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David W. Nylén  
August 16, 2010

## A.16 Sales Forecasting

### ALTERNATIVE FORECASTING METHODS

**Sales forecasting** is the process for determining current and future sales for a product or product class. Sales forecasting is different from demand estimation and the estimation of sales potential. **Demand estimation** is concerned with determining the demand curve or the relation between product sales and product price. This topic will be considered as one of the **price determinants** in GLOSSARY entry C.21. **Sales potential** refers not to actual product class sales, but to an estimation of what sales might be if all prospective consumers were to purchase.

Sales forecasting is a process used in the **situation analysis** section of a marketing plan and is also regularly applied in analyzing marketing problems.

**Forecasting Requirements.** Before considering forecasting methods that are available to

marketers, it is important to understand what forecasts are required for marketing decision making. Sales forecasts can be made for individual brands, individual businesses, whole product classes, or the total economy. However, for marketing decision making, the key end product of the process is a sales forecast for an individual brand.

■ **National Economic Forecasts.** If product sales are known to be related to the general level of economic activity, a national economic forecast may be needed for use as a component in the product class forecast. Rather than attempt their own national economic forecasts, most marketers, except in the very largest firms, rely upon published forecasts made by economic services, universities, or governmental units. If product class sales are related to some factor other than national economic activity (to population growth, for example), then this other factor must be projected so that it can be used as a component in the product class forecast.

- **Product Class Sales Forecasts.** Although the desired end product of a forecasting effort is a forecast of brand sales, the major application of forecasting methods is to predict product class sales. Where possible, forecasts are made by market segment as well as by total market in order to support the **target market selection** decision. The brand sales forecast is then made by applying the projected market share of the brand to the estimate of product class or market segment sales.
- **Brand Sales Forecast.** For decision making, this is the end product of the forecasting process. The level of detail in the brand sales forecast depends upon the problem. For product lines, the sales of individual items in the line may be forecast. Total brand sales may also be broken down by geographic area, by various time units (by quarter, by month), and by target market if there is more than one.
- **Business Sales Forecast.** For strategic market planning, a forecast of the sales of a business or strategic business unit (SBU) may be needed (see GLOSSARY entry A.20). Usually a SBU sales forecast is prepared by forecasting sales of individual brands in the SBU and combining them to form a forecast for the total business.

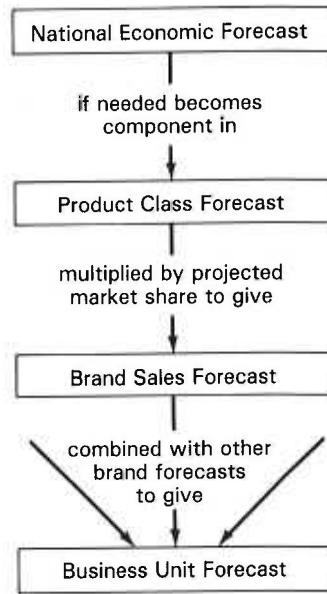


FIGURE A.16-1  
Four Levels of Forecasts

#### *Characteristics of Forecasting Methods.*

There are three broad classes of forecasting methods: time series projection, causal methods, and judgmental methods. In addition, these methods are sometimes used in combination.

- **Time Series Projection.** In this method, statistical techniques are used to fit a trend line to the pattern of historical sales figures. The trend line may be linear or nonlinear, depending upon which best fits the historical data. The trend line is usually expressed in terms of a mathematical equation that is then used to project the trend forward into future years in order to provide the forecast.

**Time series analysis** refers to a number of statistical techniques that can be applied to the raw historical data before the trend line is fitted. Smoothing techniques such as moving average, exponential smoothing, Box-Jenkins remove the distortions caused by random or one-time events such as strikes or materials shortages. Other techniques separate out seasonal and cyclical variations so that the underlying growth trend can be identified and projected.

Figure A.16-1 depicts the relationship among the four levels of forecasts.

Sales forecasts may be prepared in either dollar or unit terms. Forecasting in unit terms avoids the problem of changing price levels. Dollar sales forecasts can then be prepared by projecting average selling price and multiplying by forecast unit sales. The time period of a forecast depends upon the planning or decision-making need. Clearly near-term forecasts are more accurate than long-term forecasts. One frequent practice is to make a five year forecast with the first year forecast in greater detail. Forecasts should be reviewed and revised at least annually. In the case of the five-year forecast, the current year would be dropped, a new fifth year would be added, and the first year forecast reprojected in more detail. Part of the process of revising the forecast should be to check accuracy by comparing actual sales for the most recent period with the forecast for that period. This review permits refinement of the forecasting method used.

■ **Causal Methods.** **Causal methods** use historical data to establish the relationship between product class sales and other factors that are thought to govern product class sales. The factors chosen will vary widely with the product class, but could include such variables as population growth, growth of a particular age group, the level of disposable income, the sales level of some related product such as automobiles or home stereos, competitive activity, or the level of a number of economic variables. To make the causal method viable, it must be possible to forecast the causal factors reasonably well. Each of the suspected causal factors must be tested statistically to assure that it is related to product class sales. The resulting causal factors, and there may be a number of them, are then related to product class sales in a regression equation.

To generate a forecast, predicted values of the causative factors are fed into the regression equation as independent variables, and the equation "solved" for product class sales, the dependent variable. More complex models made up of a number of regression equations can be developed; some of these can be used to model an entire industry and provide forecasts not only of sales, but of other variables as well.<sup>1</sup> These are referred to as **econometric models**.

■ **Judgmental Methods.** Unlike the prior two methods, the **judgmental forecasting methods** do not rely upon historical data. Instead, they seek qualitative information from persons believed to have insight into the future of a market. Most of these methods attempt to bring objectivity and order to the collection of the judgmental data.

**Expert opinion panels** may ask a number of market sensitive executives in the firm or a number of experts in the field each to prepare a sales forecast; these results are combined to form a consensus forecast. **Delphi method** forecasts use the same approach, but there are several rounds of forecasting with each forecaster able to adjust his or her forecast after seeing the forecasts of others on the panel. The **sales force forecast method** aggregates the sales forecast of each company salesperson for his or her territory. **Buyer intention surveys** use marketing research to ask prospective buyers what their purchase plans are. **Histor-**

**ical analogies**, most often used for new products, attempt to relate product sales to the historical sales pattern of some related product. For example, the sales pattern of compact disc recorders might be estimated by looking at the historical sales of home stereos. The **product life cycle** curve is sometimes used in the same way as a pattern of expected sales (see GLOSSARY entry A.15).

## CRITERIA FOR SELECTING A FORECASTING METHOD

Many forecasting methods are highly technical and require experts for implementation. However, marketing managers are likely to be involved in the selection of the forecasting methods to be used. This requires that the marketing manager know criteria that can be used in selecting a forecasting method and understand how well each of the major methods meets those criteria.

**Selection Criteria.** No one forecasting method is best. Instead, the best method to use depends upon the situation facing the decision maker. The criteria given below can help the marketer evaluate the decision-making situation and match the forecasting method to the situation:<sup>2</sup>

- **Accuracy.** What forecast accuracy is needed?
- **Data Availability.** What data are available to support the forecast?
- **Time Horizon.** For how long a time period is the forecast required?
- **Technical Capability.** What technical forecasting capability does the business have, including people, computers, and programs?
- **Cost.** How much is the marketer willing and able to pay for the forecast?
- **Trend or Turning Point.** Does the marketer anticipate a stable trend or seek to identify a market turning point?

<sup>2</sup>The criteria are based on suggestions in John C. Chambers, Satinder K. Mullick, and Donald D. Smith, "How to Choose the Right Forecasting Technique," *Harvard Business Review* (July-August 1971), pp. 45-74, and David M. Georgoff and Robert G. Murdick, "Manager's Guide to Forecasting," *Harvard Business Review* (January-February 1986), pp. 110-20.

<sup>1</sup>Terry W. Rothermel, "Forecasting Resurrected," *Harvard Business Review* (March-April 1982), pp. 139-47.

- *Timing of Need.* Is the forecast needed quickly? How frequently will the forecast be updated?
- *Life-Cycle Stage.* At what stage of the product life cycle is the product class for which the forecast is needed?

**Selecting a Forecasting Method.** The choice of forecasting method should be one that best meets the marketer's situation as described in the criteria listed above. The ability of the three forecasting methods to meet these criteria is summarized below.

- *Characteristics of Time Series Projection.* When good historical data are available, time series projection gives excellent accuracy for near-term forecasts, but is less useful for long-term forecasts. Time series projection works best in markets that are in the mature stage of the product life cycle because they tend to be more stable. It is not effective in anticipating turning points. Time series projection requires moderate statistical expertise. Most of these projections today utilize computers and, if historical data are available, can be produced and replicated quickly and inexpensively.
- *Characteristics of Causal Methods.* These methods also rely on strong historical data that allow the forecaster to establish the relationship between product class sales and the causal variables. Initially establishing the causal model will take longer and cost more than for time series projection, but once the model is formed, new forecasts can be produced rapidly and inexpensively. Building the initial model also takes considerable expertise, especially if a multiple equation econometric model is formed. Because they do not rely only on internal product class trends, the causal methods are better able to identify turning points. This makes the method more suitable for earlier stages in the product life cycle. Accuracy can be very good for shorter-term forecasts.
- *Characteristics of Judgmental Methods.* Judgmental methods are best suited to situations where historical data are not available. They are insightful in identifying turning points and in forecasting in unstable or new product markets, early stages in the product life cycle, and for long-term forecasts. Opinion panels and sales force estimates are inexpensive and require little technical expertise, but take longer to produce. Intentions surveys are more ex-

pensive and require considerable time to develop. Judgmental methods are frequently used to supplement forecasts produced by one of the quantitative methods.

**Forecasting for New Product Markets.** New product markets represent a special forecasting problem. If the market is truly new, the absence of historical data makes application of either the time series projection or the causal methods difficult if not impossible. Most forecasting for new product categories relies on judgmental methods or marketing research techniques. Opinion or expert panels are not highly accurate in this situation because the experts have little experience on which to base a judgment and may not be objective if closely involved in the new product's development. Historical analogies may hold greater promise, although the forecasts developed are necessarily crude.

New product marketers rely most heavily on market research estimates of sales, although such forecasts are necessarily short term. Surveys asking consumers their likelihood of purchasing a product after seeing a description or model of the product are sometimes used for preliminary estimates before sample product is ready to distribute. Intention-to-buy responses are converted into projected sales. When pilot quantities of the new product become available, field experiments are used to test product acceptance under more normal purchase conditions. Market tests and simulated market tests are two widely used techniques. If the test has been conducted with a representative sample of consumers, sales results are projected to the total population to generate a national sales estimate. **New product development** and **new product introduction** are considered more fully in GLOSSARY entries C.17 and C.18.

## THE USE OF FORECASTING IN MARKETING DECISION MAKING

Sales forecasting is an essential element of the **marketing planning process**, conducted during the **situation analysis**. It is also an es-

sential ingredient in solving many individual marketing problems outside the planning process.

**Sales Forecasting in Marketing Planning.** Determining the current market size and forecasting the market growth rate is a necessary part of the situation analysis section of the marketing planning process.

In the situation analysis, the market size and growth forecasts are analyzed to determine if they present problems or opportunities to the product. Large and growing markets clearly indicate opportunities while a slowing growth rate or a declining market indicate a problem. Such conclusions are fed to the **positioning** section of the plan. Here the problems or opportunities are studied to determine if objectives should be set to respond to them.

The sales forecast also provides essential information used in **target market selection** and in numerous **marketing mix** decisions. These are considered below.

**Sales Forecasting in Marketing Decision Making.** Whether the decision is made as part of the marketing planning process or separately, criteria for making marketing strategy decisions frequently require a sales forecast. These criteria are detailed separately elsewhere in the GLOSSARY for each decision, but examples are given below.

- **Target Market Selection.** The criteria for target market selection require estimates of market size and market growth. In selecting a target market, large markets are favored over small ones and growing ones over static or declining ones (see GLOSSARY entry B.4).
- **New Product Development.** Choice among new product candidates for **new product development** also depends upon a market size and market growth forecast. In order to be chosen for development, new products should normally be able to show a large market with predicted growth that would support a new and profitable entry (see GLOSSARY entry C.17).
- **Promotional Budgets.** Sales forecasts are used in the determination of advertising, personal selling, or other promotional budgets. Large and growing markets promise sales that make larger promotional budgets affordable. More important, large and growing markets require more promotional coverage to take advantage of the increased potential (see GLOSSARY entry C.1).
- **Channel Decisions.** Many channel of distribution decisions depend upon an understanding of the present and anticipated size of the market. For example, if the sales forecast promises a larger market, it may become economically feasible to switch from indirect distribution through middlemen to direct distribution to users. Similarly, a forecast of growth in the market may call for more intensive distribution to capture a share of the growth (see GLOSSARY entries C.10 and C.12).

## SUGGESTIONS FOR FURTHER READING

- CHAMBERS, JOHN C., SATINDER K. MULLICK, and DONALD D. SMITH. "How to Choose the Right Forecasting Technique." *Harvard Business Review* (July-August 1971), pp. 45-74.
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