a demand planning process, what business cases they might leverage, and which SAP solutions they might choose to support them.
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