

Sales forecasting

LEARNING OBJECTIVES

By the end of this chapter you will:

- understand the role of sales forecasting in the marketing planning process
- appreciate the distinction between short-, medium- and long-term forecasting
- be aware of the importance of accurate sales forecasts to different functional areas in the business
- know the relationship between sales forecasts and sales budgets
- be familiar with the major types forecasting techniques available to the marketer

INTRODUCTION

The task of business management would be simpler if industry was not in a continuous state of change. This change is precipitated to a large extent by the growth of global competition. The widespread adoption of IT-based commercial applications has speeded up the way that business transactions take place. IT-based innovations in manufacturing and service provision have meant that new ideas and procedures are more quickly adopted and implemented. This makes it increasingly important and necessary for organizations to predict future prospects in terms of sales, costs and profits, otherwise there is a danger that they will stagnate and be overtaken by competition.

AID TO MARKETING PLANNING

Forecasting can be described as the act of giving advance warning in time for beneficial action to be taken. The value and importance of advance information is a cornerstone of planning activity. Modern businesses are aware of sales forecasting and its overall purpose, but many managers do not pay due regard to its importance. Only in recent years has the value of forecasting become clear. This has resulted in the development of sophisticated forecasting techniques that can be applied directly to businesses.

To predict the future we must examine the past to observe trends over periods of time and establish the degree of probability with which these trends are likely to repeat themselves in the future. Forecasts cannot be totally exact; management must be aware of this, and decide on the degree of inexactitude that can be tolerated when planning the future.

Incorrect forecasting (or no forecasting) is at the base of many business failures. In a production-oriented environment goods might be sold on company reputation alone and forecasting is less important. In a more competitive environment sentiment does not apply, and firms that do not attempt to make an accurate forecast on which to base their future production and subsequent corporate planning find it difficult to survive.

When attempting to forecast we must ultimately forecast for a specific market segment at which the marketing effort is aimed. However, one can attempt a macro-forecast for, say, the world market for a particular commodity that the company produces, in the knowledge that the company's marketing effort will only include a portion of this. The skill lies in determining what percentage of that total potential market is likely to accrue to the company, given its anticipated marketing effort. It is here that management planning must determine the resources that must be apportioned to individual parts of the business to achieve the forecasted sales that the company anticipates.

Back to Your Roots

2008–9 was a difficult time for many marketers. Perhaps the most severe economic depression since the 1930s hit virtually every country in the world. As a result many companies' sales were severely depressed as customers cut back on their spending. Amongst some of the most severely hit markets were those for non-essential luxury products, hence in most countries sales of, for example, electrical products, cars, and holidays, were substantially down.

Another market badly hit was the personal care and beauty market. For example, many women cut back on their visits to the health centres and hairdressers. Surprisingly, marketers of some of the leading hair care brands forecast a large increase in sales for some of their products and expanded their marketing and production budgets accordingly. Were they crazy or just poor forecasters?

In June 2009 sales of Clairol's Root Touch-up home hair colouring products were 20 per cent up on the previous year as more and more women shifted from having their hair coloured by their hairdresser to doing it themselves at home.

Source: <http://web.ecohost.com>.

Forecasting occurs at different levels: internationally, nationally, by industry, etc., until we ultimately reach a specific product forecast. Normally a company does not have to produce general international or national forecasts on such matters as economic growth or inflation. These are provided by government and other agencies. Company forecasters take this information and adjust their individual forecasts in the light of these macro-level predictions. In some industries, forecasts for the industry are sometimes supplied in general terms by an agency such as a Manufacturers' Association. As Shahabuddin¹ shows, industries such as the automobile industry are particularly well supplied with this type of information for forecasting. Forecasts for the industry are termed market forecasts, as opposed to a sales forecast that pertains to an individual company. The method where company forecasts are derived from macro-data is termed **top-down forecasting**. Conversely, a company can forecast from its own data by extrapolating company sales. This is termed **bottom-up forecasting**.

Management planners are thus only interested in a forecast when it relates to the individual firm and specific products or services, because it is from there that they can prepare plans and budgets. It is this pragmatic level of forecasting in which we are interested; what makes the situation better is that management can now place more confidence in forecasts, because more sophisticated techniques are now available.

SHORT, MEDIUM AND LONG-TERM FORECASTING

Marketing and other managerial functions need these three types of forecasting horizon because each directly affects a different business function, and more importantly, medium and long-term forecasting are critical to the corporate planning process.

Short-term forecasts are usually made for tactical reasons that include production planning and control, short-term cash requirements and adjustments that need to be made for seasonal sales fluctuations. This latter factor can be very important for production, whereas the general trend may be of less consequence. Such forecasts are for periods of less than one year, with a normal range between one and three months.

Medium-term forecasts are made for minor strategic decisions in connection with the operation of the business. They are important in the area of business budgeting for the operating budget, and it is from this forecast that company budgets are built up. Incorrect forecasting can have serious implications for the rest of the organization, for if it turns out to be over-optimistic, the organization will be left with unsold stock and will have overspent on production. Money will be owed to the bank and other creditors, and stock may have to be sold at a loss to raise money to satisfy these creditors. Many bankruptcies among smaller firms can be ascribed to insufficient attention being paid to medium-term sales forecasting. This forecast is used for such matters as the staffing levels that are required to achieve expected sales, the amount of money to be spent on sales effort, and short-term capital requirements for such items as machines to be purchased to meet increased production. The time period for a medium-term forecast is normally one year.

Long-term forecasts are for major strategic decisions to be taken within an organization, and they very much relate to resource implications. They deal with general rather than specific items, and as shown by Raspin and Terjesen² rely more heavily in their computation upon such factors as government policy, social change and technological change. They are, therefore, concerned more with general trends, and in the light of these trends, attempt to predict sales over periods greater than two years. In some strategic, heavily capitalized industries, predictions might be needed for a decade or more. The problem is that for these lengths of time the forecast cannot be more than vague, and planners in retrospect blame the forecast when things go wrong (often for reasons completely outside the possible knowledge of the original forecaster) and forecasting thus receives criticism.

CORPORATE OBJECTIVES

A major reason for forecasting is to provide a basis for medium and long-range plans. Businesses must plan in order to achieve goals established on the basis of such forecasts, and these plans will affect various functional aspects of the business. At the base of such plans is long-term profitability, for without this the company may not be able to meet its future commitments in achieving the planned-for sales. Company planners will have to assess whether or not such potential sales can be achieved within the confines of the business as it stands and, if not, what resources will be needed in order to achieve these sales.

Medium-term forecasts are also used for business planning, but less so for strategic reasons. They are of particular importance for costing, and through the sales budget, for marketing management in controlling the marketing function while it goes about achieving the forecasted sales. With a reasonably accurate sales forecast such plans will be more realistic, and when they are put into action they have a better opportunity to work.

Management decisions within a manufacturing concern, together with such external changes as new technology, fashion and the cost of raw materials, affect the accurate prediction of future sales. It is the accuracy of this prediction that can single out the successful firm from the unsuccessful. In the current competitive climate there is little margin for error, and efficiency of operation is a major factor for success. Consequently, prediction of a change in demand is essential for continued prosperity. If a company is able to forecast a change in demand and the extent of that change, it can plan ahead to operate in the most efficient and profitable manner.

Managers are surrounded by a multitude of factors that can affect the future operation of the business. By using the best available forecasting method they can assess their present position and provide more accurate predictions for the future. Whatever circumstances surround the situation in which the manager makes a forecast there is one clearly defined objective, which is to profit eventually from this prediction in terms of revenue or knowledge.

Companies prepare for change by planning. This requires forecasts to be made, followed by an assessment of how these planning goals are to be reached. In practice, the sales forecast acts as the planning base upon which all internal forecasting and budgeting takes place. The effect of considering expected levels of sales in making such decisions is to reduce uncertainty and lower costs. Forecasting is thus central to the planning process and should not be used as a substitute for effective decision making, or management will simply tend to react to short-term fluctuations as they affect sales instead of developing long-term strategies. The company should first work out its selling plan, because this is really what is going to determine the level of sales. For example, a price reduction can be expected to influence a company's share of the total market, and such considerations should be noted by the sales forecaster. Consequently, the forecaster predicts what will happen for a set of decisions in a given set of circumstances, whereas planning states that by taking certain actions, the decision maker can alter subsequent events relating to a particular situation. Thus, if a forecast is made which predicts a fall in demand, management can prepare a plan to prevent sales from falling. The future is not immutable; if it was, there would be little strategic point in forecasting or planning.

The objective of the sales forecast is to predict a company's sales for some period in advance, and this can be done in one of two ways.

- 1 It can predict the company's sales directly from past sales data and from anticipated orders the company expects to receive (called a **sales forecast**).
- 2 It can forecast the total market and then determine the company's share of it (called a **market forecast**).

For many companies, the latter course is the most logical, because a company's future strategy will affect its market share and this strategy is directly linked to what is happening in the marketplace. Consideration must also be given to what competitors are doing, and in many cases sales action by one manufacturer will merely cancel out similar action by another.

It has been said that forecasting is often a fruitless adventure, but difficulties when forecasting should not be used as an excuse for inactivity. Forecasting is not a 'crystal ball' that enables the manager to foresee the future more clearly. It is an aid to more informed and better decision making.

FUNCTIONAL OBJECTIVES

Forecasts are needed for many different purposes, including production planning; ordering raw materials; ensuring a steady supply of trained personnel; controlling stocks or inventories; estimating short-term cash requirements, and a variety of other reasons. All these applications have different 'time horizons'. That is, the forecast is needed at different times before the event if it is to be of any practical value. The sales forecast is thus not merely used for planning marketing; it has company-wide applications.

It is marketing and sales personnel who should prepare the sales forecast. In fact according to Geiger and Guenzi,³ the sales force itself has a key role to play in sales forecasting. This point is made because in many companies, sales forecasting is left to the finance department, as they have an immediate need for the forecast for business budgeting purposes. When forecasts are left to finance in this manner it is an abrogation by marketing of its responsibilities. The reason is that finance personnel are not expected to be forecasting experts and they will simply take sales from earlier periods and do extrapolations from past data. Marketing, above all other functions in business, should be in the best position to ascertain potential sales, including downturns and upturns, of which accountants will be less aware, since they are much further removed from customers than the marketing department. Forecasting is a risky business, which is all the more reason why marketing should not abrogate its responsibilities in this regard.

We now consider the business functions that are most directly concerned with sales forecasts.

Production needs forecasts for each product line in order that manufacturing can be planned and scheduled on an orderly basis. Thus machines and manpower can be more effectively utilized. When the transport element of logistics is organized by production, it is helpful to have advance warning of bulky or awkward items that have to be packed and moved, particularly when overseas considerations are involved. In the longer term, production needs to make decisions on levels of plant operation in order to be able to meet production levels to achieve the planned-for sales. Production's main need will thus be for accurate short-term forecasts for production planning and control.

Human resource management (HRM) needs forecasts in order to be able to ascertain staffing levels in the future. It will then be able to recruit personnel to achieve the forecasted sales. There will be training implications for employees taken on to achieve an increase in sales, so the concern of HRM will be mainly in respect of the medium-term forecast, but the long-term forecast will be needed for formulating management succession plans.

Purchasing needs accurate forecasting so that raw materials and component requirements can be met on a timely basis. As the forecast will give the purchasing officer more time in which to purchase, rather than having to wait until the requisition is received from production, he or she may be in a position to purchase on a more favourable basis because of the increased lead time. The purchasing department can also operate more effective stock control for raw materials and part manufactured goods and work out optimum stock levels. The danger of overstocking, with the risk of deterioration and obsolescence, will be less, and because less stock will need to be carried, this will result in a saving on working capital. Better forecasting will also avoid the possibility of stock-outs resulting in disruption to the production programme. In general, the purchasing function will be more interested in short-term forecasts, although the medium-term forecast will be of value. Clearly the techniques

of JIT supply and lean manufacturing as discussed in Chapters 1 and 9 have altered the nature of the need for short-term forecasts in this regard.

Finance needs forecasts in the medium term to establish budgets based on the planned-for sales. Here, accuracy is important, because if the forecast is incorrect, then all the company budgets will be incorrect, with consequent overspending in the case of an optimistic forecast. Cash requirements to fund working capital need to be budgeted, and an incorrect forecast could mean that the company has to make a request to the bank for increased borrowing. Many bankruptcies are a result of a shortage of working capital, and better forecasting could, in many instances, have avoided such an event. Also, finance needs to engage in long-term profit planning and must predict income flow. It must make provision for long-term capital needs in terms of plant, machinery etc., and here the long-term forecast is of importance if the organization is to be ready to produce appropriate products in the correct quantities at the time these are needed.

Marketing should make the forecasts, and these are needed for the entire company as just illustrated. However, marketing also needs these forecasts in order to plan promotional campaigns and sales strategies to complement these campaigns. It needs the forecast in order that the correct types of sales and marketing personnel can be recruited and trained to achieve the planned-for sales. Remuneration plans will also need to be formulated, particularly when these are linked to sales targets or sales quotas, and these targets or quotas will be a reflection of the sales forecast broken down among individual sales personnel. When 'off-the-shelf' delivery is offered to customers, the sales forecast will help to determine maximum and minimum stock levels, and here an incorrect forecast will result in either stock-outs (and possible loss of custom) or overstocking (with a resultant drain on working capital). In the longer term, more precise goals can be set for members of the marketing channel, both in terms of the supply chain and the demand chain. Channel arrangements tend to be of a more stable, long-term nature, and if potential sales are predicted to be much higher in the long term, then new channel arrangements might be called for. Thus, marketing is in need of short, medium and long-term forecasts.

Research, Design and Development (R,D&D) requires technological forecasts. Marketing is the conduit through which changes in the marketplace can be relayed to the R,D&D department. Design features and new technology will affect company sales, and products need to be updated or changed at intervals. Marketing is in close touch with customers and should be aware of competitive offerings, so marketing is best placed to give advice in this respect. It might be that a particular product line is becoming obsolete, in which case R,D&D will need to plan and develop a new product or make modifications to an existing product in conjunction with marketing research. Only by doing this will an organization be able to keep ahead of, or pace with, its competitors and continue to produce products that are appropriate for the marketplace. Marketing, through the medium of marketing research, will liaise with R,D&D and from medium and long-term forecasts will co-ordinate new product developments and ultimately product launches.

With an accurate forecast, departments can plan more effectively with the reassurance that these action plans can be carried through and will not have to be modified, as they might be if the forecast was inaccurate. There is thus an interrelationship and interdependency between the plans and operations of each of the above functions, because they are all based on the sales forecast. If the original sales forecast proves to be incorrect, then it will affect each and every function within the business, because each department uses the sales forecast as its starting point. The importance of

an accurate and timely sales forecast cannot be overemphasized. What we must do is reduce the extent of the wrongness of the forecast, or at least provide guidelines as to the extent to which it might be incorrect.

SALES BUDGETS AND THEIR USES

Budgets, which are also discussed in Chapter 14, stem from the sales forecast, and the sales budget is the vehicle through which sales are generated. Thus the **sales budget** comes after the sales forecast, and this is a representation of each salesperson's sales broken down by product type, by customer type and by individual territory. The sales department budget then follows, together with other departmental budgets. Although we use the term 'sales department budget', its true description reflects more than purely selling. It includes forthcoming investment in promotion, such as different forms of advertising, displays, exhibitions, consumer and trade promotions, etc. It also includes investment in distribution, which includes distributive intermediaries and facilities such as warehousing and physical distribution of finished goods to customers. Additionally, it includes marketing research expenditure, selling expenditure and all the various costs that go into winning orders. For definition purposes, cost accountants subdivide the sales department budget into the selling expense budget, the advertising budget and the sales department administrative budget. These terms of course reflect production orientation, and better descriptions might ultimately be found for each of the subdivisions which reflect a more modern marketing orientation. However, accountants use these terms that are now universally accepted, so for these reasons they are included here.

A budget differs from a forecast in that it is a representation of what is planned to happen, whereas a forecast is concerned with what is expected to happen. The forecast is far more uncertain, because it is affected by extraneous factors, whereas the budget is to do with internal matters, and these can be controlled directly by the organization. The relationship is explained diagrammatically in Figure 11.1.

It has been explained that the budget is derived from the sales forecast, and business budgeting cannot commence until the forecast has been agreed. Budgeting requires detailed planning of all duties to be undertaken during the budget period (normally one year ahead). The total sales budget is divided among the individual product lines to be sold in terms of apportionment of expenditure on advertising, packaging, personal selling etc. The way the total sales budget is apportioned is, of course, a decision for marketing management.

It is important to ensure that the sales budget co-ordinates with other budgets in the organization. For instance, the sales budget should not plan to achieve more sales than production is budgeted to manufacture. Budgets must also be flexible to allow for changing conditions or unforeseen circumstances, and in some companies it might be necessary to prepare more than one budget as a contingency measure. Thus flexibility is important, because if during the budget period it seems as though another set of circumstances is likely to prevail, then the budget might need to be altered to cover such a contingency.

When actual expenditure differs from the budgeted expenditure, the departmental manager should explain the deviation. Cost accountants refer to each item of cost as a budget or cost venture,

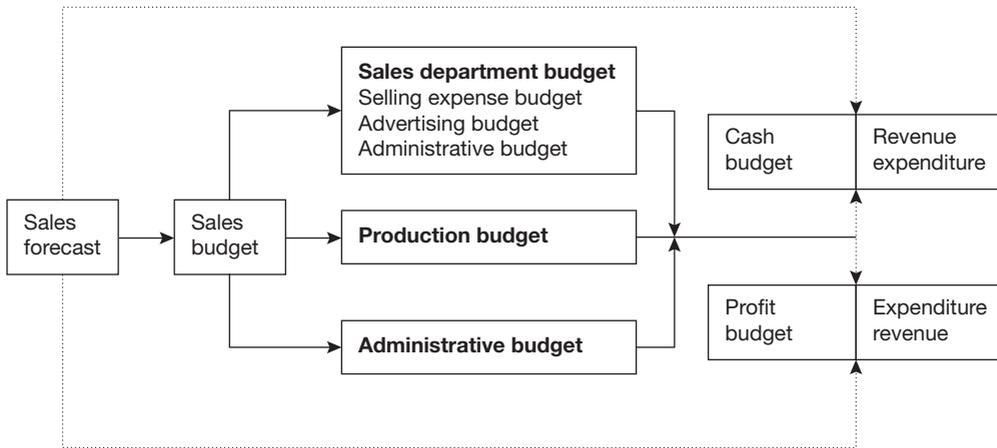


FIGURE 11.1 Sales budgetary procedure

and they describe these differences as ‘variances’. The term used to describe this process of control is ‘management by exception’, and the philosophy implies that only when events do not go as planned does an investigation need to be made. Budgeting is not merely a matter of planning; it is also used as a method of control. Furthermore, realistic evaluation cannot take place unless detailed plans have been agreed before the budget period.

In short, budgets provide a financial statement of the company’s plans and policies, and reflect the co-ordinated efforts of all departments (or cost centres) within the organization. The sales department budget is thus the marketing function’s share of the company budget and this, in turn, is broken down into constituent parts covering promotion, selling, administration etc., and then allocated between each product within the range of products.

NEED FOR PROFIT PLANNING AND ITS DERIVATION

Profits need to be planned on the premise that in a well run organization, they should grow. Actions within the company that can bring about such profit growth include: better working practices, provision of incentive schemes to bring about increased productivity, better computerization with resultant efficiency in the performance of clerical tasks, automation in the workplace, better stock control of raw materials, components and finished goods with resultant savings in working capital, standardization and variety reduction exercises to bring about a reduction in inventories, less obsolescence and better quality control, and many other cost saving exercises.

Sales forecasting must precede **profit planning** exercises, and it is emphasized that such forecasts should be as accurate as possible, for such efforts as those just described are time-consuming and costly in their implementation. To be meaningful, they should take place in the light of anticipated production and resultant sales, which is based on the forecast.

Companies need to plan in order to make provision for fixed and working capital expenditure. Such fixed capital expenditure plans are necessary because old assets deteriorate, new additional plant and buildings may be needed to accommodate increased production, and new production methods may become available, rendering the old plant and machinery obsolete. Similarly, working capital needs to be planned, and this means forecasting stock investment because sales can fluctuate on a cyclical basis or for economic or other reasons. As a result, raw materials, components and finished stock levels will fluctuate in accordance with demand. Working capital in terms of liquid cash assets must be planned to accommodate the value of stocks to be held plus the costs of holding such stock.

The sales forecast precedes all planning, and the need for fixed and working capital expenditure forecasts has just been outlined. Once this has been done, it is necessary to translate all of these statements showing how they will affect the finances of the business. This is called the **cash forecast**, which encapsulates the sales forecast and resulting business plans in terms of money. Preparation of the cash forecast is a specialized cost accounting activity, but it starts with the basic premise that profits should increase the amount of cash in the business. Therefore, a net profit figure is forecast, and from this is taken away corporation tax, increases in stock and work in progress, loans and overdrafts repaid, dividends and interest, increases in debtors, decreases in creditors, and expenditure on capital equipment. To the end figure must be added sales of assets, receipts from share or loan issues, decreases in stock and work-in-progress, depreciation, increases in creditors and decreases in debtors. The amount left at the end is profit, and how it is distributed is a decision for the board of directors. The fact is that a plan is needed in order that business management can organize its activities in a responsible manner and such planning, of necessity, stems from the sales forecast.

TECHNIQUES OF FORECASTING

There are two basic techniques:

- 1 **Objective methods** that are of a mathematical or statistical nature;
- 2 **Subjective methods** based on experience, judgement and intuition rather than on quantitative analysis.

The wide acceptance of objective techniques in recent years is primarily because objective methods have developed a record for accuracy and thus have inspired confidence in managers who use them as an aid to decision making. As we shall discuss in Chapter 12 the development of better forecasting software has greatly improved its accuracy. Subjective methods still rely largely on intuition, but the practice of objective forecasting is more advanced. Marketers recognize that the pace of change in the marketing environment, and the increased uncertainty which this gives rise to, is making the use of such intuitive techniques more appropriate.

The discussion that follows relates to specific practical and managerial problems that can be encountered when using such techniques.

Objective methods

Moving averages This method of time series analysis involves compilation of the arithmetic average of a number of previous consecutive points in a time series. It is best employed in a situation where an extrapolation of a trend that is gradually increasing or decreasing is present. It has a low cost with ease of manual computation. Problems occur in the choice of the number of points to average, and the effects of a non-typical item in the time series. Seasonality and cyclical trends can be catered for by the application of relevant indices, provided they are known.

The major disadvantage of this technique is that it is purely quantitative in its approach and thus extremely introspective. It does not take into consideration any salient factors in the environment that may affect future sales.

Exponential smoothing Using a moving average has the problem that it gives equal weight, or significance, to all the items in a time series. More recent points in a time series will represent the present situation more accurately than older items, and it is therefore, only logical to attach more significance to more recent items by using a weighting method. The different weight attached to an item in a time series can be calculated either simply by using an arithmetic progression or, more sophisticatedly, by using a geometric progression. When a geometric progression is used and a graph is drawn, raw sales data are smoothed into an exponential curve; hence the name 'exponential smoothing'. In the case where an arithmetic progression is used, this is simply known as a weighted moving average.

Exponential smoothing provides a forecast which is equal to the old one, plus or minus some proportion of the past forecasting error(s). There are many variations of exponential smoothing, ranging from the very simplistic to the more complex methods involving a greater number of data points and proportions of forecast errors. These techniques, because of their statistical nature, lend themselves particularly to purely quantitative data, thus neglecting other important market factors. A more realistic prediction is gained through the use of this technique than moving averages because it allows for new factors and influences that have emerged in the most recent sales period.

Trend projections By fitting a trend line to a mathematical equation it is possible to make forecasts about future sales using the equation. Figure 11.2 shows four typical growth curves that a firm may experience. The danger of using the trend approach alone is that when the analyst extrapolates, the assumption is that what affected sales in the past will continue to affect sales in the same way over future periods. An adequate number of past measurements or observations are also required for adequate statistical significance, but care must be taken not to include too many past observations or history will be too heavily weighted. Trend projections, like moving averages and exponential smoothing, are not ideal for short or medium-term forecasts. They are more fitting for predicting a 'broad sweep' trend over the long term.

The Box-Jenkins forecasting method is a special case of exponential smoothing in which the time series is fitted with an optimizing mathematical model that attributes minimal error to historical data. Once the model has been identified and constructed, the parameters must then be estimated.

Of the available statistical routines, this is one of the most accurate and flexible in that it can cope with almost any type of data pattern. However, accuracy involves complexity, which, along with flexibility, results in a relatively high cost and the need for a skilful operator with plenty of time to reap the full benefits of this technique. As this method's accuracy is limited to the short

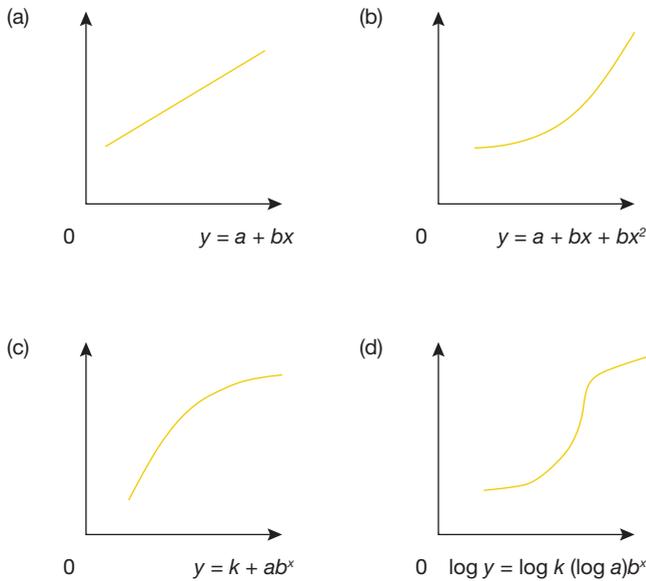


FIGURE 11.2 Company growth curves

term it is not very often used in practice, as there are many other cheaper and easier techniques that can be employed, and although they do not give as much accuracy, these are often adequate for short-term decisions.

Spectral analysis Incorporated in the classification of spectral analysis is the technique of Fourier analysis, where a time series is mathematically decomposed into its constituent sine wave forms. Thus, from one time series, a spectrum of time series are produced having the name 'power spectrum'. The mathematical complexities of this method put it beyond the use of all but the most competent analyst, whose skill and understanding of the technique are imperative for its successful implementation.

X-11 technique is similar to spectral analysis in that it decomposes the original time series into a spectrum of time series. However, it only separates out the seasonal and cyclical trends, and then fits a time series to the remainder. It takes the best of spectral analysis and Box-Jenkins and combines them in one technique. Used by a skilled analyst, it rates as one of the most effective short to medium-term forecasting methods, with its ability to identify turning points being a major asset.

Causal methods are still objective techniques, but they all involve some degree of subjectivity. One of the best known causal methods is that of **regression analysis**, which attempts to assess the relationship between at least two variables: one (or more) independent and one dependent, the purpose being to predict the value of the dependent variable from the specific value of the independent variable. The basis of this prediction generally is historical data. This method starts from the assumption that a basic relationship exists between two variables, and the least squares method of estimation is used to formulate the mathematical relationship which exists. Various forms of regression analysis exist, one being multiple regression analysis, where any number of variables

can be considered at one time. Another form is stepwise regression analysis, where only one independent variable is considered at one time. The value of this technique is difficult to assess other than in individual cases, as the accuracy is dependent upon the degree to which the independent variables explain characteristics of the dependent variable. This relationship may vary considerably, but improved computing techniques have meant that the value of regression analysis is increased dramatically on a cost/benefit basis.

Through techniques such as regression analysis, the Newspaper Society has established clear links between their different life stage categories with levels of demand for a range of products. Unsurprisingly, Mothercare shoppers are almost four times more likely to have pre-school-aged children than the national average.

Econometric models are an extension of the regression technique whereby a system of independent regression equations is evolved. These equations describe a particular sector of economic activity whose parameters are usually estimated simultaneously. Generally, these models are relatively expensive to develop, the precise cost being dependent on the amount of detail incorporated in the model. However, the inherent systems of equations in such models express the causalities involved far better than an ordinary regression equation, and thus will predict turning points more accurately.

Input-output models are particularly applicable in the field of industrial marketing since they are concerned with inter-industry or interdepartmental flows of goods or services in a company and its markets. The technique is based on the theory that the output of one industry comprises the basic inputs of products and materials of another, thereby providing an inter-industry/interdepartmental flow of goods and services within the economy/industry. Major inputs required for this type of model are not in the operation of the model, but in the collection and presentation of data. This is because tables and government statistics showing the extent to which one industry obtains its basic inputs from another are very broadly defined in standard industrial classifications.

The cost of these models in producing a sales forecast, especially when they are combined with econometric models to produce economic input-output models, is often high but as Lackman⁴ shows this should be offset against the relatively high accuracy produced by these more sophisticated models.

Diffusion indexes use the many economic indicators available that represent general economic activity, or the activity within a particular industry or product class. By formulating an index based on a certain combination of these indices, an indication of future trends can be compiled. The accuracy and applicability of the index can be tailored to fit specific requirements, such as predicting turning points in the short term by choosing appropriate economic indicators. A forecasting technique of this nature can be accurate and relatively economical to apply in certain industries and product classes.

Tied indicators are used where the sales of one product are closely related to sales of another product and the sales trend of one product precedes that of the other. The preceding product is the indicator, and in the case of leading indicator models, the sales of more than one product may be utilized along with indicators of general economic activity. The leading indicators generally increase or decrease prior to the pending increase or decrease in the dependent variable, and they usually take the form of a time series of economic activity. As a forecasting method the real value of this type of model is its ability to predict turning points rather than as a predictor of future trends in general.

Life cycle analysis is particularly applicable where there is no historical data. Sales of similar products are analysed over time and usually a particular 'S' curve (see Figure 11.2 (d)) is found to apply for a certain product class. The phases of product acceptance by various groups i.e. innovators, early adopters, early majority, late majority and laggards are essential to the analysis (see Chapter 4, Figure 4.12, Roger's 'Diffusion of innovations'). Consideration of the concepts of life cycle analysis by individuals is often more valuable than a thorough detailed expert analysis, as the database for this type of model is conceptually weak. A manager can readily appreciate that the product has to pass through the various stages in its life cycle and subjective opinion might even be as accurate as any expert analysis.

Subjective methods

Market research involves studying a representative sample of a market involving a systematic formal procedure for evolving and testing hypotheses about a market. For any valid information to be obtained, two reports should be made over a period of time so one can be compared with the other and conclusions drawn. This necessitates the collection of market data from questionnaires, surveys, published statistics, marketing intelligence reports and time series analyses of market variables. Due to the relatively high cost of this technique, it is only used in cases where there is a considerable financial risk, which generally means it is restricted to large companies. The major application of this technique for sales forecasting is in the area of predicting new product sales by investigating consumer reaction to a new product concept or prototype. A variety of market research techniques are available for this purpose, and these are discussed in Chapter 12.

The **Delphi method** is a technique that involves the marshalling of expert opinion to cope with the problems of eradicating the 'bandwagon effect' of majority opinion. Its workings and implications have already been discussed in Chapter 4.

Panel consensus is not unlike the Delphi method, except that the panel of experts are encouraged to communicate and discuss matters in relation to the future prospects of what is to be predicted. Developed primarily for long-term forecasting, this method is rarely used due to the problems of personal and social bias influencing the members of the panel. Methods of this nature often do not arrive at a true consensus of opinion because of the effects of such bias.

Experts are not infallible. Predictions regarding the growth in access to the Internet in the UK proved to be too conservative. Growth rates in the diffusion of this technology into UK households have been much higher than the experts predicted.

Visionary forecast is where 'visionary' forecasters or 'futurologists' attempt to prophesy through personal opinion and judgements. The method is characterized by subjective guesswork and imagination, and in the method is non-scientific. A set of possible scenarios about the future is prepared by a few experts in the light of past events. At one time, visionary forecasts were felt to be too subjective to be used in marketing decision making. However, as mentioned earlier, the pace of change and dynamic nature of the marketing environment have begun to make companies appreciate some of the advantages of visionary forecasts even though they may sometimes be wrong.

Many believe that at least in part the success of Microsoft in being ahead of its competitors in many areas is down to visionary forecasts. The company has a system whereby senior managers are encouraged to think about the future in the widest possible sense, including, for example, social

trends and developments, and how these developments, might potentially open up new opportunities for Microsoft for future product development.

Historical analogy is a comparative analysis of the introduction and growth of similar new products, and this bases the forecast on similarity patterns. By comparing a new product with a similar previous new product, forecasts of future sales performance can be made. This technique, however, is conceptually weak, as a true new product will not be similar to any previous product, and even a new version of a product will probably not be similar enough to make any comparison really valid.

Sales force opinion is where members of a sales force are in constant contact with customers, and are in a position to predict their buying plans, attitudes and needs. An obstacle to gaining true estimates is that salespeople often tend to be pessimistic, owing to their compensation system. It is common practice for salespeople to be remunerated according to the degree to which they attain sales quotas which, in turn, are based on sales forecasts. Thus it is in their own interest to underestimate future sales, resulting in low quotas and possibilities of high compensation. However, Jobber and Lancaster⁵ provided evidence that being involved in the sales forecasting and hence quota setting process can actually increase salesforce motivation, therefore making the achievement of agreed sales quotas more likely. This method has the advantage of being relatively cheap and easy to introduce and administer through the existing sales organization.

APPROPRIATENESS OF TECHNIQUE CHOSEN

There can be no general conclusion drawn as to which is the best forecasting technique to employ, but it is certainly true that a forecast should consider both objective and subjective aspects. The analyst can only consider what is required, and with the resources that are available, try to match them against a method that will provide the best result.

The techniques considered cover a range of objective and subjective, quantitative and qualitative techniques that require various resources and data for their employment. It is the situation, within various constraints, that should determine the method to be used for forecasting, not external constraints of cost, simplicity and personal preferences.

MEASURES OF VALUE OR VOLUME?

In theory, a manager should use sales forecasting where the benefit is greater than the effort needed to generate the forecast. The problem of measuring the effectiveness of a forecast is a major obstacle. A manager can accurately cost the use of a forecasting technique in terms of current time and money, but not the benefits that could possibly be enjoyed in the future by having a more accurate forecast.

One of the problems the analyst has to face when preparing a sales forecast for a product or product group is what units should be the units of measurement for future sales? Even if a total market prediction is undertaken, the forecaster still has to determine what units to use for the forecast. In most commercial situations this results in a choice between value and volume, dependent upon whichever is the most consistent over time and likely to provide the most accurate measure of future sales, assuming data are available in both forms.

Volume measures are likely to be confusing where the product mix is not homogeneous, e.g. two products may have similar physical characteristics that classify each of them as one single unit, but they may have widely differing sales values. A volume measure may state a market of so many units, but the value of this market could vary to a large extent as the value of the constituent units is not precisely known. However, volume forecasts have the advantage of not being affected by inflation or deflation because once a physical unit is defined it is not affected by external factors.

On the other hand, value predictions can be adjusted for variations in the buying power of a currency, but the application of many of the available inflation/deflation indices is not representative of the same fluctuation experienced by the product. Indices are invariably computed on the basis of price changes and reflect only one aspect of inflation/deflation, neglecting to compare the product with other products. The consumer can be regarded as having a disposable income for which many companies compete by means of their products, and a consumer's choice of product is a function of that consumer's perception of the worth of that product in relation to other products. A price increase index does not reflect the inflation/deflation experienced by a product in relation to other products.

IMPORTANCE OF ACCURATE FORECASTS

Should actual sales fall short of, or exceed, forecasted sales, management must investigate the reasons for the difference, and from their inquiries determine whether or not it is necessary to adjust the sales forecasting technique. Thus sales forecasting is a continuous process. The changing nature of the economic and physical environment means that forecasts should be under continuous scrutiny and revision. Every projection can be improved, and in competitive situations even fractional increases in accuracy can be translated into higher profits.

It has already been said that all sales forecasts are wrong; they only differ in the extent of their wrongness. Perfection is unattainable, and the organization must decide what level of accuracy is required within pre-determined time and cost constraints. Management must fix the level of inaccuracy that can be tolerated, and this will allow it to compare cost with value when selecting the appropriate technique.

An illustration of how this notion of comparing the costs of different techniques of forecasting can be traded off against their degree of accuracy in order to arrive at the best-value techniques is illustrated in Figure 11.3.

THE SALES FORECASTING SYSTEM

Sales forecasting involves the determination of the expected levels of sales in the future, based on past and present sales data, the intentions of management and environmental influences upon the enterprise. The forecasting of sales can be regarded as a system having inputs, a process and an output. This may be a simplistic viewpoint, but it serves as a useful tool for the analysis of the true worth of sales forecasting as an aid to management, and is illustrated in Figure 11.4.

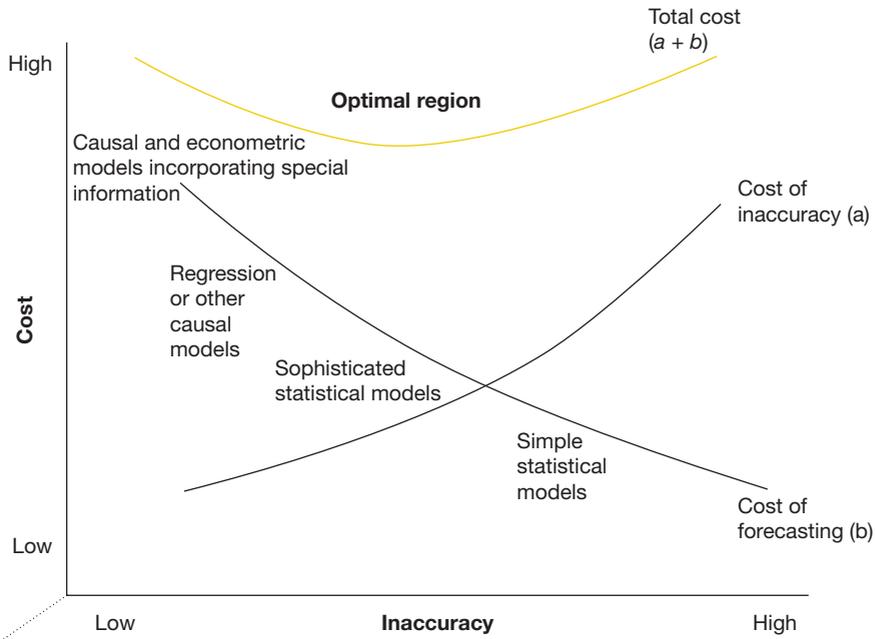


FIGURE 11.3 The cost/sophistication trade-off

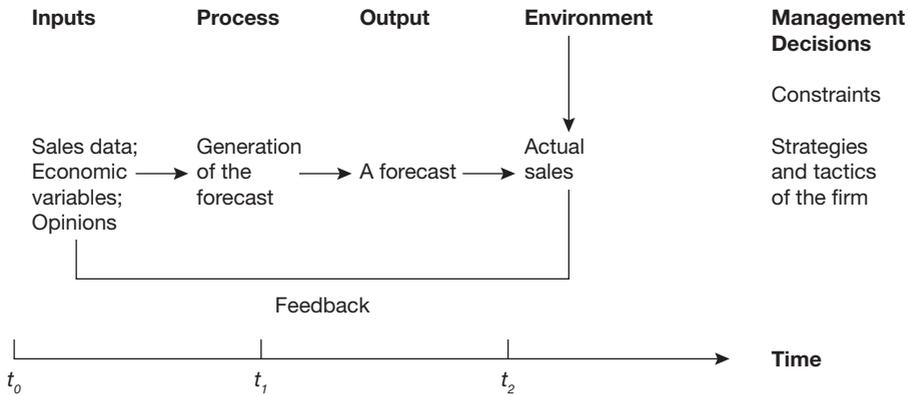


FIGURE 11.4 The sales forecasting system

THE TIME FACTOR

It could be said that the main concern of forecasting is the elimination of the phenomenon of time, in that it attempts to negate the effects of time by the logical and probabilistic determination of future events. To appreciate this, you only have to consider the effect time has on the validity of inputs to a forecasting technique. In Figure 11.4, at time t_0 all the inputs may be correct, but by time t_1 , when they are collated, some may well have varied to reflect changing situations, yet this is not shown in the inputs to the forecasting process. Certainly by time t_2 (the lead time) the inputs could be totally inaccurate due to changes in the market and this is without considering the changes that may occur in the projection time of a forecast.

Although the analyst may strive to reduce the lead time for a forecast to a minimum in order to ensure that the output is based on the most recently available data, any forthcoming changes in the inputs will ultimately occur in the projection time. As forecasting should be a continuous process, analysts should constantly be updating the inputs to reflect any changes and produce revised forecasts. It is thus the job of the analyst to reduce lead time to an optimum point where a forecast is based on the latest data without sacrificing accuracy, or involving disproportionate costs for the value of the prediction obtained. On the whole, quantitative methods lend themselves to economical revision far more readily than qualitative techniques owing to the nature of the data involved and the cost of generating and processing them.

A common fallacy is that forecasting is an activity that takes place at periodic intervals, such as once a year, and ceases entirely between these intervals. In fact, in order to reflect changes in the environment and internal structure of the firm, forecasts should be continually evaluated and revised to maintain their credibility. Such factors as price alterations by competitors, government legislation, technological breakthroughs, changes in the organization's own advertising strategy and alterations of any one of the factors in the marketing mix which has not been previously foreseen can substantially alter sales.

Sometimes a forecast can be rendered totally wrong by completely unforeseen events which would have been impossible to forecast using any method. During the fuel crisis in the UK in the early weeks of September 2000, panic buying caused sales of some products to increase by up to 75 per cent over a three-day period. Few of the companies affected by this could have forecast such a dramatic increase in short-term sales.

The importance of the feedback loop cannot be overemphasized. For the ongoing forecasting process, the feedback loop constitutes a major input to the forecasting process, as can be seen by considering the value attached to error analysis in many quantitative methods. In the case of qualitative techniques, significant weight is attached to any variance between what was forecast and what actually occurred, and the related reasons. Future forecasts thus attach considerable significance to the reasons for past performance and try to incorporate these in any new forecast. The feedback loop is the control on the process.

SUMMARY

Forecasting is of utmost importance to business as it is the precursor to all planning activities and lies at the base of corporate strategic planning. The strategic plan determines how the company will go about achieving its share of the total forecasted sales. Thus sales forecasting and strategic planning are interlinked.

Sales forecasting does, however, have three principal dimensions, short-term (about three months), medium-term (normally one year) and long-term (usually two years minimum and a lot longer in some industries). Each of these dimensions is for specific tactical (normally short or medium-term) or strategic (normally medium or long-term) purposes.

Once the sales forecast and the strategic plan have been agreed, business budgeting can take place and the sales budget is the medium through which sales are generated.

Forecasting therefore lies at the base of all company planning. It is of paramount importance that this forecast is the best that can be produced within the resource constraints of the company, for if the sales forecast is incorrect in the first place, then the whole planning exercise for the organization will have been in vain.

KEY TERMS

Top-down forecasting	351	Spectral analysis	360
Bottom-up forecasting	351	X-11 technique	360
Short-term forecast	352	Causal methods	360
Medium-term forecast	352	Regression analysis	360
Long-term forecast	352	Econometric models	361
Sales forecast	353	Input-output models	361
Market forecast	353	Diffusion index	361
Sales budget	356	Tied indicators	361
Profit planning	357	Life cycle analysis	362
Cash forecast	358	Market research (forecasting)	362
Objective methods	358	Delphi method	362
Subjective methods	358	Panel consensus	362
Moving averages	359	Visionary forecast	362
Exponential smoothing	359	Historical analogy	363
Trend projections	359	Sales force opinion	363

CASE STUDY

Scalar Products

Sonia Miller cannot believe what she has just heard. Having joined Scalar Products as a Market Analyst and Planner she has just been informed that the company has no sales forecasting system and Finance simply examine previous sales when doing next year's estimated sales for budgeting purposes. She cannot understand how the company has managed to operate effectively without one.

Her marketing manager, however, a very competent technical engineer who has over the years moved through sales and into marketing in the company, believes that all

forecasts are simply a waste of time. His view is that what is going to happen will happen and no amount of forecasting will affect this. Moreover, he has pointed out that in his experience forecasts are usually wrong and so it is better to do without them. Although Sonia has already pleaded her case regarding the need for and uses of sales forecasts, her manager is adamant that she should spend her time on other 'more useful activities'. Sonia, however, feels that she cannot effectively do her job with regard to helping prepare marketing plans without an effective system of sales forecasting.

CASE STUDY QUESTION

How can Sonia persuade her manager that sales forecasts are not only useful, but essential, in the marketing planning process? What should she advise her manager in relation to the types of forecasts and forecasting techniques might be useful in any newly established system of forecasting?

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