"turning data into dollars"

Tom's Ten Data Tips – June 2007

## Forecasting

Forecasting is the "art" of predicting the future. Given prevailing conditions, and within bounds that can and will be influenced, an estimate of *future* demand is derived. Sales targets should follow forecasts, *never* the other way around (see also tip# 6). They take into account what attainable conditions need to be created to succeed.

It is an excellent idea to include other measures besides statistical accuracy to determine the success of the forecast. These "other measures" should align with corporate goals related to the bottom line like reduced inventory, improved throughput times, less customer complaints, etc.

Since an organization performs most efficiently when it operates in unison, it is preferable for organizations to rely on one centrally determined forecast. All departments should then derive *their* unique view of the future from this centrally determined forecast (see also tip# 10).

## 1. Forecasts Are Fundamentally Different From Targets

A Forecast is to all intents and purposes, an expectation about future demand given the current set of environmental conditions. This could be expected sales for the next month, number of cancelled accounts next year, etc. A forecast has an entirely different *function* from a sales or marketing target.

Whereas a forecast tells you what previous realities would make you expect, a target purveys what the company aspires to realize. As such, it has a function to motivate employees in commercial functions. Both forecasting and target setting go awfully wrong when these two realities are mixed.

## 2. To Improve Forecasting, Focus On The Process

Improved forecasting rarely follows from purchasing more advanced software or systems. Adequate prediction software is a necessary but not sufficient condition. Analyst skill, data quality, and inter departmental alignment are just as important, if not more so.

 

When you regard the outcome of a forecast as the result of a value creating *process*, there are several elements within this value chain that can help achieve a better forecast. Communication and collaboration are far more important than advanced statistics. By focusing on the *causes* of error, instead of the forecast *accuracy*, the road to improvement is paved.

## 3. Results Of Forecasting Accuracy Need To Be Presented In Business Terms

It is of little value to the business to know that a particular sales forecast has an $R^2$ of 0.62. What *is* of interest to the business is that the improvement from an $R^2$ of 0.54 to an $R^2$ of 0.62 led to a decrease in capital allocation for carrying inventory of $700.000. Or that the improved forecast to balance the workload for the service department led to 12% less customer complaints.

As always, to make this transition from a statistical measure to a business outcome, additional calculations need to be made, assumptions need to be explicated, etc. These challenges must not prevent you from going the extra mile and making such business aligned calculations.

## 4. Forecasts Based On Regression Are Fraught With Difficulties

In theory, regression can potentially lead to the most accurate forecasts. However, there are relatively many challenges that need to be met. For one thing, all predictive fields need to be compiled in a timely manner, and (multi-variate!) data quality needs to be assured prior to deployment.

Another challenge is checking the appropriateness of all computational procedures to ascertain that the statistical operations are legitimate, given the rather strong assumptions that need to be made. Examples of such assumptions for regression analysis are: the average of the errors should equal zero, errors should be normally distributed, the variability of the errors should be constant across the range (homoscedasticity), and the errors should not be autocorrelated. Judging the impact of violating these assumptions on the legitimacy of predictions requires specialized expertise.

 

## 5. Forecasting Is A Challenging Job

One of the reasons why forecasting is a tricky job is that there is only one thing that can be said with absolute certainty about a forecast: it will be wrong.

On a good day, week, or month, the forecaster's life is peaceful because the deviation between his prediction and reality is considered acceptable. However, if a prediction is off by an unacceptable amount, there will be complaints. So work either goes unnoticed or is discarded, and only if it goes awry will the forecaster get the limelight.

## 6. Begin With A Forecast, *Then* Derive The Sales Plan

It is good practice to *start* with a forecast. This should be based on what is likely to happen given current circumstances in the market. Note explicitly that there is no relation whatsoever between the forecast and financial targets for the company. It is hardly the analyst's fault if consumers are insufficiently interested in buying the product, neither ought the forecaster get kudos if consumers are lining up in front of stores to buy!

Only *after* the present situation is appraised and forecasted does one derive what activities need to be undertaken to realize the target – *not the other way around!*. That would be like trying to force-fit size 9 into Cinderella's glass shoe.

## 7. Systematic Bias In The Forecasts Has A Systemic Cause

Bias may occur because in order to arrive at a forecast, one needs to acquire and process large amounts of complex information. At the same time, it is likely that adjustments to a forecast are subject to company politics. This usually involves the way people are rewarded. If sales people get bonuses for beating their targets, pressure will be to lower that target. Hence, if you need to eliminate bias, you need to change the system, not the forecast.

Ways to overcome systemic bias involve either better alignment and/or improved communication. The former involves strategic rethinking of internal objectives and targets. The latter may involve periodic meetings between departments. The minutes from meetings where modifications of past forecasts were discussed, should lead to an accumulation of knowledge about factors that influence demand. If bias keeps occurring, surface the systemic origin, and present this to senior management for reconsideration.

 

## 8. Forecasting Needs To Be In Everyone's Job Description

Since the process of deriving forecasts often hinges on input from multiple departments, this is best supported if performance evaluation systems and bonuses reflect this reality. As they say: "What gets paid, gets done."

Otherwise, arriving at the best possible forecast will not get the right priority. If, for example, the sales force needs to supply estimates of upcoming orders to enhance the forecast, they need to be available in time. When job performance and bonus hinge on sales results, it is easy to see why that will get the first priority. The compensation system needs to demonstrate that management values time spent in support of forecasting, or else this will remain an uphill struggle.

## 9. Marketing Or Sales Should "Own" The Forecast

The marketing or sales function typically creates demand, and needs to *share* this perspective with those dependent on it to create plans (either financial, operational, etc.). To ensure the best possible alignment of interests across departments, this is where the forecast should reside, or at the very least be signed off.

Also, marketing or sales is best suited to *influence* demand, should any of the other departments need to formulate constraints. This could be a cap on the maximum production by operations, a shift in the credit make up of a portfolio by finance, etc. No other function can influence demand as directly and promptly as marketing and/or sales. They should also have the best view on what demand will be. Because of extraneous needs, this may also be where the temptation to let political forces undermine objective forces be strongest and therefore best fended off (see also tip# 7).

## 10. The Corporation Needs To Be Run Based On *One* Central Set Of Numbers

There can be *no* valid business reason why different departments can work off different sets of forecasts. It *is*, however, entirely possible that departments may require a different *view* on the same underlying forecast(s). The distinction is far from trivial, and goes beyond avoiding duplication of effort when separate departments derive their own forecasts.

Best practice is to have multiple departments like Marketing, Operations and Finance work of the same *underlying* forecast that is

 

presented in different ways. Finance may only be concerned with quarterly financials. Operations may need weekly details at the SKU level. Both can and should be derived from the same unified forecast from which the business is run.

 