

# Forecast Analysis

By Jon Schreibfeder

I visited a hard goods distributor this week. This company has seven locations and over five million dollars in stock inventory - yet they face two common challenges:

- Stockouts of products that their customers expect to be available for immediate delivery
- Money tied up in dead stock and slow moving inventory

This is not a “mom and pop” shop. They are a large distributor with a comprehensive ERP system containing the latest “best practice” customer service and order processing capabilities. But as we discussed their inventory replenishment practices, we discovered a lack of solid, well-grounded policies and procedures. And while their software included many “bells and whistles” to promote sales and customer relationships, it lacked the tools needed to effectively manage their inventory.

Little thought was given to how predictions of future customer demand of specific products were determined. A demand forecast is a prediction of the quantity of a specific item that will be sold, transferred or otherwise consumed in an upcoming time period. An accurate demand forecast is a critical element in achieving effective inventory management:

*“Effective inventory management allows a distributor to meet or exceed customers’ expectations of product availability with the amount of each item that will maximize net profits.”*

If you don’t have a good idea of what your customers are going to buy, how are you going to “meet or exceed their expectations of product availability”? It is surprising how few distributors pay attention to the accuracy of their demand forecast and implement “best practice” forecasting policies and procedures. They are missing a key element in the formula for success. In this whitepaper we will discuss:

- Measuring forecast accuracy
- The elements of an accurate forecast
- How different patterns of usage require different forecast formulas
- How to improve forecast accuracy
- How to incorporate “best practice” forecasting into normal operations

While accurate forecasting is not a high priority for many distributors, our customers that have made a concerted effort to implement “best practice” forecasting procedures have reduced their value of stock inventory by an average of 32.5%, while maintaining or increasing their customer service level. Achieving accurate demand forecasts is not easy. A lot of people ask if it is worth the effort. While contemplating this question, calculate what 35% of your inventory is worth. Don’t you think it might be worth the effort?

## Measuring Forecast Accuracy

How accurate are your current forecasts? Most companies have no idea. As a first step to achieving the most accurate predictions of future demand possible, we suggest that you calculate your current forecast error. The forecast error measures the difference between the forecast and actual usage in the most recent months or weeks. We suggest you use this formula to calculate the forecast error:

$$\text{Absolute Value of (Forecast – Actual Usage)} \div \text{Smaller of the Forecast or Actual Usage}$$

For example, June’s forecast for item #A100 was 50 pieces. Actual usage was 40 pieces. The forecast error is 25%:

$$\text{Absolute Value of } (50 - 40) \div 40 = 25\%$$

We get the same forecast error if the numbers are reversed (a forecast of 40 pieces and actual usage of 50 pieces):

$$\text{Absolute Value of } (40 - 50) \div 40 = 25\%$$

Why do we use this formula? Because we believe being overstocked is as bad as being under stocked. A study we conducted for the National Association of Wholesale-Distributors (NAW) indicates that most distributors do not have accurate forecasts<sup>1</sup>. Participants in this study represented wholesalers in a wide range of industries; they ranged in size from one to over 150 locations, and they utilized a wide range of computer enterprise resource planning (ERP) systems.

- The mean forecast error for the products they stocked was 682%.
- The median forecast error for products they stocked was 381%.

But the most profitable distributors had an average forecast error less than 1/10<sup>th</sup> of the average error of all distributors selling similar products. This leads to two conclusions:

- There is a correlation between more accurate forecasting and higher profitability.
- The wide range of forecast accuracy found in every industry suggests that there are actions you can take to improve the accuracy of your demand forecasts.

## Elements of an Accurate Demand Forecast

There are five elements to an accurate forecast:

- Known future requirements (also known as “dependent demand”)
- Past usage of the product or similar items
- Choosing the best forecasting method for each item (including the recognition of trends)
- The effect of promotions or other events
- Subjective information from customers, salespeople, management or other sources

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<sup>1</sup> Guess Right – Boost the Accuracy of Your Demand Forecast, Copyright 2003, Distribution Research and Education Foundation of the National Association of Wholesale-Distributors

## Collecting “Dependent Demand”

Distributors have to forecast or predict what customers will need in the future. However, some customers know what they will need far in advance of when the product is actually required. This may involve items that are needed to complete a long-term project, scheduled maintenance or production that is planned months in advance. Known future usage is referred to as “dependent demand”. But how do you ensure that customers’ dependent demand estimates are as accurate as possible?

- **Create a “Sales Call Report”.** This report allows your salespeople to review customers’ prior forecasts of usage and their actual purchases. Reporting back the results of previous forecasts usually results in the customer providing better estimates of future demand.
- **Offer incentives for more accurate predictions of future demand.** If a customer can accurately predict what they will buy or use in the future, you can stock less and still meet their expectations of product availability. Why not share the resulting savings with your customer? This will encourage them to continue to provide you with accurate estimates of their future needs.

## Past Usage of a Product

Often customers don’t know what they will need until they actually need it. This is referred to as “independent demand”. A lot of buyers believe that “what we sold in the past is a good indication of what we will sell in the future”. But do you want to always restock based on what you actually sold? Consider these situations:

- Sales are lower than normal because you are out of stock or a customer temporarily stopped using a product.
- Sales are higher than normal due to a customer’s one-time project that requires a large quantity of a specific item.
- A promotion or a factor such as inclement weather temporarily increased sales of a product.
- A competitor is out of stock of a critical item. As a result, their customers are buying the product from you.

A state of the art computer system bases forecasts on product “usage” rather than sales. Usage is a special history maintained only for forecasting purposes. When deciding whether a transaction should be posted to usage, the system should determine *if you want to replenish this quantity of this item in this location to meet customers’ future needs.*

Reasons why usage will differ from actual sales include:

- **Lost Sales** – Customer requests that could not be filled because you didn’t have adequate inventory of the item. Usage should reflect what you could have sold had the item been in stock.

- Unusual Sales – Examples of unusual sales include one-time purchases necessary to complete specific projects, or temporary increases in volume resulting from promotions.
- A product has been discontinued and superseded by an updated model.
- An item was substituted for an out of stock product the customer really wanted.

A state of the art computer system allows buyers to adjust usage history to compensate for activity that will not reoccur in the future. One of a buyer's primary responsibilities is to examine situations where the forecast in the month or week just completed significantly differs from actual usage, to determine if usage needs to be adjusted to reflect what would have happened under "normal" circumstances.

### Choosing the Best Forecasting Method

Stocked products have different patterns of usage. For example, some items increase or decrease in popularity over time. Other products can have seasonal patterns of usage. You will even have products that have sporadic usage (they are not sold or used on a regular basis). Even products in the same vendor line, stocked next to each other on a shelf in your warehouse, can have very different patterns of usage.

One formula or method cannot be used to accurately forecast future demand for all products. "Best practice" software provides multiple forecasting methods that can be further customized to fit a specific distributor's unique business environment. How does the system determine which method from the library of formulas should be used for each item?

- It will calculate a forecast for each of the past several months using several different forecast formulas.
- The system will then calculate a forecast error (using the formula previously described) comparing the calculated forecasts to the actual usage recorded in each month.
- The formula that results in the lowest forecast error will be used to calculate future forecasts for the item.

### Promotions and Other Events

Promotions and other events can temporarily increase or decrease sales of specific items. It is critical that your forecasting system have the capability to properly manage forecasts and events. A "best practice" system will:

- **Allow you to identify promotions or events** (a listing of those occurrences that will or might affect usage).
- **Measure the actual effect of each listed promotion or event.** What was the actual effect of this promotion or event on usage?
- **Clean usage history.** Adjust out the effects of the event from usage history. After all, this promotion or event will not occur at exactly the same time next year. If a promotion increased sales by 20%, remove this 20% increase from usage history.

- **Record results.** By reviewing the effect of previous promotions or events on usage you will be able to predict how they will affect future sales. If a promotion typically increases sales by 20%, you can increase a forecast calculated with “clean usage history” by 20%, to ensure you will have adequate stock to meet customer demand.

## Collaborative Information

Business conditions change over time. You gain and lose customers; competitors enter or leave the market, etc. Salespeople, customers, vendors and management all have the potential to provide information on how business will change in the future. But how do you know that the information they provide will be accurate?

We have found that best practice is to implement a formal process for collecting and evaluating collaborative information. “Best Practice” software will allow you to apply this collaborative information to a forecast based on past usage history and analyze the results. There are several techniques for collecting and evaluating collaborative information. These include:

**Live Meetings:** All members of the management team (marketing, sales, production, procurement, logistics and accounting) gather to review the calculated demand forecast and then consider the anticipated effects of promotions, events, and other market knowledge to “tweak” the final results.

**Trading Notes:** All management team members receive a report of calculated demand forecasts and independently tweak the results. The forecast coordinator (usually the buyer) compiles the results and sends a revised forecast back to all members of the management team for final approval.

**Salesperson Input:** Each salesperson receives an initial forecast for their primary customers and products. They are then allowed to tweak the results before sending them back to the forecast coordinator.

To ensure that the collaborative information provided management and salespeople is realistic, be sure to report resulting sales back to the source of information. For example, if a salesperson predicts that sales of a certain product will increase by 30%, be sure to send him/her a report comparing their prediction against actual sales at the end of the month.

## Improving Forecast Accuracy

A demand forecast is a prediction of what will be sold, transferred or otherwise used in the future. There is an old saying that all forecasts fall into two categories: inaccurate forecasts and “lucky” forecasts. Without a crystal ball we will never have totally accurate (i.e., “lucky”) forecasts. But this doesn’t mean that we should stop striving to achieve the most accurate forecast possible.

The best way to improve your forecast accuracy is to analyze situations where your forecast substantially differs from actual usage. “Best Practice” computer systems report these differences on an unusual usage report or inquiry. Actual usage will differ from the forecasted quantity for one of several reasons:

- **There were transactions that will not reoccur** – Adjust usage history to what would have been sold under normal circumstances.
- **Stockouts or other temporary conditions prevented you from selling the product** – Again adjust usage history to what would have been sold under normal circumstances.
- **A new trend has begun** – The product’s popularity has suddenly increased or decreased. Best practice is to adjust usage history over the past 12 months to reflect the new sales pattern. For example, if demand for an item suddenly increases by 1,000 pieces per month, increase usage in each of the past 12 months by 1,000 pieces. Increasing usage will ensure that your system-generated forecast compensates for this new increased demand.
- **You have received inaccurate collaborative information** – Report the difference between his/her prediction and the resulting sales or usage back to the source of information. Hopefully future predictions from this source will be more accurate
- **You need to apply a different forecast formula** - The pattern of usage for the item has changed. Allow your system to re-evaluate the product’s usage history and select a more accurate formula to forecast future demand for the product.

### **Incorporating Best Practice Forecasting**

There is little doubt that accurate forecasting of future demand will improve both profitability and customer satisfaction. But how do you implement and maintain a comprehensive forecasting program? It is not as difficult as you might think. Just follow this step-by-step program:

- Determine your current forecast error.
- Evaluate “best practice” demand forecasting software packages by comparing your current forecast error to the results generated by their system. Be sure that you include all of your stocked items in the evaluation (or at least all of the items stocked in one warehouse). Also ensure that evaluated software packages use the correct formula to calculate the forecast error. Which software solution provides the best results?
- Appoint a forecast coordinator for each of your product or vendor lines. This may be the buyer of those products. The forecast coordinator must fully understand the capabilities of the forecasting software, as well as the needs of every department within your organization. In addition, he/she must be able to effectively communicate with sales and management personnel.
- Have the forecast coordinator collect dependent demand and collaborative forecast information each week or month. They should also report back the resulting accuracy of these estimates to the source of information.
- The forecast coordinator should review possible unusual activity on a monthly or weekly basis and enter adjustments to usage history as necessary.
- The resulting forecast should be used to set your system’s replenishment parameters. These parameters determine when to reorder products and how much to order.

## **Conclusion**

Distributors face more challenges today than ever before:

- The challenging economic environment has reduced the number of opportunities available to increase sales.
- Advances in technology have allowed competitors to increase their marketing areas.
- More competition has resulted in lower profits and more demanding customers.

You have to provide better product availability with fewer dollars available to invest in inventory. Accurate forecasting will lead to effective inventory management. This is probably the most effective action you can take to improve your company's profitability and assure its long term success.

## **About the Author, Jon Schreibfeder**

Jon Schreibfeder is president of Effective Inventory Management, Inc., a firm dedicated to helping manufacturers, distributors, and large retailers get the most out of their investment in stock inventory.

For over 20 years, Jon has served as an inventory management consultant to over two thousand firms to improve their productivity and profitability. Jon has designed several inventory management computer systems and has also served as a distribution industry "troubleshooter" for two major computer companies.

A featured speaker at seminars and conventions throughout North America, Latin America, Europe, Asia, and the Pacific Rim, Jon has been awarded the title "Subject Matter Expert" in inventory management by the American Productivity and Quality Center. He is an advisor and guest lecturer in the Industrial Distribution Program at Purdue University.

## **About Absolute Value**

Absolute Value supports middle market distributors with software solutions for forecasting and replenishment. Our best fit formula-based forecasting and multi-site replenishment solution allows you to lower your inventory investment while increasing customer service levels.

Absolute Value helps distributors by providing a complete forecasting and replenishment solution with ERP independence. The software can plug into an existing distribution system or legacy system without the pain, complexity, and cost of purchasing a new ERP system.

Blending end-user and software vendor experience with knowledge of state-of-the-art technology, the Absolute Value team has helped meet the needs of 300+ distributors.

For more information about Absolute Value:

678-905-1204

[avinfo@absolutevalue-us.com](mailto:avinfo@absolutevalue-us.com)