



SPECIAL FEATURE

WHEN AND HOW SHOULD STATISTICAL FORECASTS BE JUDGMENTALLY ADJUSTED?

INTRODUCTION by Feature Editor, Nada Sanders

Preview: In her introduction to this feature section, Nada explains the challenges of judgmentally adjusting statistical forecasts, and the problems that can occur if the process is not done correctly.



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Managers today are under greater pressure to deliver accurate forecasts than ever before. Accurate forecasting has always been a critical organizational capability that enables effective business planning (Armstrong, 2001; Fildes and Hastings, 1994). Managers have historically relied on forecasts to help them identify new market opportunities, anticipate future demands, schedule production more effectively, and reduce inventories.

Over the past few years, however, forecasting has become especially critical as competitive market pressures create the need to improve forecast accuracy (Sanders and Manrodt, 2003a). Information technology (IT) has enabled forecasts to drive entire supply chains and enterprise-resource-planning systems, placing greater importance on the forecasts (Lee, 2004). At the same time, global competition has created an environment characterized by uncertainty, rapidly shifting markets, and compressed cycle times. Customers are increasingly demanding shorter response times, improved quality, and greater product choice. The result has been a sharp rise in the complexity of the forecasting process, in which historical data is often

of limited value in predicting the future, and managers have difficulty producing accurate forecasts.

Accurate forecasting has always been a critical organizational capability.



Forecasting today is more challenging because of

- increased global competition,
- rapidly changing markets,
- shorter cycle times,
- higher consumer expectations,
- information technology and e-commerce.

How should managers produce their forecasts? They can choose from two broad categories of forecasting methods: *managerial forecasts*, which are based on opinion, and *statistical forecasts*, which are based on mathematical modeling. Each category has its strengths and weaknesses. With managerial forecasts, managers can incorporate soft or inside information, which can be a valuable predictor

in changing environments (Webby and O'Connor, 1996). They can also respond to last minute changes in the environment. However, because managerial forecasts are subjective, they are often biased (Armstrong, 1985; Hogarth, 1987). Just consider the manager who is optimistic the day after a large sale, but pessimistic the day after a slump. Such events often lead managers to inadvertently bias their forecasts, which can degrade accuracy.

Managerial forecasts can respond to the latest changes in the environment but can be biased.



- Strengths of Managerial Forecasts:**
- Responsive to latest changes in environment
 - Can include inside information
 - Can compensate for one-time or unusual events

- Weaknesses of Managerial Forecasts:**
- Human cognitive limitations (e.g., limited attention span, limited memory, misunderstanding causal relationships)
 - Biases (e.g., lack of consistency, optimism, wishful thinking, political manipulation)

Unlike managerial forecasts, statistical forecasts are based on mathematical principles and are typically generated by the software packages available (Sanders and Manrodt, 2003b). Statistical methods are consistent, objective, and unbiased. They are particularly effective for generating forecasts for a large number of SKUs (stock-keeping-units), when managerial forecasts would be time consuming and costly. However, statistical methods are based on historical data and are not effective when conditions in the market change. A new competitor could enter the marketplace, for example, or a snow storm could delay a shipment. Each approach has its strengths, and the best forecasting

Statistical forecasts are objective and consistent but are only as good as the data upon which they are based.

- Strengths of Statistical Forecasts:**
- Objective
 - Consistent
 - Can process large amounts of data
 - Can consider many variables and complex relationships



- Weaknesses of Statistical Forecasts:**
- Slow to react to changing environments
 - Only as good as the model formulation and available data
 - Can be costly to model soft information
 - Require technical understanding

methods integrate both approaches. Increasingly, successful forecasting relies on the use of composite methodologies that incorporate a range of information from traditional

statistical computations to judgmental assessments of markets. Forecasting methods that combine managerial and statistical forecasts offer such an alternative.

Managerial and statistical forecasts can be combined in different ways to take advantage of their strengths. One method of combining them is to take a mathematical average of the results of the two methods to generate a forecast. Another method is to use managerial opinion as an input to the forecasting model. By far the most popular method in practice, however, is managerial adjustment of statistical forecasts. Managers take statistical forecasts, for example, those generated with software packages, and adjust them up or down based on their opinions. This adjustment is often called a managerial override, and managerial adjustment of statistical forecasts is the most popular method of forecasting in practice. In fact, in a survey of managers, Sanders and Manrodt (1994) found that 91 percent of respondents made managerial adjustments to statistical forecasts.

Managerially adjusting statistical forecasts can often improve forecast accuracy by including information not available to the statistical model. On the other hand, if not performed correctly, adjustments can degrade accuracy because of the biases inherent in human judgment. Managers should follow the established guidelines or principles for correctly adjusting statistical forecasts to take advantage of the strengths of the two methods without allowing biases to degrade forecast accuracy. Basically, there are correct and incorrect ways to managerially adjust statistical forecasts. Given the prevalence of managerial adjustment of statistical forecasts in practice and the

Managerially adjusting statistical forecasts is the most popular method in practice.

- Managerially adjusting statistical forecasts can improve accuracy.
- If not performed correctly, managerial adjustments can degrade accuracy.
- Managers must follow the dos and don'ts of judgmental adjustments.



importance of understanding the guidelines for proper adjustment, we are devoting the Special Feature of this issue of FORESIGHT to addressing how and when managers should adjust statistical forecasts. Our feature article by Paul Goodwin of Bath University is "How to Integrate Management Judgment with Statistical

Forecasts.” He provides fundamental information on how to combine the two forecasting approaches. Goodwin’s article is followed by two commentaries. In the first, Dilek Önköl and M. Sinan Gönöl of Bilkent University, discuss why and when forecasts are adjusted. In the second, Nigel Harvey of University College London, addresses how to improve the quality of judgmental adjustments and the problems that can arise when practitioners adjust their own initial judgmental forecasts on the basis of statistical information. This Special Feature concludes with two commentaries from practicing forecasters. The first is a commentary by Anthony Lee of AstraZeneca Pharmaceuticals, followed by a commentary from Lucy Kjolso of Brooks Sports, Inc. These forecasters offer insights from their organizational experiences in how judgmental adjustments are most effectively applied. Finally, the article by Tom Ross in the following section on Forecasting Processes offers a case study of the integration of statistical and judgmental forecasts.

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