

Naïve Forecasts

The sophisticated approach to supply and demand

This department answers technical questions regarding problems in production and inventory control. Readers are invited to contact Louis Malucci, CPIM, or Karen Lovecchio, Ph.D., APICS National Research Committee, Center for Integrated Manufacturing Studies, Rochester Institute of Technology, P.O. Box 9887, Rochester, New York, 14623; (585) 475-2098; via fax at (585) 475-5240; or at apics@rit.edu.

Reader T.T. says, "I am looking for some reference material on forecasting and how to measure success using MAPE [mean absolute percent error]."

Michael Gilliland, CFPIM, has an excellent discussion on this subject in the 2004 APICS International Conference and Exposition proceedings. He explains that, while MAPE does indicate the relative magnitude of the forecast error, it provides no insight into effectiveness or what to expect in the future. Thus, MAPE is unsuccessful at streamlining processes or improving accuracy and is not a legitimate metric for comparing forecasting performance across different streams of historical demand.

Gilliland cites an example where three forecasters' accuracy measurements are tracked. Forecaster A was responsible for a line of long-running, core products with steady demand and few new product introductions. Forecaster B also was responsible for a line of long-running, core products; although B's items were more seasonal and well-promoted than A's. Forecaster C was responsible for a line of fashion products—items with short life cycles, highly seasonal demand, and a continuous introduction of new products.

Using the traditional MAPE approach to forecasting performance

measurement, Gilliland explains that forecaster A's MAPE is 25 percent, B's MAPE is 30 percent, and C's MAPE is 35 percent. However, to accurately rank these forecasters, Gilliland argues that we must take into consideration demand volatility. He suggests a classic, yet infrequently used, technique to evaluate process results: a naïve forecast. Typical naïve models include the moving average (forecast equals average of last 52 weeks of actual demand) and the random walk (forecast equals last week's actual demand).

Gilliland says, "The MAPE achieved by a naïve forecasting method depends entirely on the volatility of the demand pattern it is applied to. Smooth patterns will have a lower MAPE than seasonal and erratic patterns. Performance of the naïve forecast establishes the level of accuracy that is reasonable to expect for a given demand pattern."

He goes on to explain that performing a "what if" analysis using a simple moving average (naïve forecast) over the past year for each forecaster's historical demand would reveal that A's naïve forecast is 20 percent, B's naïve forecast is 30 percent, and C's naïve forecast is 40 percent. Thus, because A's product line had stable demand patterns, the moving average achieved a MAPE 5 percentage points better than A achieved; A's efforts actually made the forecast worse. Analyst B, having moderately volatile demand, achieved the same MAPE as the naïve forecast (30 percent). As Gilliland says, "B could have just as well spent the year on vacation at the beach."

Only Analyst C, who had the worst MAPE (35 percent), actually created forecasts better than what the naïve

model would have achieved. Gilliland adds that the best way to evaluate forecasting performance is the forecast value added and, clearly, C is found to be the most effective.

Parting words

In the 2002 APICS conference proceedings, Fred Tolbert, CPIM, recommends six keys to successful forecasting.

1. Forecasting is a process, not an event.
2. Simple forecasting techniques work better than complex ones.
3. A sales forecasting system should serve as a communications vehicle.
4. The system should pick the best formula.
5. You must forecast at the right level of detail.
6. Forecasting is a full time job.

"It's too easy to say that bad forecasting is at the root of inventory management problems," Tolbert says. "Different organizations within companies have competing objectives. The [chief financial officer] wants minimum inventory and high turns. Planners want the right inventory in the right place at the right time. Marketing wants higher inventory to maintain service levels. Operations wants to manufacture and purchase at the lowest possible cost. Our job is to balance all of these competing objectives." ■

References

- Gilliland, Michael V., CFPIM, "The New Metrics of Forecasting Performance," 2004 APICS International Conference Proceedings, page 2.
- Tolbert, Fred, CPIM, "Forecast For Show, Plan For Dough!" 2002 APICS International Conference Proceedings, pages 1-4.