Guide to Improving Forecast Accuracy

A 10-point plan for creating more accurate demand information
No one doubts that more accurate forecasts can lead to lower inventories and improved customer service levels, but it is surprising how many companies struggle to deliver an effective forecasting process. Improving forecast accuracy is never easy, but is an essential step to lowering inventory levels and the associated carrying costs and scrap. Better forecasts also ensure that the right product is in the right place at the right time, delivering improved customer service levels and reducing the need for fire-fighting and expediting. In these days of complex and extended supply chains, increasing forecast accuracy is a competitive necessity to achieve top-line growth as well as bottom-line profitability.

For more than a quarter of a century, Demand Solutions has helped thousands of customers improve forecast accuracy and optimize inventories through its forecasting and inventory management solutions. We help clients create timely and accurate information so they can make informed decisions that deliver world-class performance and support strategic goals. This practical experience with clients has taught us a number of techniques to steer forecasting in this direction. Here, we’ve created a 10-point plan highlighting some of the most effective ways to increase forecast value by improving forecast accuracy.
The 10-Point Plan

1. Forecast as Close to the Customer as Possible
2. Forecast Using Demand — Not Sales
3. Identify and Separate Different Demand Streams
4. Understand and Modify History to Remove the Effect of Exceptions
5. Identify and Remove Company-Inflicted Distortions of Demand and Supply Parameters
6. Forecast at Aggregate Levels and Explode to Lower Levels
7. Identify and Manage Records with Limited History
8. Communicate, Share, and Use the Data to Drive Your Sales and Operations Planning Process
9. Make Forecasting A Key Business Step with Clear Accountability
10. Measure Performance, Publish It and Continuously Improve
1: Forecast as Close to the Customer as Possible

A forecasting process can be introduced at various points in a supply chain and is frequently attempted wherever inventory moves from one point to another. Forecasting points could be:

- Customer ➔ Consumer
- Distribution Center (DC) ➔ Customer
- DC ➔ DC
- Plant ➔ DC
- Suppliers ➔ Plant

However, the further away a forecasting process is from the end user, the more distorted a demand signal becomes. Why? Because each step in the supply chain is subject to numerous internal and external inventory drivers, such as re-ordering and safety stock policies and the difficulty of communicating actual consumer demand down the supply chain. (Anyone who has played the Massachusetts Institute of Technologies’ Beer Game simulation knows of this as the “Bullwhip Effect”)

Despite widespread acceptance of this effect, operations management teams in the suppliers-to-plants and plants-to-DC levels frequently ask us to provide a forecasting tool to improve their process. We have even been requested to make forecasts for components or raw materials using historic raw material and component demand. However, the principal that we try to apply is “never forecast what you can calculate.” So a raw material or component forecast should be calculated from the net replenishment forecast for finished products, which should in turn be calculated from a sales forecast to a customer, which could in turn be calculated from a forecast of consumer demand built from POS data. The general principal here is that the closer you are to actual product consumption, the more representative the forecast will be of actual product use. This more accurate forecast will, in turn, generate more accurate plans lower in the supply chain.

This whole process of forecasting as close to the customer as possible was recently re-branded by the consultancy world as DDSN – Demand Driven Supply Networks – something we have been preaching and enabling with our tools for more than 20 years!

In summary, moving the process closer to the ultimate consumer

- Minimizes the distorting effects of factors such as inventory stockpiles and re-ordering criteria (see below).

- Improves communication between you and your customer. If a problem, change, or improvement opportunity arises in either order fulfillment or customer consumption, you then have the mechanism to flag the opportunity and to communicate effectively with your customer to identify the best action plan.

- Allows you to take a step towards ground-breaking inventory reduction models such as vendor-managed inventory. Techniques such as these allow you to drive down even further your own inventories as well as your customer’s – building a lasting and mutually profitable relationship.
2: Forecast on Demand — Not Sales

In some cases, how much you actually manage to produce and sell to a customer is different than how much and when your customer actually requested it. An extreme example occurs if you go out of stock of a product and make no sales for several periods. The sales history data stream would suggest that the customer has no demand for the product for those months. Another example is where manufacturing struggles to produce what your customer wanted, when they wanted – but because of capacity, scheduling or raw material availability they made it available in one large batch. In both cases forecasting using the historical customer order demand stream by request date rather than the actual sales will generate more accurate statistical forecasts.

How to Spot Exceptional Demand Behavior

Demand is erratic or irregular if:

- Its history includes irregularly occurring spikes, zeros, and/or negative values
- It is a poor statistical fit to any forecasting formula
- The records have a high forecast error

After you identify exceptional behavior in demand streams, adjust the history of that stream to eliminate the exception

3: Identify and Separate Different Demand Streams

Different demand streams can behave in differing ways. A good example of this is a pharmaceutical company we worked with. The client’s total demand history by product appeared erratic and unpredictable. However, when we delved a little deeper and analyzed the business, we found that it broke down into two separate demand streams — tender business, which was about one-third of the revenue and exceptionally lumpy and unpredictable; and pharmacy and distributor business, which was regular, seasonal and statistically forecastable. The combined demand history was unpredictable, but by separating the history into the two streams, we identified an opportunity to use forecasting algorithms to calculate the forecast in one of the streams. For the other, we used collaborative tools to allow the sales team to provide the best and latest “market intelligence” about the tenders. Increasingly, companies utilize different channels to market, such as, online sales channels and retail sales channels. These channels can have very different demand profiles and should be managed separately.
4: Understand and Modify History to Remove the Effect of Exceptions

Any good forecasting package will have the capability to highlight and filter out exceptional circumstances so that history can be “cleansed.” This allows forecasting professionals to remove those one-time variables that can skew a forecast. Typical factors that distort history include:

- Promotions — particularly where the promotional activity cannot be flagged and those that occur irregularly
- Stock outs
- Unusual competitor activity that increases or decreases sales
- “Fire sales” to move inventory
- New market entrant buying market share by undercutting prices

5: Identify and Remove Company-Inflicted Distortions of Demand and Supply Parameters

Traditional sales-management and sales–promotion practices can also distort history and introduce forecast errors. These practices could include:

**Batch size and minimum order quantities:** Requiring customers to order a minimum number of units may seem to introduce stability into a fulfillment system, but these parameters almost never match true customer consumption and consequently cause distortion to demand.

**Distribution frequency:** Similarly, preset distribution intervals that lack a direct connection to customer consumption will also diminish forecast accuracies.

**Sales incentives (such as discounts for increased order size):** Such promotions may boost cash flow and one month’s P&L, but they also distort demand.

**Customer’s order quantity:** Customers might resist ordering quantities closer to actual consumption by negotiating bulk or mixed order discounts.

*Never Forecast What You Can Calculate*
6: Forecast at Aggregate Levels and Explode to Lower Levels

An effective forecasting tool will allow users to forecast at aggregate levels. This technique will often produce forecasts of much higher accuracy as long as the groupings are meaningful and manageable. For example, forecasting how much of a particular brand of paint will be sold down to individual can sizes might not be the most accurate. If forecasting at the total level rather than by can sizes will fulfill the need for material planning and budgeting, for instance, then it makes sense to do so. Forecasts at the total level can then be exploded to the individual can sizes so detailed inventory optimization and manufacturing scheduling can take place.

Sophisticated forecasting packages can actually make these size scales while aggregating so that forecasts at the total level can then be automatically exploded to individual SKUs. This technique is especially valuable wherever there is a size distribution curve (for example, shoes, clothing, orthopedic implants etc).

7: Identify and Manage Records with Limited History

In addition to managing exceptions in demand history, identifying and managing records with short history is critical. Records with just one month’s history are the most problematic to manage. These need to be reviewed each month as the latest data comes in and a decision needs to be made on the likely demand profile so that you can adjust the settings in your forecasting system to manage the record correctly. As history accumulates, the demand patterns will start to become clearer, but nevertheless, products with less than 12 months historical demand should be reviewed regularly.

One good way to manage these records is to use a forecasting tool that allows the use of demand curves based on historical demand for similar or related products. For a completely new product, your forecasting system will not be able to help you with an absolute annual or seasonal total until sales have started. However, if the annual total has been estimated, it can be spread using the seasonality curve created from a similar product. But more importantly, as the product starts to sell the seasonality curve can be used to interpolate from history giving an updated and more realistic picture of future demand based upon actual sales.

Publish Forecast Accuracy Results
8: Communicate, Share, and Use the Data to Drive Your Sales and Operations Planning Process

Demand forecasting is the first step toward achieving “one set of numbers” and the modern business imperative of a business-wide Sales and Operations Planning Process. However, this goal will be very difficult to achieve using static spreadsheets to manage tactical financial information, budgets, demand and resource plans, inventory targets and all of the other data that drive activities from product development to delivery at the customer dock.

The multiple spreadsheet approach is disparate and breeds silo thinking with everyone having their own version of the truth. By contrast, using a dynamic-but-flexible forecasting system that integrates with your ERP and other existing data systems fosters communication, uniformity of data, and KPI measurement and provides a focus for improved forecast accuracy and business efficiency.

Having multiple forecasts with differing information throughout a supply chain will always create waste - too much/too little inventory, increased labor costs, and redundant and non-value added activity.

9: Make Forecasting a Key Business Step with Clear Accountability

Sales forecasting must be a regular and highly visible process that is performed efficiently and rapidly. It should be seen as a key value-added business process to help deliver business control and execution of the commercial actions agreed upon within the Sales and Operations meetings.

Just as with other processes, effective forecasting will only happen with a clear assignment of responsibility and accountability. Usually, these rest with the sales and marketing team because this group:

- Can update the forecast with actual sales information immediately
- Knows where to modify history to deliver a better statistical forecast
- Knows where the advertising and trade promotional spend will go
- Knows and understands the short, medium and long term brand performance
- Performs market segmentation and profitability analysis, not just historically but into the future as well
- Requires the resulting performance data for aggressive portfolio management.

Monitor Short Histories Regularly
10: Measure Performance, Publish It and Continuously Improve

“What gets measured gets done.”

The key performance indicators for forecasters are sales forecast accuracy and forecast bias – measures that should be part of any company’s balanced scorecard.

It takes discipline and certainly courage to publish the first and subsequent sets of forecast accuracy figures so that a company can chart the continuous improvement in forecast accuracy. In addition, each month, look at the 10 biggest misses. Understand what went wrong and use this knowledge to deliver a better set of forecasts next month.

We are often asked, particularly when we start a forecasting project with a customer, “what should my forecast accuracy number be?” This is impossible to answer – a 45% forecast accuracy in one company may be excellent while a 70% forecast accuracy in another may be at the lower end.

The key to success is to start measuring, use the techniques above and continuously improve.

For 25 years, Demand Solutions has been empowering small and midsized enterprises to reduce costs and increase profits through effective inventory management. Its solutions address the full spectrum of inventory planning, including demand forecasting, collaboration, inventory replenishment and optimization, sales and operations planning (S&OP), retail point-of-sale (POS) planning, and advanced planning and scheduling. More than 2,000 customers in over 70 countries rely on Demand Solutions to turn supply chain insight into competitive advantage.

Learn more at www.demandsolutions.com.